



May 2001 Edition

Postgraduate Research Supervision: A Process of Knowledge Management

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Keywords: Research supervision, knowledge management, postgraduates.

Article style and source: Peer Reviewed. Original ultiBASE publication.

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Abstract

Knowledge-based industries are increasingly becoming a key part of our industrial landscape. The changing environment has profound implications for research education/training in universities where knowledge business dominates. The central issue confronting research supervisors is how to achieve quality, effectiveness and productivity of their work in the new changing environment. This paper aims to develop an innovative model using knowledge management approach to research supervision to address the central issue.

Introduction

Our society has changed dramatically over the past few years. Growing pluralisation (versatility and diversification of our communities) and individualisation (emphasis on

emancipation and autonomy) are some of the main trends of our society. Knowledge-based industries are increasingly becoming a key part of our industrial landscape. The western economy has evolved into a knowledge economy in which knowledge has become the main competition tool for business and a vital economic resource. The process of knowledge management through knowledge construction, dissemination, use and embodiment starts to gain momentum in knowledge-based industries and our society. The changing environment has profound implications for research education/training in universities where knowledge business dominates.

The central issue confronting research supervisors is how to achieve quality, effectiveness and productivity of their work in the new changing environment. This paper aims to develop an innovative model using knowledge management approach to research supervision to address the central issue. The objectives of this paper are to

- Examine the nature, dimensions and key issues of research supervision with a focus on learning, research and communication processes through a literature review and case studies;
- Construct an innovative and working model of research supervision applying concepts of knowledge management to research supervision; and
- Develop a practical supervision plan on the basis of the model with an intent to improve quality, effectiveness and productivity of research supervision.

The author takes both a holistic and an operational perspective in addressing issues of research supervision. The study draws upon the current literature concerning research education/training and knowledge management as well as personal experience in the field. Case studies are presented to illustrate issues and problems in the process of research supervision.

The paper starts with a brief literature review of the nature and dimensions of research education/training and case studies of student-supervisor partnerships. An innovative model of research supervision is presented, that shows close synergies between knowledge management concepts and research supervision. On the basis of the model, a conceptual and structured research supervision plan including content, process, performance indicators and a timeline is established as a conclusion of the paper. [top](#)

Nature, dimensions and key issues of research supervision^{*}

An overview

Research supervision is a process of fostering and enhancing learning, research and communication at the highest level (Laske and Zuber-Skerritt, 1996). Connell (1985) maintained that research supervision is the most advanced level of teaching in the educational system. The supervisory process is crucial to the success of graduate students and certainly complex, subtle, pivotal and responsible. Although there have been calls to conceptualise research supervision as a teaching/learning process, there is still a tendency

to equate it with research training and with the research responsibilities of the academic role (Johnston, 1999).

The roles and functions of research supervision are multiple and vary in the perception of its different stakeholders. In the view of students, the ideal supervision helps them to achieve a scientific, professional or personal goal, and to learn about research and how to conduct research against the quality standards of the system. In the view of supervisors, their supervision should be able to contribute to the advancement of scientific knowledge through creating effective learning/research situations and entail opportunities for supervisors to conduct research projects with students which may enhance their own learning, research and reputation. From the perspective of universities and society, supervision increases the links between universities and industries/communities and contributes to the production of high-level scientists (Laske and Zuber-Skerritt, 1996). These perceptions of the roles and functions of research supervision are concerned with the main aspects and key dimensions of research supervision, while there is a much wider range of roles and contributions that research supervision is expected to perform. [Top](#)

Models of research supervision: Traditional and new

Traditional models of research supervision are based on a single supervisor working with a motivated, well-prepared student over an extended period of time (Holbrook and Johnston, 1999). Conventional research education assumes to be on-campus and full-time, and prepares students for academic or other full-time research work. However, the conventional model has shown itself to be deficient in the face of changed environment (Knight and Zuber-Skerritt, 1992). With the overall growth of postgraduate enrolment and more diversity of the students' background, today's practice of research supervision turns to be more flexible and more mixed-mode (Evans and Person, 1999). In terms of supervision structure, new supervision arrangements to supplement the conventional single-supervisor structure, have been established. They include joint supervision of one student by two or more supervisors, committee supervision that provides complementary expertise that students can call upon, and supervisory group which involves students in their own and each other supervision. The supervisory group structure embodies a fundamental change in theories and practices in research education and training. Under this structure, students are involved in the process of providing guidance to each other and sharing access to faculty sources in a group setting. Some models generated from the structure are a workshop model, a coursework model, a conference model and a methodology group model (Conrad, Perry and Zuber-Skerritt, 1992). [top](#)

Case studies of student-supervisor relationships - Key issues

The relationship between student and supervisor plays a vital role in the process of research supervision. Establishing a right match and maintaining an effective working relationship holds the key to success of research projects and theses. Experience and perspectives of some students and supervisors about the partnerships are shown below:

Students say:

"Until the parameters of both the roles and aims of both supervisor and student are objectively established and genuinely accepted by both, the relationship so vital to co-operative research, will remain fragile, emotional and unbalanced (Baker, 1999 p152)."

"I've actually had two supervisors and the first one, I didn't go very far with because I just couldn't work this out (what was required). The second one Dr Brown, is just so much better. He makes it clear and I'm able to move ahead quite well. Certainly I don't just do as I'm told, but I have clear guidelines and that's important for me." (Unpublished interview raw data)

"Your supervisor guides you with this (the right question), though to be honest I haven't always had as much guidance as I think I should but that's another matter. I think the task of the supervisor is essentially to help you to develop as a researcher as well as just to answer a question and get a degree and this isn't what I found I got from my previous supervisor. I guess I didn't know what I wasn't getting until I met up with my present supervisor. He is just great..." (Unpublished interview raw data)

Supervisors say:

"Students need to trust you, trust that you can get them through if they do what you ask and part of the trick is to make sure you get your instructions tight enough and there is limited misunderstanding." (Unpublished interview raw data)

"That's what you're doing you're developing a researcher..... and to be honest if the students aren't up to doing that then I'm not interested in working with them. I'm not here to get them research degrees; I'm here to develop them as researchers." (Unpublished interview raw data)

"I'm working with essentially an ethical issue with one of my students. It has helped me to learn as much as them I think and I really appreciate that and that has made me want to be a bit braver and explore some other less certain areas for me and because this is the way areas develop in a fast changing culture I push myself to do this. I warn them that we will be doing this as partners. I will sometimes take the lead but they must some times lead me and we will help each other to produce something new and exciting." (Unpublished interview raw data)

In summary, in terms of learning, research and communication, key issues of student-supervisor partnerships identified through study of each of the above personal accounts and the current literature include:

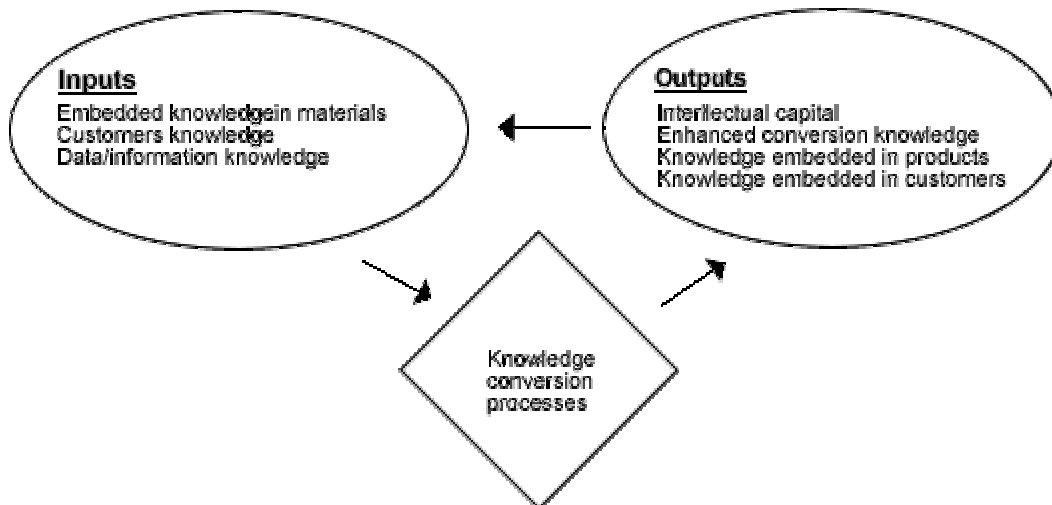
- Matching students and supervisors in terms of individual characteristics,
- Assessing and meeting mutual needs and expectations
- Developing a research frame and an action plan
- Regular meeting and quality feedback
- Communication and interaction of students with the academic community [top](#)

A Knowledge management model for research supervision

In this section, the author proposes a knowledge management model for research supervision. As the proposed model of research supervision draws upon core themes of knowledge management concepts, it is necessary to make a brief introduction of knowledge management literature. Knowledge management has been defined in different ways and from different perspectives in current literature. Davenport et al. (1998) defined knowledge management using a project-based approach:

Knowledge management is concerned with the exploitation and development of the knowledge assets of an organisation with a view to furthering the organisation's objectives. The knowledge to be managed includes both explicit, documented knowledge, and tacit, subjective knowledge. Management entails all of those processes associated with the identification, sharing and creation of knowledge. This requires systems for the creation and maintenance of knowledge repositories, and to cultivate and facilitate the sharing of knowledge and organisational learning.

Figure 1: knowledge management processes
(Adapted from Armistead, 1999)



Different from the project-based approach taken by Davenport et al., Figure 1 above explores knowledge management from the perspective of operational process, that is, the basic input-output transformation process. At the input end, we have a combination of knowledge of customer's needs and expectations, knowledge of raw materials and resources to be used, knowledge of products and services to be delivered as well as data

information or knowledge. The process clearly indicates that knowledge management takes information, knowledge and people as its basic inputs, and applied knowledge and intellectual capital as its desired outputs.

The knowledge conversion process is actually a changing and/or improving process. It consists of preserving, embedding and enhancing knowledge of process, products and services. The knowledge conversion process can also be seen as one of knowledge creation, transferring and sharing, and a process of knowledge access improvement as well. Fostering a knowledge environment that is conducive to knowledge development, use and transfer is vital in the knowledge conversion process (Armistead, 1999). The knowledge management process is not a one-stop process but a spiral cycle of continuous improvement and development. The outputs of the cycle may be supplied as inputs for the next transformation process.

Knowledge management in different organisations may serve different purposes. Universities have a significant level of knowledge management activities associated with the creation and maintenance of knowledge repositories, improving knowledge access, enhancing knowledge environment and valuing knowledge (Rowley, 2000). The supervision of research students is undoubtedly an integral part of the knowledge management activities in universities. The author maintains that the effectiveness of research supervision process to achieve quality improvement and increased productivity will be enhanced if knowledge management concepts are effectively integrated into the process.

Figure 2: A knowledge management model for research supervision

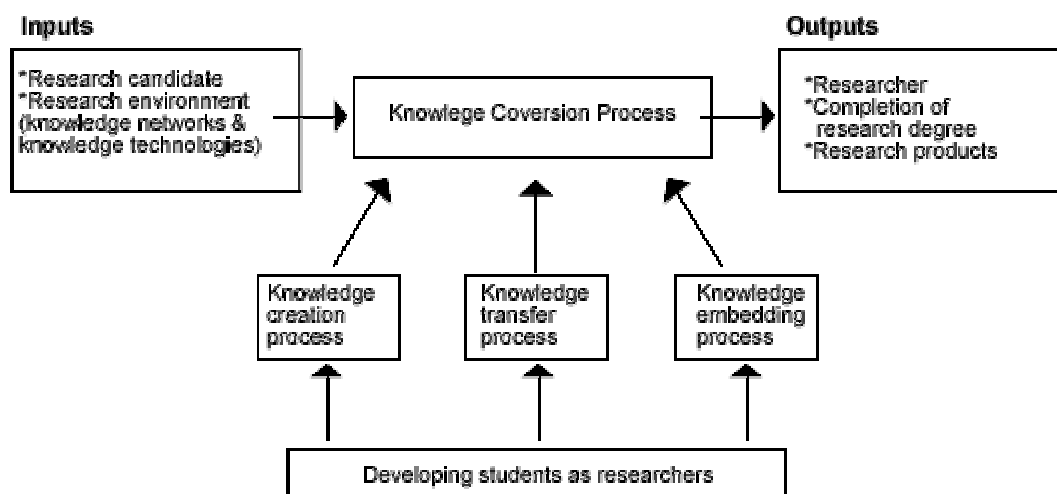


Figure 2 above illustrates a model of research supervision which incorporates the core knowledge management concepts summarised above into research supervision process. The model demonstrates close synergies between knowledge conversion process and that of research supervision.

As mentioned before, research supervision is a teaching/learning process that aims to develop and advance learning, research and communication at the highest level (Laske and Zuber-Skerritt, 1996). Developing research candidates as capable researchers is the focus of research supervision (Down, Martin and Bricknell, 2000). The proposed model by this author suggests that research supervision is also knowledge creation, transfer and embedding processes in which research candidates develop new knowledge, theory and methodology (knowledge creation) through integrating, synthesising and valuing existing knowledge (knowledge transfer), and in which candidates advance understanding and develop new insight into their area of investigation (knowledge embedding). In this regard, research supervision is also knowledge conversion process. The process requires innovation-oriented individuals (research candidates) and a research environment that provides networks of experts and easy access to knowledge technologies for knowledge creation, storage and transfer. The outputs of the research supervision from knowledge creation, transfer and embedding processes are qualified researchers who successfully complete their research degrees by producing and presenting research outcomes with potential value to our knowledge-based society.

The above knowledge management model for research supervision is new and innovative in nature because it takes a non-conventional approach, that is, a knowledge management approach to address research supervision. That is different from the exiting models which have been developed to address issues of supervisory structures and/or learning/teaching patterns as mentioned in the paper. However, is the innovative model feasible in the real world? The following section addresses the question of how to implement the model in actual research supervision. [Top](#)

A practical supervision plan

This section is devoted to establishing a conceptual and practical research supervision plan with the intent to enhance quality, effectiveness and productivity of research supervision. The plan is designed for the implementation of the proposed model of this paper. Table 1 below outlines the entire research process and pattern that most research students follow to complete a research degree (RMIT, 2000). It covers every aspect of their research activities, from defining a research topic to the final stage of thesis writing. These aspects are also the milestones in a research student's candidature, against which student's progress is monitored and assessed. The Table also shows what actions a supervisor is supposed to take during his/her supervision process. The process of the supervision in Table 1 demonstrates how to apply knowledge management to research supervision to enhance student's knowledge, skills and ability to conduct research. As effectiveness supervision aims to improve quality and productivity, the plan defines a timeline of achievement of each milestone of research, that takes a total of 30 months (minimum) or up to 48 months (maximum) to complete a PhD degree on an equivalent full-time basis. Quality in research supervision is monitored and assessed against the performance indicators in the Table. These performance indicators are identified through an analysis of the nature, dimensions and key issues of research supervision illustrated in the paper. The performance indicators provide a means of benchmarking for supervisors

and academic managers to identify the best practices in research supervision and set goals to emulate them.

Table 1: Supervision plan for PhD candidature

Research Process/Milestone	Supervision Process
<ul style="list-style-type: none"> • Defining research topic/problem • Developing research methodology, theoretical framework • Designing research • Conducting literature review • Collecting data • Analysing/interpreting data • Writing thesis 	<ul style="list-style-type: none"> • Facilitating students' access to knowledge, information, database • Creating knowledge repositories through guiding students to present and publish their work • Enhancing knowledge/research environment through facilitating students' networking & sharing knowledge/research • Embedding knowledge in the students and their thesis
Performance Indicator	Timeline (equivalent full-time)
<ul style="list-style-type: none"> • A right match of supervisor & student <p>Level of effectiveness in providing guidance to students</p> <ul style="list-style-type: none"> • Quality and timeliness of meetings and interaction • Extent of relevance and appropriateness of assessment and feedback given to students • Level of adherence to pre-set project objectives • Milestones achieved in the planned time 	<ul style="list-style-type: none"> • 6 - 12 months (research proposal) • 3 - 6 months (literature review) • 12 - 18 months (collecting/analysing/ interpreting data) • 9 - 12 months (writing thesis) <p>Total: 30 months (minimum) 48 months (maximum)</p>

As discussed in this paper, research supervision is a complex process. How to achieve effectiveness, quality and productivity of research supervision warrants extensive attention and discussion. Innovation in supervisory theory and practice concerning postgraduate students is as important as that in teaching and learning in undergraduate programs. This paper is committed to contribution to the innovation. [Top](#)

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Footnote: By research supervision, the author means, throughout this paper, postgraduate supervision of research students.

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