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A small-scale investigation into Engineering PhD student satisfaction with supervision in an Australian university campus

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Structured abstract

BACKGROUND

Doctoral supervision is doubtless one of the most complex forms of teaching in higher education. Poor quality supervision may affect the student's candidature by, for instance, increasing the time for candidature completion, decreasing the quality of the research outcomes, and reducing the number and quality of publications. Further, poor quality supervision may also lead to early termination of doctoral candidatures. A quality doctoral supervision process, including a successful supervisor/student relationship, can provide high levels of student fulfilment and satisfaction and consequently, a successful doctoral candidature.

PURPOSE

This study investigated the level of satisfaction of engineering doctoral students with supervisors and supervision process at a large Australian university campus. Further goals of this investigation were: a) to determine the overall level of satisfaction of engineering doctoral students with different aspects of their supervision process; b) to identify positive and negative aspects of the doctoral supervision; and c) to identify the important qualities for a successful supervision process from the engineering doctoral students' perspective.

METHOD

The method employed in this investigation was based on a student quantitative and qualitative survey. A total of 47 full-time doctoral students were invited to participate via an anonymous online submission system. The survey comprised questions about students' current supervision experiences, and about their views on quality supervision. The questions were taken or adapted from validated methods published in the literature for similar studies.

RESULTS AND CONCLUSIONS

This study showed that approximately 50% of the engineering PhD students are satisfied with their supervision process at this university campus. The main reasons for satisfaction with supervision are related to the knowledge demonstrated by the supervisor, as well as to personal qualities such as friendliness, approachability, patience, consideration and understanding. The main reasons for dissatisfaction were related to the apparent lack of involvement of supervisors in the research projects, and the perceived lack of knowledge in the field for some supervisors. These issues suggest that supervisors should perhaps consider increasing the number of participants in the supervision team to provide PhD students with more assistance. Well-aligned with these issues are the students' remarks on the importance of supervisor interaction and collaboration with other research centres and universities in order to increase the cohort of supervisors potentially available to assist the students.

KEYWORDS

Supervision, Doctorate, satisfaction

Introduction

Doctoral supervision is doubtless one of the most complex forms of teaching in higher education. A poor quality supervision process may negatively affect the student's candidature by, for instance, increasing the time for candidature completion (De Valero, 2001; Sinady et al., 2009; Kiley, 2011; Pitchforth et al., 2012), decreasing the quality of the research outcomes (Cullen et al., 1994; Kam, 1997; McCulloch, 2010), and reducing the number and quality of publications (Cullen et al., 1994). More importantly, poor quality supervision may also lead to termination of doctoral candidatures (Frischer and Larsson, 2000; Lovitts and Nelson, 2000; De Valero, 2001; Manathunga, 2005; Ismail et al, 2011).

According to Lovitts and Nelson (2000), one of the most important factors in student decisions whether to withdraw from or continue a candidature is the relationship with the supervisor. Manathunga (2005) emphasizes that adequate support, access and guidance from the supervisor is essential to avoid student drop-out, particularly in the early stages of candidature. According to McCulloch (2010), the quality of the candidate's experience and the outcomes of the period of study are closely related to the quality of the supervision process. It follows, therefore, that high quality doctoral supervision processes, including a good supervisor/student relationship, can provide high levels of student fulfilment and satisfaction and consequently, successful doctoral candidatures.

From findings of the best available research projects on effective supervision practices, James and Baldwin (1999) summarise the eleven best practices for effective postgraduate supervisors. According to these authors, supervisors must:

- 1) Ensure an effective partnership for the project;
- 2) Get to know students and carefully assess their needs;
- 3) Establish reasonable, agreed expectations;
- 4) Work with students to establish a strong conceptual structure and research plan;
- 5) Encourage students to write early and often;
- 6) Initiate regular contact and provide high quality feedback;
- 7) Get students involved in the life of the department;
- 8) Inspire and motivate;
- 9) Help if academic and personal crises arise;
- 10) Take an active interest in students' future careers; and
- 11) Monitor the final production and presentation of the research.

Even though recognition should be given to the numerous studies addressing the question of how to deal effectively with postgraduate students, most of these studies have been conducted from a supervisor's perspective (Ismail et al., 2011), and only a handful of studies have actually acknowledged the students' opinion on doctoral supervision effectiveness (McAlpine and Norton, 2006). One of these studies is a survey conducted and reported by Phillips and Pugh (2005) with doctoral candidates from the London Business School, which found that students expect that their supervisors will:

- 1) Read their work well in advance and provide prompt feedback;
- 2) Be available when needed;
- 3) Be friendly, open and supportive;
- 4) Be constructively critical;
- 5) Have a good knowledge of the research area and willingness to share this knowledge;
- 6) Structure the supervision process in a way that facilitates the exchange of ideas;
- 7) Have sufficient interest in their research to provide more information in the student's path; and
- 8) Help students secure a good job at the end of the candidature.

In this context, this study aims to investigate the current level of satisfaction of engineering doctoral students with supervision at a large Australian university campus. Further goals of this investigation are: a) to determine the overall level of satisfaction among current

engineering doctoral students in relation to specific aspects of the supervision process; b) to identify positive and negative aspects of doctoral supervision at this large university campus; and c) to identify qualities or aspects that would foster good quality doctoral supervisions from a student's perspective.

It is important to highlight that the study of quality of supervision is particularly important in countries that follow the British supervision system, such as Australia, which includes an intensive one-to-one relationship between student and supervisor, assessment based on thesis, and virtually no coursework (Kiley, 2011). Therefore, the success of the system is highly dependent on the quality of the supervision process, for supervisors have to provide the expertise, time and support to ensure students develop research skills and attitude that will lead to a thesis of acceptable standard (Heath, 2002).

Methodological approach

This study's aim was to determine the level of satisfaction with supervision of engineering doctoral students at a large Australian university campus. The method employed in this investigation was based on a student quantitative and qualitative survey. The survey was conducted from April to May 2013. A total of 47 full-time doctoral students were invited to participate via an anonymous online submission system. The survey included questions about students' current supervision experiences. This survey will be referred to as the 'PhD Supervisor Satisfaction Survey' or 'PSSS' throughout this article.

The PSSS involved two main parts. The first part involved demographic questions to profile respondents and enable a comparison of subgroups to see how opinions varied among these groups. These questions were mainly about age (whether above or below 30 years), availability of scholarship and stage of candidature. The second part of the PSSS included questions about the students' supervision experiences.

In the second part of the survey, students were first asked about their supervisor's availability, provision of feedback, meetings, encouragement to publish and other supervision aspects. A total of 14 aspects were covered, with approximately half taken from the Postgraduate Research Experience Questionnaire - PREQ (Australian Department of Education, Training, and Youth Affairs & Australian Council for Educational Research, 2000). These aspects were complemented with questions from the survey Qualities of an Ideal Supervision (The University of Otago, 2012) and the 2010 Graduate Student Satisfaction Survey (UC Berkeley Graduate Assembly, 2010), as well as a few questions formulated based on aspects not covered by these sources. For this part, the students used a *Likert* scale from 1 (low) to 5 (high) to indicate their experiences. Another question was about their overall satisfaction with their principal supervisors, which was again based on a scale from 1 (low) to 5 (high). Also, students were asked to list positive and negative characteristics of their supervisors or supervision experience. Students were also asked to list qualities that they felt would make an effective supervisor. Finally, the students were asked whether they would recommend their supervisors to a friend wanting to conduct research aligned with the research area of their supervisors.

Results and discussion

The participation rate in the PSSS was 64%, meaning 30 surveys were returned out of the 47 that were sent out to all full-time engineering doctoral students. Of the 30 respondents, 16 were aged below 30 years, and 14 above 30 years, showing a balanced distribution between mature and non-mature students. Regarding citizenship status, 13 doctoral students were either Australian citizens or permanent residents, and 17 were international students. The majority of the students (> 73%) held a full scholarship, meaning they were not only exempt from tuition fees, but also received a stipend to cover their living expenses. Also, the majority (>76%) responded that they performed some type of paid work either within or outside the university. Students in early-mid candidature (that is, either before the confirmation of

candidature or a few months into confirmation of candidature) numbered 17 (56.7%), and students in mid-final candidature (several months into confirmation of candidature, or writing doctoral thesis) numbered 13 (43.3%).

Table 1 summarises the results of the question about overall satisfaction with supervisors. The students were asked to rank their satisfaction from 1 (= low satisfaction) to 5 (= high satisfaction). The average satisfaction level was 3.3, with a mode of 4. About half of the students responded they were satisfied with the overall supervision process (that is, selected 4 or 5), and 24.5% were shown to be dissatisfied (that is, selected 1 or 2). Also, 26.5% of the students responded they were neither satisfied nor dissatisfied (that is, selected 3). The students were also asked whether they would recommend their principal supervisors to a friend wanting to conduct research aligned with the research area of their supervisors. About 60% of the students responded they would recommend their supervisors, while 26.5% would not. This last percentage seems to correlate with the percentage of students who were dissatisfied with the supervision process. The remaining students responded that they would possibly recommend their supervisors to a friend.

Table 1 – Engineering doctoral student overall satisfaction with supervision at a large Australian university campus (n = 50)

Question about supervisors	Results
Overall satisfaction (average) ¹	3.3
Overall satisfaction (mode) ¹	4.0
Students satisfied with supervision ²	49.0%
Students dissatisfied with supervision ³	24.5%
Students neither satisfied nor dissatisfied ⁴	26.5%
Students who would recommend supervisor to a friend	61.2%
Students who would not recommend supervisor to a friend	26.5%
Students who would possibly recommend supervisor to a friend	12.2%

¹ on a scale from 1 to 5, where 1 is low and 5 is high

² students who responded either 4 or 5

³ students who responded either 1 or 2

⁴ students who responded 3

An Australian National University study conducted in 1991–1993 reported student satisfaction to be 85% (Cullen et al., 1994). Heath (2002) found the same agreement in a similar survey conducted in The University of Queensland, with an overall level of supervision satisfaction of 85% amongst students. Ainley (2001), by analysing the PREQ results from Australian universities, also concluded that Australian higher degree research students were highly satisfied with their supervision. Govendir and Govendir (2010) found a level of supervision satisfaction of 75% in The University of Sydney. Further, Harman (2003) found that 62% of doctoral students were either satisfied or highly satisfied with their supervisors in two of the major ‘Group of Eight’ universities in Australia. They also found that 17% of the students were either dissatisfied or very dissatisfied, and that the remaining 21% were neither satisfied nor dissatisfied. A conclusion may be drawn, therefore, that the level of overall satisfaction of doctoral students at this university campus is not on par with the overall satisfaction identified in other Australian research institutions.

In agreement with the 2010 UC Berkeley Graduate Assembly survey, this study also indicated that the level of satisfaction with the supervision process is lower for candidates in their final stages of candidature. The level of satisfaction for these students was 35%, whereas the level of satisfaction for early candidature students was close to 60%. The rate of students who would recommend their supervisor to a friend interested in the same field as the supervisor’s was 50% for students at the end of candidature, and 70% for students in early candidature. Some possible interpretations for these results are, for instance, that poor quality supervision may increase time to graduation (increasing dissatisfaction levels); also final year students could have higher expectations of their supervisors, for example, regular feedback on thesis writing, and advice relating to professional development and career

planning, which are less of a concern for commencing students (UC Berkeley Graduate Assembly, 2010).

Other parameters such as age, scholarship, citizenship status and work did not appear to influence the results of satisfaction. The number of supervisors, however, seemed to have a slight impact on student satisfaction levels, with those students having one supervisor being slightly less satisfied than students with two or more principal supervisors. Out of all single-supervisor students, 46% were satisfied with their supervisors, and 60% would recommend their supervisor to a friend. Of the multiple-supervisor students, 50% were satisfied, and 62% would recommend supervisors to a friend.

When asked about satisfaction with particular aspects of the doctoral supervision process (Table 2), a higher level of satisfaction was demonstrated in comparison with the overall supervision satisfaction discussed above. For example, student satisfaction was high (> 70%) for “supervisor encouragement to write and submit papers for publications” (77.6%), for supervisors being “friendly and approachable” (75.5%), and for supervisors being “available” (71.4%). The areas of concern revealed by this research were the provision of “meetings”, with 46.9% of students being dissatisfied, and the provision of “clear directions”, with 44.9% of students showing dissatisfaction. Also important was that 30.6% of the students appear to feel that their supervisors are more concerned about the production of publications than about the student’s overall learning experience.

Table 2 – Engineering doctoral student overall experience with different aspects of their supervision at a large Australian university campus (n = 50)

Supervision aspects	Students' responses (%) ¹		
	Agree	Neither agree nor disagree	Disagree
This supervisor encourages me to write articles and submit for publication	77.6%	6.1%	16.3%
This supervisor is friendly and approachable	75.5%	10.2%	14.3%
This supervisor is available when needed	71.4%	8.2%	20.4%
This supervisor encourages me to attend conferences and other research events	69.4%	14.3%	16.3%
This supervisor provides additional information relevant to my topic	61.2%	12.2%	26.5%
This supervisor has contributed significantly to my PhD	59.2%	18.4%	22.4%
This supervisor provides timely feedback	57.1%	24.5%	18.4%
I was given good guidance in topic selection and refinement	57.1%	16.3%	26.5%
This supervisor makes a real effort to understand the difficulties I face	55.1%	22.4%	22.4%
This supervisor provides helpful/quality feedback	53.1%	24.5%	22.4%
This supervisor has high motivation and inspires me	44.9%	28.6%	26.5%
This supervisor gives me clear directions	42.9%	12.2%	44.9%
This supervisor thinks about my goals rather than publications that will be generated from my research	36.7%	32.7%	30.6%
I am happy with the meetings scheduled by my supervisor	20.4%	32.7%	46.9%

¹ Based on a 1-5 scale where 1 is 'strongly disagree' and 5 is 'strongly agree'. 1 and 2 responses have been aggregated as 'agree' and 4 and 5, as 'disagree'

The results of the quantitative analyses were closely correlated with the results of the qualitative analyses. In this part of the survey, the students were first asked to list aspects that are outstanding in their supervisors, and aspects they think the supervisors need improvement. For the positive characteristics, most of the comments were related to “knowledge” (21.7%), as for instance “*supervisor is knowledgeable*” or “*supervisor has knowledge of the research topic*”. This was followed by comments related to “friendliness and approachability” (15.7%) - which highly agrees with the quantitative results (refer to Table 2) – and comments related to “patience, consideration and understanding”, with 11.3% of the students referring to at least one of these aspects. There was also a significant number of comments on “participation and involvement” (9.5%), on the “overall conduct of the supervision process” (8.7%) and about “motivation and encouragement” (8.7%).

For the negative characteristics of supervisors, most comments were related to the “lack of participation and involvement in the project” (24.0%), with comments along the lines of “*supervisor does not show interest in the research project*” or “*supervisor is not available when I need*”. Comments about students wanting more meetings with supervisors were also included in this theme. Also significant was the number of comments related to the “lack of knowledge in the field” (16%) and comments on the “overall conduct of the supervision process” (for example, “*ineffective supervision*” or “*poor supervision*”) (15%). Furthermore,

10% of the students included comments related to “professionalism”, such as “*supervisor needs better time management skills*”, 9% included comments related to the “lack of engagement with other universities, research centres and industry”, and 8% of the students referred to the “lack of friendliness and approachability”.

Finally, students were asked to list characteristics that they consider essential for an effective supervisor or supervision process. The results are presented in Table 3. Most comments were closely related to “participation and involvement in the research project” (19.0%), followed by comments related to “knowledge” (17.1%), and then to “friendliness and approachability” (9.5%), “conduct of the supervision process” (9.5%) and to “motivation and encouragement” (9.5%). Note these characteristics are well-aligned with those aspects students listed as “negative aspects” of their supervisors/supervision – particularly with supervisor participation and involvement in the research project – which demonstrates how important these aspects are in a supervision process in the view of the engineering PhD students of this university. It is also interesting to note that all the important aspects pointed out by these students have also been outlined by Phillips and Pugh (2005) under the list of the nine most important expectations of higher degree research students with supervision.

Table 3 – Engineering doctoral students’ opinions on the most important characteristics for an effective supervisor (n = 105)

Themes for quality of supervisor/supervision	Examples of comments
Related to “Participation and Involvement” (20 comments)	Supervisors... Should feel responsible when students face difficulty and try to find a solution for the problem too Should provide timely and quality feedback Should work together with student to build a good quality thesis Should be willing to collaborate and get involved in the research Should help solve problems
Related to “Knowledge” (18 comments)	Supervisors... Should have an updated knowledge about his/her field Should have years of experience in very close relationship to the research topic Should have profound knowledge and background on the research field Should understand very well the topic Should be confident on the topic
Related to “Friendliness and Approachability” (10 comments)	Supervisors... Should be friendly Should be easy-going Should be approachable
Related to the conduct of the supervision process (10 comments)	Supervisors... Should give clear directions Should demonstrate diligent attention to student’s work Should have leadership skills
Related to “Motivation and Encouragement” (10 comments)	Supervisors... Should be motivating Should show interest in the research Should be inspiring

Conclusions and Final Considerations

This study showed that approximately 50% of the engineering PhD students are satisfied with their supervision process at this Australian university campus. This could lead to an interpretation that the overall satisfaction is below the overall level of satisfaction reported in the literature for other Australian universities, which falls in the range of 65% – 85%. It is important to note, however, that the available studies on PhD satisfaction in other universities encompass all available disciplines (that is, not only engineering). It could be speculated that the satisfaction of engineering students is generally lower than the satisfaction of students in other fields, due to the higher complexity and demands of engineering projects. Therefore, further work investigating the relative satisfactions of PhD students from different disciplines with their supervision may provide clearer indication of relative position of engineering student satisfaction.

In agreement with similar studies, this study also demonstrated that there is a significant decrease in the level of satisfaction amongst doctoral students in final stages of candidature. Only about 35% of the students in these stages were satisfied with their supervision

processes. Some possible explanations for this outcome are, for instance, that poor quality supervision may increase time to graduation, increasing dissatisfaction levels, and that final year students could have higher expectations of their supervisors in respect to more regular feedback on thesis writing, and advice relating to professional development and career planning.

According to this research, the main reasons for PhD student satisfaction with supervision can be attributed to the knowledge demonstrated by the supervisor, as well as to personal qualities such as friendliness, approachability, patience, consideration and understanding. It seems that the doctoral students from this particular Australian university campus highly value when supervisors are sensitive to and aware of students' time and competence limitations.

The primary contributor to PhD student dissatisfaction with supervision appears to be the perceived lack of involvement of supervisors in the research projects. Students often commented that they have no one to count on when they are facing problems with the research methods or with tools they are supposed to employ in their research. Several students mentioned that the addition of one or more associate supervisors to the supervising team would help minimise these issues, as long as the additional members could assist students with those specific problems principal supervisors are unable to help with.

The second main contributor to PhD student dissatisfaction, which could be interpreted as a possible reason for the low level of supervisor involvement, is the apparent lack of supervisor knowledge in the field being supervised. This is of particular concern, and again suggests that supervisors may consider ways of inviting appropriate expertise to the supervision team or facilitate access to those colleagues with requisite expertise. Well-aligned with this issue are the students' comments on the importance of supervisor interaction and collaboration with other research centres and universities in order to increase the number of people that would be available to help the students.

There are certainly some straightforward actions that could be implemented in the short term to address some of the extant supervision issues identified in this study. With respect to the "lack of supervisor participation and involvement" the clarification of roles and expectations of student and supervisor, particularly in the early stages of candidature, is widely supported in the literature (Goodyear et al., 1992; Kiley, 1998; Latona and Browne, 2001; McCormack, 2004; Boud and Lee, 2005; Ives and Rowley, 2005; Phillips and Pugh, 2005). Watt and Chiappetta-Swanson (2011) suggest the following areas in which supervisors should consider clarifying and negotiating expectations with their students: the extent and level of direction given; the level of independence expected of the student; preparation for, frequency and the manner in which consultation will occur, and the feedback that will be provided; frequency of submission of progress reports and drafts of written work; the role of both in editing the student's work; and the manner in which differences in ideology or opinion will be managed.

Recognising that both academic work and student research are dynamic processes, then regular consultation to understand changing needs and to identify potential areas of improvement in supervision approaches constitutes a responsive and mature quality process. Supervisors may also take the opportunity of making more use of information disseminated through scholarly literature, codes of practices and the 'how to... (supervise)' literature (Stokes and McCulloch, 2010). Supervisor and student might regularly review the expected timing and regularity of meetings and ensure a mutually satisfactory schedule. If a student starts their candidature aware of how the supervision process will develop, expectations will be formed to reflect this initial view, and provided those arrangements are followed, including regular review, the level of student satisfaction is likely to be higher throughout the supervision process.

With respect to a perceived "lack of knowledge of the field": at relevant stages the student and supervisor might openly discuss and determine limitations in the supervisor's expertise

so that an additional supervisor or directions to an expert in the field can be considered. Actions arising from the main issues identified by the PhD students will include exploration of the provision of more flexible supervisory team membership, and development of a knowledge base from which directions to needed expertise can be derived. This directly relates to students' comments that "*supervisors don't have much interaction with other centres and institutions, limiting the number of people that could be involved in the research project*". Any approach that assists supervisors to increase their networks and collaborate more with other centres or universities so that the spectrum of expertise supervision is enlarged will be helpful.

In summary, this study has identified a number of student issues with supervision practices that have implications for timely completion of PhD candidatures, and also ongoing student satisfaction. With respect to actions arising from this study: findings will be disseminated internally within the engineering school; a draft good practice guide for PhD supervision will be developed; and the study will be expanded to include research supervision at other campuses. Investigations will extend to informing the development of appropriate quality assurance structures to support enhanced PhD supervision experiences for both academics and students.

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