Creating original knowledge in and for the workplace: evidence from a practitioner doctorate

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Abstract

The workplace is becoming acknowledged, if not without some contention, as a site of knowledge-production that can have equal validity with academic and other research-oriented contexts. One way of investigating practice-based knowledge generation is through doctoral work that is based on research and development in the workplace. Examination of a selection of outputs from a doctorate geared specifically to work-based candidates confirms the workplace as a site of valid knowledge-production, and also indicates that real-life projects concerned with development and change rather than explicitly with research can, if pursued with intellectual rigour and critical reflection, be a powerful source of new knowledge.

Keywords: workplace knowledge; knowledge production; work-based learning; doctorate.

Introduction

Over the last thirty years or so there has been gradual acknowledgement of the role of the workplace as a site for learning that can have academic as well as practical validity (for instance Adams *et al* 1991, Boud 2001). A slightly slower realisation has taken place that it can give rise to new knowledge that has value beyond short-term and local applications and can be of equal significance to (and not simply an applied version of) knowledge produced through academic research. The idea of original knowledge being generated from 'everyday' workplaces – as opposed to those that have a research or research-and-development function – is still contentious. The emergence in some universities of what can be termed 'practitioner doctorates' (Lester 2004) is however a tacit recognition of this kind of knowledge-production, and due to the public nature of doctoral outputs it also provides a readily-available source of material for examining how it occurs and how the knowledge is used and where appropriate disseminated.

Knowledge production in the workplace

A conventional educational view of workplace knowledge is typically to see it as located in and restricted by (if not always to) the context in which it is produced, as in Bernstein's conception of everyday or 'horizontal' knowledge (e.g. Bernstein 1990). This viewpoint does not seek to trivialise its value, but suggests that there is a break between workplace knowledge which is of a vernacular,

contextual nature, and academic or curricular knowledge that is transcendent and doesn't depend on experience (Young 2003). A common way of representing this difference is in a hierarchy between pure, applied and contextual knowledge, with traditionally only the first two being viewed as the territory of (respectively) academic and vocational education.

This view of knowledge has been challenged and recontextualised in recent years from a number of directions, two of which are particularly relevant to the subject of this paper. One, now a guiding principle in some professions, emphasises the role of practitioners in constructing and reinterpreting knowledge in work settings through reflection, observation and practical experimentation. This is reflected most notably by Donald Schön in his work on reflective practice (Schön 1987), but it is also present in professional applications of action research (e.g. Carr & Kemmis 1986), action learning (Revans 1980), and appreciative enquiry (Cooperrider & Srivastva 1987). None of these approaches however – other when interpreted in an extreme form – suggest that contextual knowledge is a *replacement* for the more formally-acquired kind, but they demonstrate both the necessity of reflective, situationally-derived knowledge for working successfully in complex contexts, and the ability of insights from practice to add to, refine and critique more general academically-based and formal procedural knowledge.

The other direction from which the primacy of academic knowledge has been challenged has been the recognition that substantial knowledge-production, including in scientific and technological fields, now takes place in commercial and similar settings outside of the pure research environment, and is validated as much by reference to fitness *for* and *of* purpose (simplistically, stakeholder and social, environmental or ethical criteria) as by claims to truth as judged through academic peer-review. This is what Gibbons *et al* (1994) term a move from Mode 1 (disciplinary) to Mode 2 (transdisciplinary) knowledge-production. While their argument is concerned principally with macro-issues in the organisation of research, they also have direct relevance to the way that knowledge is generated in day-to-day settings including by individual practitioners. Mode 2 knowledge emerges in response to a context-based issue, synthesises across and beyond disciplinary knowledges and perspectives, and is produced through methods that are reflexive and embedded in particular contexts and standpoints. It can be uncodified and individual in nature (Eraut 2009), but it is often formalised within the community involved in producing it, and it may find its way into the codified knowledge of professions, industries and sometimes academic disciplines.

Both of these newer but largely binary perspectives are drawn on in the model put forward by Scott *et al* (2004), in which four kinds of knowledge are distinguished: disciplinary, technical-rational, transdisciplinary or dispositional, and critical. Scott *et al*'s model was developed to describe the approaches taken in professional doctorates, and while it has been particularly useful in providing a language to discuss educational curricula it also has relevance to the way knowledge is generated more broadly in the workplace. Briefly, their categories are:

- Disciplinary knowledge, concerned with discrete disciplines that have their own epistemologies and methodologies and don't depend on practical contextualisation; the principal mode of organising knowledge in academic communities.

- Technical-rational knowledge, concerned with performance, procedures, and 'right' or accepted ways of approaching and solving problems; the knowledge-bases of professions and the formalised knowledge of organisations are predominantly of this type.

- Transdisciplinary or dispositional knowledge, concerned with adequacy for complex practical situations that resist analysis and routinisation; this kind of knowledge is reflected in expert practice and is essentially non-predictable, non-deterministic and not easily amenable to being codified.

- Critical knowledge, concerned with challenging existing assumptions, practices and power relationships; it typically emerges from dissonance between experience and other knowledge-claims, and may be individual or shared by a group.

Scott *et al*'s model is non-hierarchical and recognises the validity of different kinds of knowledge for different purposes. From a workplace perspective, this suggests that more than one type of claim to knowledge can be made which is valid even at doctoral level. While Scott and his colleagues examined the design principles underpinning various doctoral programmes, there is also scope to use their model to consider the kind of insights individual doctoral candidates (and by extension other knowledge workers) generate in the workplace.

The 'practitioner doctorate'

The doctorate, generally the highest level of qualification awarded by universities, is widely associated with the production of new or original knowledge as can be evidenced from almost any university's regulations for its award. In Mode 1 contexts this normally means undertaking research to increase current understanding within an academic discipline, or in more applied versions within a technical-rational knowledge-base – typically the knowledge considered to belong to a profession or an industry. This type of knowledge-production is a feature of traditional forms of the PhD as well as many profession-specific doctorates such as the DPsychol (psychology) and EngD (engineering). Maxwell (2003), referring to professional doctorates but using a typology that could equally be applied to PhDs, regards this function as that of a 'first-generation' doctorate, where the doctoral candidate defines (or is given) a problem to be researched that represents a gap in the academic or professional literature, investigating it as a detached and impartial observer. While there are established traditions of doctoral research particularly in the arts and social sciences that don't conform to all the features of this model, professionally-oriented doctorates that move beyond an essentially Mode 1 approach are more recent: they include PhDs based on action research (Levin & Greenwood 2002) and action learning (Zuber-Skerritt 2006) as well as what Maxwell (2003) terms second-generation professional doctorates. These programmes can broadly be characterised by what can be termed practitioner research (Fox, Martin & Green 2007), where candidates investigate issues and concerns in their own workplaces as involved participants with a stake in the outcomes.

Beyond this second-generation model, the idea of a practitioner doctorate (Lester 2004), work-based doctorate (Boud & Tennant 2006), or third-generation doctorate (Stephenson, Malloch & Cairns 2006) has been posited in which the focus can be described as 'practice *as* research.' This means that the original contribution of the doctoral work is produced through practice itself rather than through an activity that is necessarily separated off as 'research.' Conceptually this model favours Scott *et al's*

transdisciplinary notion of knowledge, and practically it is often concerned either with finding solutions to 'wicked problems' (Rittel & Webber 1986) in the workplace, or alternatively with synthesising across practice to produce practical wisdom and new insights that are typically associated with the 'swamp' (Schön 1987) of real-life practice rather than the 'hard, high ground' (*ibid*) of the technical-rational ideal. While the idea of original knowledge is epistemologically problematic in a transdisciplinary model, there is generally an assumption that even where the doctoral output is primarily concerned with action in context it must also have something new and valid to say (or demonstrate) to the wider world.

The study reported here uses as its research material the outputs of one such practitioner or work-based doctorate. This programme was established in the United Kingdom in 1998 as a logical extension to a transdisciplinary, learner-negotiated model of work-based learning that had evolved in the university over the preceding decade (Portwood & Thorne 2000). Its essential features are that it is not profession- or career-specific, it aims to support experienced practitioners to take a researching and critically reflective approach to complex practice issues, and it recognises that most candidates will have extensive expertise in their particular fields. Outputs from the programme can range from fairly conventional investigations focused on an area of professional concern, through to projects that create new developments or produce substantial change. The doctoral programme itself avoids advocating particular methodological choices, although candidates take a methodological course in which *inter alia* the ideas of paradigms, personal standpoints and the nature of insider- and practitioner research are discussed (see for instance Costley & Armsby 2007). Recognising the level of expertise and experience of some candidates a facility was introduced in 2007 to achieve the doctorate by 'public works,' corresponding to the more familiar academic publication route. Public works can take forms other than published works, so they could be for instance artistic or creative outputs, designs, products, software, or organisational or other systems for which tangible evidence exists, accompanied by a critical commentary.

Examining doctoral outputs

The study described here took place in late 2009 and involved documentary examination of doctoral outputs. I examined a total of 33 theses[1] held by the university, the majority of which are available on its web site (http://eprints.mdx.ac.uk/view/divisions/work=5Fbased=5Flearning.type.html, last accessed 23rd August 2010). The choice of theses was initially pragmatic based on their availability in digital form, with additional hard-copy theses being selected to include representation from the earlier years of the doctoral programme. No other pre-selection was undertaken. The thesis submission dates spanned the period 2000-2009, with two-thirds coming from 2005-2009. Geographically, 17 referred to work located in the United Kingdom, four to Cyprus, three Greece, two South Africa, and one each Australia, the Caribbean (a transnational project), Hong Kong, Iran, Ireland, Sweden, and the USA. Twenty candidates were male and 13 female. One thesis was a joint submission by two candidates and two were 'public works' submissions as described above, involving syntheses of previous written work with accompanying narratives.

In terms of the project (rather than the main profession of the candidate), seven doctorates were located in education and training contexts, six in business and management, six in health and social

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[1] 'Thesis' is used here to refer to the written output, 'project' to the undertaking(s) giving rise to the written work.

care, three in culture and tourism, three in religious ministry, two in financial services and the remaining six in shipping, food processing, veterinary medicine, dispute resolution, political analysis and information technology. Projects were concerned with education, training or extension (nine), professionalisation (five), evaluating and improving service provision (five), improving communication and advice (four), organisational development (three), coaching (three) and single examples with safety, general management, information systems, and process engineering.

My object in reading the theses was to establish what the project was about and the context in which it was located; the kind of knowledge being produced; the approaches or methodologies employed; how the knowledge was used and to whom it was disseminated; and to whom it can be regarded as original and significant. Initially these objectives were turned into fairly loose questions which were applied after reading the first text in depth. I repeated this process with the next four theses, then attempted some emerging categories and classifications. These were applied to a further five examples, after which they were adjusted to provide a more structured interrogation tool enabling quicker assessment of less problematic categories along with free-text inputs. After exhausting the electronic-format outputs, I interrogated a further eleven hard-copy theses using the final versions of the categories. The resulting data were analysed quantitatively using a simple spreadsheet, and qualitatively to identify themes emerging within and between categories.

Findings

The theses were varied in approach, with at one end of a spectrum fairly conventional research projects that addressed a topic of relevance to the candidate's area of work and most of which would fit with a fairly conventional PhD format, to at the other projects that were concerned directly with development and change while also producing insights of value beyond their specific contexts.

The more conventional research projects made up just over a quarter of the sample (nine theses). Two illustrative examples are summarised in table 1. These projects arose out of matters that candidates were currently engaged with or interested in, ranging from critical issues that the practitioner had substantial ownership for (as with the two examples given) to areas where there was a general desire to inform others, stake out a claim to expertise, or influence policy. A variety of quantitative and qualitative methodologies were employed, with in most cases straightforward research techniques being used such as surveys, interviews and focus groups. The type of knowledge being produced can be described largely as knowledge of a phenomenon such as attitudes to safety regulations (project 3) or delinquency (project 14), with some projects producing a certain amount of knowledge of a system or set of practices (project 3 does this in examining how the regulations in question were being implemented). In Scott *et al's* terms projects were producing predominantly technical-rational and to an extent disciplinary knowledge; while some (project 3 is a good example) also resulted in a certain amount of transdisciplinary knowledge, this was generally secondary. These projects were largely used to make recommendations or inform actions and policies, although (with a few exceptions, one being project 3) there was rarely evidence of the recommendations being implemented within the projects' lifespan. While the examples illustrated are exceptions, on balance this group of projects was the weakest in terms of engagement with practical issues and also, more surprisingly, in terms of academic output: none had resulted in academic publications at the time the thesis was submitted.

Table 1. Doctoral projects: researching for practice

[3]: implementing an international safety agreement

The candidate is a director of a marine insurance company and an acknowledged authority on safety at sea. His doctoral project came about as a result of his concerns that uptake of a major international safety code was not progressing as well as it should have been and decisions about its implementation were being based on conjecture rather than evidence.

The candidate started his project by reviewing existing data and commentaries and reflecting on his own experience in relation to the Code. He then set up and managed a large-scale survey to gather information and reactions from mariners, shipowners and other relevant stakeholders. The research was the first comprehensive study of the Code's implementation. Disseminated in book form and through numerous presentations, conferences and short articles within the maritime sector, it has provided evidence on which organisations throughout the world are now basing their decision-making.

[14]: researching delinquency in school-age children

The candidate is an educational psychologist. She is interested in delinquency among girls of secondary school age and its potential links to psychological factors and ethnicity, an area that is problematic in the region she is responsible for and currently under-researched.

Her project researches delinquency using a mix of quantitative and qualitative methods including standard inventories, self-reporting questionnaires, focus groups and participant observation. The findings are used to produce recommendations for the national education department, educational psychologists and schools, as well as for the education of teachers and educational researchers.

A second and equally fairly distinct group of projects (ten theses, 30% of the sample) were concerned directly with development and change.   These are illustrated by projects 1 and 18 in table 2. In these projects the primary focus is the practical output (e.g. a professional qualifying process, an evaluation model, a change in organisational culture and working practices, a software product), with the identification of knowledge and insights for wider dissemination being secondary to this aim. For most candidates in this group the project was something that they would need to do anyway as part of their work, formalised and in most instances further developed intellectually to fit the doctoral framework. Methodologically most of the projects unsurprisingly followed an action-based model, with action research and soft systems approaches predominating; all but one were qualitatively oriented, and several were methodologically fairly sophisticated with approaches being adapted, combined and moulded to work within the practice situation. Knowledge production focused on knowledge of a system or set of practices, with knowledge of phenomena secondary. Using Scott *et al's* typology the projects were deeply rooted in transdisciplinary modes of production, with insights emerging from the practice context being used directly to inform action; however, in most projects this knowledge was also at least partly formalised to contribute to the stock of knowledge of a professional or academic field, and in two cases there was substantial development of critical knowledge through engagement between the systems knowledge generated from the project and existing policy assumptions, professional know-how and academic literature.

As a group, these practice-based projects were the most diverse in terms of the extent to which the insights they generated were formalised and disseminated outside the project context. Several gave

rise to multiple academic and professional papers and one produced, of all the theses in the sample, the largest academic output; these provided ample illustration of how insights from practice can, through engaging with published and other public-domain knowledge, theories and claims, add to knowledge at a more general level. Conversely a minority of projects in this group lacked any significant theorisation and dissemination beyond the immediate practice context, and remained firmly located within a purely transdisciplinary, horizontal mode of production; however, it could be argued that they add to the stock of knowledge and intellectual capital of an organisation or local community of practice (Garnett 2001).

Table 2. Doctoral projects: practice as research

[1]: developing a profession

The candidate is a consultant in professional development who was commissioned by a practitioner community to develop a robust qualifying process and help them work towards forming a professional institute. The project focused on developing the communities' practising standards and qualifying processes through a series of cycles informed by action research and soft systems methodology. The first cycle was concerned with designing and trialling the standards and processes, the second with practical implementation and review, and the third with a wider and more conceptually-based review.

The project has provided a platform for the community to establish itself as a credible profession represented by an authoritative institute. The candidate also disseminated the project through a series of academic and professional journal articles, using it to engage with current issues and debates in the fields of qualifications, professional development and professionalisation.

[18]: developing a new approach to evaluating training

The candidate is a director of a commercial training company. Working with corporate clients he has found increasing demand for more effective approaches to learning and development, along with a need for more sophisticated models for evaluating them. His project focuses on developing a more appropriate and effective evaluation model.

The candidate begins by reviewing and critiquing existing approaches to evaluation used in corporate training. He then takes an inductive approach to investigating how training works within client organisations, developing theories about the way that learning interventions are translated (or not) into changed performance. The output is a five-stage model of evaluation that is grounded in business needs and is built in to the training intervention from the outset. This model has been trialled through use in the candidate's company and it is now a standard part of their consultancy offering. He has also disseminated it widely through articles and conferences.

A third group of projects (eight theses, 24% of the sample) could be described as having characteristics that fitted between those of the research-for-practice and practice-as-research projects described above. These are exemplified by projects 10 and 16 in table 3. In principle they can be described as classic practitioner research projects in that they respond to concerns identified by the candidate in relation to his or her work, are immersed in an ongoing practice situation (distinguishing them from the first group of research-for-practice projects), and although they may result fairly directly in implementation and change are nevertheless distinct research projects (distinguishing them from the second group of practice-as-research projects). In reality there is a certain amount of overlap between the categories, as for instance what is initially conceived of as an action research project

becomes a participant observer study when changes in the work situation make a change of approach necessary, or an initially more purely investigative project moves into a development phase (as with project 16).

All these projects used qualitative methodologies, with one also employing survey research. As with the previous group action research predominated, although case-study and phenomenological approaches were also in evidence. The knowledge produced was principally concerned with a system or with current practices, with one project focusing on a situated phenomenon (the role of counselling services within an educational institution). While the kind of knowledge being produced was situationally immersed and essentially transdisciplinary, in all cases this was developed into more widely relevant technical-rational knowledge, though this rarely extended into disciplinary knowledge. Dissemination tended to occur within a professional arena as well as internally in the candidate's organisation or community of practice, and most theses produced recommendations as well as leading directly to changes or new developments in the local context.

Table 3. Doctoral projects: research within practice

[10]: developing practice in business coaching

The candidate is a business coach. Her doctoral project grew out of an organisation development project to bring together seven companies in a co-ordinated supply chain. Working with one of the companies, her project researches the use of coaching to facilitate agreement on organisational culture both as an end in itself and to inform professional practice.

The project was action-based from a phenomenological standpoint, using the candidate's coaching activity within the organisation as the main vehicle for research while also researching perceptions of organisational culture among staff. The project had a direct impact for the organisation in terms of developing agreement on culture, and it also produced learning points that the candidate fed back into her practice and intends to disseminate more widely within the coaching profession.

[16]: creating a new model of training to overcome gender bias

The candidate is an educator in a church college. Her project sets out to address the issue of the lack of a women's perspective in theological education in the church and develop a model more appropriate to participants of both genders.

The candidate set out to capture and analyse clergywomen's collective lived experience of theological education, principally through in-depth interviews and reflective discussions with twelve participants. The investigation brought the experience of women clergy to the fore and resulted in a new more gender-neutral model of theological training. It has had a direct practical impact in the candidate's college, initially through introducing a new module followed very quickly by embedding the approach across the curriculum. The candidate has published several articles in academic and professional journals, and had started to gain support for extending her ideas across the church internationally.

The final six projects form a less homogeneous group than those described above, but they share the characteristic of synthesising and building on earlier work completed by the candidate. The subject of synthesis included earlier research and evaluation (e.g. project 27, summarised in table 4), scholarly investigation and theorisation (project 9), a life's work contributing to a particular field (project 29), and previous practice and informal research (project 25, also summarised below). Most of the work on

which each of these projects draws would fit within one or other of the three groups discussed above, but there is a substantial additional element in all of them where further knowledge and insights are generated through the process of synthesis, reflection and summary or theorisation. Project 25 differs from the others in that it synthesises a wide range of information from across and outside the practitioner's organisation rather than drawing on pre-existing major works; it has elements of both reflective practice and phenomenological research, and could also be conceptualised as the development of the 'rich picture' (Checkland 1981) in a soft systems project.

The synthesis projects proved to be the most diverse in terms of the type of knowledge they generated and how it was used and disseminated. To an extent the projects were influenced by the way knowledge had been produced in the work that they each drew on, though through the synthesis itself the majority produced a wider range of knowledge-types than the contributing works might have done alone: for instance two produced knowledge of both systems and phenomena, all contributed both transdisciplinary and technical-rational or disciplinary knowledge, while of the five projects in the overall sample that produced significant critical knowledge, two were in this group. The way knowledge was used and disseminated in this group of projects varied widely, with half the theses being unusual for the particular doctoral programme in not having any direct application into practice or dissemination within an immediate working environment; this is partly due to this kind of project tending to be undertaken fairly late in a career with a focus on external dissemination rather than application to practice.

Table 4. Doctoral projects: syntheses

[25]: developing future strategy

The candidate is a senior manager in a large charitable organisation and chair of its advisory board. His project takes the form of a strategic review of the organisation's operating context.

The candidate uses two major sources for his project. The first draws on his work over the last ten years and synthesises material from a wide-ranging series of discussions with local and function-based staff to identify issues and trends. In the second he commissions short (typically 3-5 page) expert reviews from key people within and occasionally outside the organisation. He draws together all these inputs to produce an authoritative and far-reaching review. The project's output is principally in the form of findings and recommendations; some of the implications will require further deliberation, and implementation is expected to take place over an extended timescale.

[27]: building on service evaluations

The candidate is a researcher in a health charity where much of her work involves leading evaluations of new approaches and initiatives in healthcare. Many of these studies are significant pieces of work in their own right and some run over several years.

The candidate presented three recently-completed evaluations for the basis of her doctorate. The evaluations were all substantial projects in which she had played a leading role, and all resulted in refereed publications. The results of the projects were then re-examined and critically evaluated, including in the light of emerging policy changes. This synthesis resulted in recommendations for implementing mental health services as well as a modified approach to evaluating them.

Towards a typology of workplace knowledge-production

The findings from the study suggest that there are a number of activity-types that can give rise to workplace knowledge. Three of these, reordered to present a spectrum from activity concerned principally with action to that concerned mainly with research, follow from the first three groups of projects discussed. They can be represented as: (A) *practice as research* (the second group discussed), where knowledge is produced from taking a researching approach to activities that are primarily intended to create development or change; (B) *research within practice* (the third group), where a distinct research activity takes place alongside and closely connected to practice; and (C) *research for practice* (the first group), where research is pursued outside of the immediate practice environment but with the intention of informing it. The synthesis projects translate less easily into an activity-type of this kind, though two things are indicated. The first is that new knowledge can be produced from the act of synthesis and the associated reflection and conceptualisation, and this in itself suggests a separate category (D) of synthesis-based knowledge production. Secondly, in two projects – of those illustrated 25, plus to a lesser extent project 29 – there is significant use of, and reflection on, activities that rather than being designed actively to capture insights were part of the ongoing work of the practitioner or organisation. This reflection on previous action is closely related to type A activity; the main difference is that rather than building in knowledge-generation to a practical activity, knowledge and insights are produced at a later stage through reflection. There is of course overlap between this category and type A (and B) activities where it is not uncommon for post-hoc reflection on serendipitous occurrences to contribute to the production of data and insights. Reflection on action might therefore be best represented as a sub-category within A.

These categories are summarised below as a typology of workplace knowledge-generating activities. The categories are not discrete, as (as has been outlined in the discussion of the projects) real-life activities will shade between them or incorporate aspects of more than one; they could best be regarded as key types rather than bounded categories.

A1. Reflection on action.
Past activities are reflected upon to produce new insights and knowledge. The activities themselves would typically be part of routine work activity, not normally strongly theorised or designed to be knowledge-generating; new insights are drawn out through reflection and theorisation. Reflection can be personal and phenomenological, or it can include more formal qualitative or quantitative analysis and synthesis. Knowledge production is primarily transdisciplinary though it may be developed to include other forms; knowledge is likely to be principally of systems and practices. Reflection on action is typically used to inform future practices or make recommendations, though it can also be disseminated to influence wider policy and practice.

A2. Practice as research.
Real-life development or change is pursued in a researching or critically reflective way, both to guide implementation and to produce insights of value beyond the immediate project context. This type of activity is designed primarily to achieve practical results with wider knowledge-generation normally a secondary outcome. Methodological approaches are principally action-based, drawing for instance on action research or soft systems methodology for their overall framework. Knowledge production is primarily transdisciplinary though it may be developed to include other forms; the knowledge produced is principally of systems and practices. Practice as research is concerned directly with

guiding action, though the knowledge generated from it can also be disseminated to influence wider practice and policy.

B. Research within practice.

Research is embedded in the practice situation so that it produces or experiments with changed practice as well as developing new, more widely-applicable insights. The main difference between this category and the one above is that the research activity is discrete and it is designed within or in addition to the 'real-life' project. Methodological approaches are action-based or participant research. Knowledge production is principally transdisciplinary and technical-rational, and the knowledge produced is primarily of systems and practices. The knowledge generated is typically used to initiate, modify or inform action, though it can also be disseminated to influence wider practice and policy.

C. Research for practice.

A discrete research project, not embedded directly in a practice activity, is undertaken to produce knowledge that informs practice or makes recommendations. Methodologically, research for practice can be pursued as 'insider' or 'outsider' but not 'participant' research, and it uses non-action-based approaches. The knowledge produced is primarily technical-rational or disciplinary, and is concerned with phenomena (although these may relate to systems and practices). It may be used to inform practice or policy directly, but more typically it is used to make recommendations.

D. Synthesis.

Previous activities, themselves generally knowledge-producing, are synthesised, reflected on and theorised to produce new conceptualisations and insights. Synthesis can be broad and general, or it can include more formal qualitative or quantitative analysis. All forms of knowledge-production can occur, and while knowledge is more likely to be of systems and practices, depending on the source material knowledge of phenomena may also be generated. Synthesis is often associated with dissemination rather than with informing specific actions.

Conclusions: knowledge production in the workplace

The doctoral projects forming the sample for this study represent particular and in some senses artificial instances of knowledge production in workplace contexts. Nevertheless they are examples of activities that take place to create development or change in work environments, or respond to issues that emerge out of practice; at least some would have taken place without their progenitors having enrolled on a doctorate, even if some of the broader investigation and context-setting may have been missed out and the written output would not be in the form of a thesis or explication. In principle therefore they can be regarded as a formalised type of work-based activity, partly geared to drawing out knowledge that is relevant to or emerges from practice.

Returning to the primary topic of this article, the theses collectively indicate that practice-based issues can provide fertile ground for stimulating the production of knowledge that has relevance far beyond the immediate context, and that the workplace can act as a site of significant knowledge-generation when live issues are responded to and reflected upon with intellectual rigour. The strength of many of the Type A practice-as-research and Type B research-within-practice projects indicate that this is particularly the case where enquiry and critical reflection are strongly bound up with practice, as opposed to being pursued as more detached, conventionally academic research (Type C). On the

other hand some Type C projects were also both practically and intellectually strong, suggesting that the relative weakness of others may have owed more to other factors: for instance candidates placing more emphasis on finding a research theme to pursue for their doctorate than taking forward a project located in a complex and compelling real-world issue.

Comparing the projects that produce significant insights at a more general level with those where their contribution to wider knowledge is less easy to discern, several differences are apparent. Among the projects that are heavily embedded in practice, the better ones are clearly located in a wider theoretical and practice context and they also include at least some evaluation that gives a sense of their significance. Weaker projects tend to lack this contextualisation and appear as isolated cases that can beg the question 'so what?' Among the more conventional research projects the stronger theses are more clearly located in a work issue to which they aim to contribute something direct and practical, and they are also contextualised as described above. Weaker versions tend to be less engaged with practice and less well contextualised, relying on their strength purely as academic studies for their worthiness at doctoral level. As an aside, while attention is often given to the development of doctoral candidates' research-mindedness and methodological competence (see for instance Costley, Elliott & Gibbs 2010), these findings suggest that deep engagement with practical issues and associated contextual matters are equally important to generating knowledge from the workplace.

In conclusion, the projects examined in this study indicate that practical work activities that involve complex change-oriented issues and are approached with a researching and critically reflective orientation can be a powerful source not only of contextual insights but of academically- and professionally-valid knowledge, giving rise to new concepts, models, theories and critiques as well as different ways of doing things. This kind of knowledge is capable of being far-reaching in terms of both its direct effect on practice and its less direct impact through various modes of dissemination. The way that it is produced is in most cases transdisciplinary, involving interplay between formal processes, reflection, and more tacit and experiential knowing; while the kinds of knowledge produced can span all of Scott *et al*'s spectrum even (exceptionally) within a single project. While the idea of different kinds of knowledge – as described by Scott *et al* (2004) or by Eraut (1994), or the distinction made here between *knowledge of a system or set of practices* and *knowledge of a phenomenon* – is generally supported, the study suggests that the kind of knowledge that can be produced in the workplace is much more complex and far-reaching than for instance is suggested by Bernstein's notion of everyday or horizontal knowledge.

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