STUDENTS' PERCEPTIONS OF DOCTORAL SUPERVISION: A STUDY IN AN ENGINEERING PROGRAM IN AUSTRALIA

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ABSTRACT

Aim/Purpose	The overall aim of this study was to improve our understanding of engineering student satisfaction and expectations with PhD supervision and their perceptions of the roles in a supervisory relationship.
Background	Studies on PhD supervision quality are highly valuable, mainly when they provide information on supervision experiences from students' perspectives, rather than from supervisors' perspectives. Understanding how PhD students think, their preferences and their perceptions of roles in a supervision process can help enhance the quality of supervision, and consequently, form better researchers and produce better research outcomes.
Methodology	The method employed in this investigation was based on a student survey with scaled and open-ended questions of 30 full-time engineering PhD students from a research institution in Australia.
Contribution	Studies that provide a better understanding of how engineering PhD students think and how they expect a supervisory relationship to be are limited. This study can be used to derive recommendations for improving supervisory relationships, particularly in engineering schools and institutions.
Findings	The majority of the students perceived most of the supervisor and student roles in close agreement with the roles described in the literature and existing codes of practice for the supervision of higher degree research students. The main reasons for dissatisfaction with supervision were identified as being the lack of involvement of supervisors in the research projects, particularly in the writing process, and the lack of supervisor's knowledge in the field being supervised.

Recommendations for Practitioners	It is recommended that the roles of each party in a supervision process be discussed and clarified at the beginning of any PhD candidature to avoid false student expectations. The right supervisory fit should be ensured early in the candidature, and additional supervisors should be added to the team if the expertise of supervisors is deemed insufficient. The use of supervisory panels as opposed to individual supervisions to ensure that responsibilities are shared and to increase the range of advice and support available to each student is highly recommended.
Recommendations for Researchers	It is recommended that this type of research be expanded to other disciplines. It is also recommended that specific actions be taken to improve supervision and these be correlated to satisfaction rates and/or student performance.
Keywords	doctorate, higher education, relationship, advisor, survey

INTRODUCTION

Supervision is considered one of the most influential factors in doctoral experiences (Sverdlik, Hall, McAlpine, & Hubbard, 2018). The appropriate matching of student and supervisor/s is a key catalyst for the successful progress of research students (James & Baldwin, 1999). This matching is particularly important in STEM disciplines, where students' research efforts are more closely intertwined with the work of their supervisors (De Welde & Laursen, 2008; Golde, 1998; 2005). According to Gardner (2009), Lin (2012), and Gube, Getenet, Satariyan, and Muhammad (2017), supervisors play a major role in student satisfaction, persistence, and academic achievement. Furthermore, Seagram, Gould, and Pyke (1998), Lovitts and Nelson (2000), and Manathunga (2005) emphasize that adequate support, access and guidance from the supervisor is essential to avoid student dropouts, particularly in the early stages of candidature. Moreover, Kiley (2011) states that satisfaction with supervision is the most important factor in timely candidature completion. According to McCulloch (2010), the quality of the candidate's experience and the outcomes of the candidature 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. As defined by Gatfield (2005), an effective supervisor is one who achieves high completion rates, has candidates submit their thesis within the normally expected time frame and engages in multiple supervisions.

A poor quality supervision process may negatively affect the student's candidature by, for instance, increasing the time for candidature completion (De Valero, 2001; Kiley, 2011; Pitchforth et al., 2012; Sinady, Floyd, & Mulder, 2009), decreasing the quality of the research outcomes (Cullen, Pearson, Saha, & Spear, 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 early termination of doctoral candidatures (Castello, Pardo, Sala-Bubare, & Sune-Soler, 2017; De Valero, 2001; Frischer & Larsson, 2000; Ismail, Abiddin, & Hassan, 2011; Lovitts & Nelson, 2000). Moreover, poor quality supervision is associated with high levels of stress and other health issues among students, which can directly affect the quality of the expected research outcomes and candidature milestones (Haag et al., 2018).

It is also widely discussed in the literature that the clarification of the roles and expectations of both student and supervisor is an essential step, particularly in early candidature, to avoid potential frustrations and dissatisfaction that could eventually lead to unsuccessful candidatures (Barrie, 2004). Research on doctoral supervision indicates that ethical, technical and methodological problems can be substantially minimized or prevented if students and supervisors begin their relationship with clear expectations regarding their respective roles (Boud & Lee, 2005; Goodyear, Crego, & Johnston, 1992; Ives & Rowley, 2005; McCormack, 2004). More specifically, Latona and Browne (2001), and Phillips

and Pugh (2005) argue that the level of satisfaction of students with their supervisors can be partially explained by how students perceive the differences in the roles. Moreover, Eley and Jennings (2005) state that it is the supervisor's role to talk about the "nature of the contract" between the student and supervisor at the onset of the research work, regarding contributions and joint efforts from both of them throughout the research.

AIMS AND OBJECTIVES

The study of the quality of supervision is particularly important in countries that follow the British supervision system, such as Australia, including an intensive one-to-one relationship between student and supervisor, assessments based on thesis and virtually no coursework (Heath, 2002; Kiley, 2011). In these systems, the success of the PhD candidature is highly dependent on the quality of the supervisory process, because supervisors have to provide the expertise, time and support to ensure students develop appropriate skills and attitudes towards research that will lead to a thesis of acceptable standard (Heath, 2002). Therefore, studies on supervision quality become highly valuable for these institutions, mainly when they provide information on supervision experiences from students' perspectives, rather than from supervisors' perspectives. This information can be used by these institutions to enhance the student experience, and consequently, this will benefit students, supervisors and the institution itself.

The overarching aim of this study was to better understand engineering students' experiences and perspectives of supervision in PhD programs, and to provide insights into the possible enhancement of PhD supervision experiences. The method employed in this investigation was a student survey involving full-time PhD students from an Australian engineering school. The study had the following objectives:

1. To learn about engineering students' general perceptions of the roles attributed to students and supervisors in doctoral candidatures, and compare these perceptions with the roles described in codes of practice for higher degree student supervision from Australian universities;
2. To identify the main reasons why engineering students choose a PhD supervisor;
3. To determine the current overall level of satisfaction of these students with the supervision at this school and the overall level of satisfaction among these engineering doctoral students, in relation to specific aspects of the supervision process;
4. To identify the positive and negative aspects of doctoral supervision, and the qualities or aspects that would foster good quality doctoral supervisions, from these engineering students' perspectives; and
5. To recommend further actions towards improving engineering PhD student satisfaction.

LITERATURE REVIEW

In this section, literature is first reviewed on the topic of effective and ineffective research supervision. This is followed by a discussion on the importance of clarification of roles and expectations in a supervisor-student relationship.

EFFECTIVE AND INEFFECTIVE RESEARCH SUPERVISION PRACTICES

From findings of the best available research projects on effective supervision practices, James and Baldwin (1999) summarized 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 robust 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 or 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' opinions on doctoral supervision effectiveness (McAlpine & 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 expected that their supervisors would:

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 their 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 students' path; and

8)   Help students secure a job at the end of the candidature.

Many studies advocate that student socialization and academic integration into the departmental community are extremely important in PhD candidatures, it being the supervisor's role to introduce the student to the institution, and to open opportunities for socialization and integration (Golde, 2000, 2005; Lovitts & Nelson, 2000). According to Lin (2012), and Walsh (2010), supervisors were found to be the main contributor to students' sense of belongingness within their research groups. Furthermore, Lovitts and Nelson (2000) argued that when students first arrive on campus, they are interested in the department's collective social life and activities, and how they can participate in these activities. The authors emphasized that it is the supervisor's role to facilitate this integration. Lack of socialization and integration was found as the second most important reason for PhD students to drop out of their studies in a Spanish study involving 724 PhD students and 56 universities (Castello et al., 2017). Lovitts and Nelson (2000) also suggested that students would feel more a part of the academic community if they could be represented or take part in the various schools' committees. They also discussed the importance of recognition, arguing students' publications, for instance, should be circulated across the department, and students should be recognized for their achievements. This recognition, it was estimated, would increase their motivation and satisfaction with their PhD candidature.

Heath (2002) discussed the importance of regular meetings in the supervisory process. An Australian study found a close correlation between the frequency and regularity of meetings and supervision effectiveness and student satisfaction. It was found that those students who met with their supervisors more regularly (on average every fortnight) finished their candidature earlier and were more like-

ly to be satisfied with their program overall. Similar correlation had also been found for students who were required to submit written work earlier, with these students being more satisfied than those who were only required to submit written work at the final stages of their candidatures (Heath, 2002).

Hammond, Ryland, Tennant, and Boud (2010), and Kiley (2011) discussed the importance of supervisor training and professional development to enhance supervision performance. Hammond et al. (2010) advocated that supervisor training is essential to guarantee the overall professionalism of supervision, for it provides pedagogical support for supervisors and further supervisory knowledge and skills. A study conducted by Kiley (2011) in eight Australian institutions found that between 2000 and 2010, the universities in the sample had introduced a significant number of workshops and seminars on supervision-related topics, such as supervisor/student relationships, clarification of various expectations at the beginning of candidature, milestones and monitoring progress, roles and responsibilities of supervisors, candidates and institutions and policies. By comparing PREQ (Postgraduate Research Experience Questionnaire - Australian Department of Education, Training, and Youth Affairs & Australian Council for Educational Research, 2000) results from 2000 to 2010, the study concluded that doctoral candidates from the institutions under study were more satisfied than candidates from ten years ago and attributed this improvement to the introduction of these training programs. Examples of programs that universities had been implementing ranged from simple full-day induction programs to more sophisticated on-line courses with multiple modules that supervisors needed to work through. There were also more complex programs where the supervisors were classified as 'accredited' or 'unaccredited' based on the number of successful, timely completions. 'Unaccredited' supervisors were required to work with 'accredited' supervisors until they get at least three successful completions (Kiley, 2011).

Hammond et al. (2010) also suggested that supervisors could improve their supervision practices by co-supervising, that is, by learning from a more experienced colleague. According to the authors, an effective supervision process could only be achieved with the combination of training (skill development through workshops and other programs) and co-supervision practice. Kiley (2011) supported this view by suggesting that experienced supervisors run mentoring workshops for their supervising colleagues.

According to Green and Lee (1995), ineffective supervision practices might arise due to different reasons, but mostly from a lack of interpersonal skills demonstrated by either the supervisors or students or an insufficient scholarly approach in the supervisory process. Barrie (2004) suggested that poor quality supervision can also be attributed to the supervisor's assumption that the student is ready and aware of expectations, requirements and roles. In addition, Dann (2008) highlighted that supervision failure may occur just as a result of 'non-delivery of supervision', that is, when supervisors do not bother to make time to meet their students, delay providing feedback or reading draft material. Amongst other factors, these undesirable practices were attributed to poor time management skills, staff resource overloading or poor timetabling, which reduced the capacity of the supervisor to provide adequate supervision (Dann, 2008). Ives and Rowley (2005) also pointed out that often the research project and supervision are "sold" to the student in response to a demanding research environment, misleading the student as to what the research and supervision would actually be like. This is in agreement with McCormack (2004), who noted that dissatisfaction arose among students when their supervisors gave them misleading or misguided impressions as to the nature of the research project and the level of supervision. Ray (2007) considered ineffective supervision a result of poor student selection of supervisors, and that a multi-criteria tool should be made available to students to help them get the best supervisory fit for their candidatures.

Certainly, numerous factors affect the level of satisfaction students feel towards their supervisors and aspects of supervision. Stage of candidature, for instance, seems to result in different levels of satisfaction, with decreasing contentment as the candidature approaches the end (UC Berkeley Graduate Assembly, 2010). Also important is the complexity of the research project (Krull, 2010). Other factors that have been pointed out by Rodwell and Neumann (2008) are the attendance status (part-time

or full-time), the availability of funding and scholarships and the intellectual environment of the department. Ellis (2001) suggested that satisfaction with supervisors is something that varies between males and females and between races. Latona and Browne (2001) pointed out that the research discipline is an important factor too in determining levels of contentment. Satisfaction levels could also decrease due to isolated factors, such as when a candidate is left as an "orphan" in an institution, due to the supervisor leaving or retiring, requiring someone else to take over his position (Krull, 2010).

Interestingly, despite extensive literature linking student-supervisor relationship to doctoral student satisfaction, findings from Gardner (2009) suggested that supervisors were often unaware of their part in student failures and dropouts. It was shown that supervisors usually perceived program attrition as principally due to students lacking requisite skills or motivation (74%; Gardner, 2009), followed by complications in students' personal lives (e.g., mental illness; 15%). Conversely, the most commonly cited reason, after personal problems (e.g., marriage, childcare issues; 34%), was poor supervision practices (30%). Adrian-Taylor, Noels, and Tischler (2007) found graduate students to reported lack of feedback as the primary reason for conflict with their supervisors, but supervisors instead attributed this conflict to students' characteristics.

CLARIFICATION OF ROLES AND EXPECTATIONS IN A SUPERVISORY RELATIONSHIP

Another critical aspect to consider when analyzing the complex issue of supervision satisfaction is the student perception of the roles and expectations of supervisors and students in supervisory relationships. It is widely argued that the quality of supervision and the level of satisfaction of students with their doctoral education can be explained by how students distinguish the differences in the roles (Latona & Browne, 2001; Phillips & Pugh, 2005) and by the way they choose to occupy their roles (Hockey, 1996). Ives and Rowley (2005) found that a lack of clarity regarding the roles could lead to overall student dissatisfaction with the whole research experience. According to Elay and Jennings (2005), both student and supervisor can harbor differing perceptions of what each should be doing, and problems can ensue as a consequence. For instance, students may expect their supervisors to continuously contribute and actively participate in their research projects. Supervisors, in turn, may expect students to undertake research more independently, as they perceive their roles as one of provision of guidance and support only. This clash of expectations and clarity in the roles might further decrease student satisfaction. McCormack (2004), and Boud and Lee (2005) found that failure to establish expectations and clarify the roles of supervisors and students highly correlated to decreased candidature completion rates. Cotterall (2013) examined the most commonly occurring emotion-eliciting elements of the doctoral process in an Australian institution and found most emotional episodes involved interactions with supervisors. Whereas most comments concerning supervisors were positive, it was the discrepancy between supervisors' and students' expectations that generated confusion, stress, and anxiety in students. In a study conducted by Goodyear et al. (1992), it was suggested that ethical, technical and methodological problems in PhD candidatures could be minimized or prevented if all the participants began the relationship with clear expectations for their respective roles.

It is widely emphasized in the literature that the clarification of the roles and expectations of both student and supervisor should be made early in the candidature to avoid potential frustrations and dissatisfaction that could eventually lead to unsuccessful candidatures (e.g., Barrie, 2004; Boud & Lee, 2005; Elay & Jennings, 2005; Kohner, 1994). Elay and Jennings (2005) argued that the "nature of the contract" between student and supervisor regarding contributions and joint efforts from both parties should be made clear at the onset of the research project. This clarification would optimize both the enjoyment of the experience and the chances of a successful outcome. Both the department and supervisors must be attentive in working with students to establish these mutual expectations, responsibilities and benefits for working together (Phillips & Pugh, 2005). Based on the work of Moses

(1985), survey tools have been developed to assist in clarifying role expectations in supervision between the supervisor and student (Griffith University, 2018; University of Adelaide, 2017).

Even though most published studies reported on the responsibility of the supervisor to create and maintain a positive relationship with their students, it was also demonstrated that students' characteristics (i.e., factors that are under the control of students themselves) also played an important role in this relationship. Goldman and Goodboy (2017) suggested that students' psychological maturity, for example, was an important factor in maintaining a respectful, friendly, and constructive relationship with their supervisors. Similarly, bringing positivity and respect into the relationship, practicing and demonstrating gratitude could also improve this relationship (Howells, Stafford, Guijt, & Breadmore, 2017). Students who consistently respected timelines, prepared for meetings, accepted feedback, and demonstrated their capabilities in their work, were more likely to ensure the satisfaction of their supervisors in the relationship (Sverdlik et al., 2018). This shift in focus is important as it can provide evidence-based strategies for improving the supervisory relationship that are within the students' direct control (Sverdlik et al., 2018).

METHODOLOGY

Methodology for this investigation consisted of two stages. The first stage, addressing research objectives 1 to 4, was to collect empirical data relating to PhD students and their supervision experiences. This was conducted using a survey constructed from a range of existing instruments as described below. The second stage, addressing research objective 5, was to engage with scholarly literature relating specifically to effective PhD supervision to determine practices appropriate to address students' needs.

The first method employed in this investigation was based on a student survey with scaled and open-ended questions. The study was approved by the ethics and research committee of the authors' university (ENG/08/13/HREC). The survey included questions about students' current supervision experiences, as well as about how they perceive the roles of supervisors and students within the doctoral supervision process. This survey is referred to as the 'PhD Supervisor Satisfaction Survey' or 'PSSS' throughout this section.

The PSSS was conducted in the Griffith School of Engineering, Griffith University, Australia (GSE) in 2013. A total of 47 full-time doctoral students (i.e., the entire PhD student cohort in the GSE) were invited to participate via an online anonymous questionnaire through an anonymous submission system. In March and April 2013, the students were contacted via email and were invited to participate in the study. Supervisors in the GSE were also informed about the study and were asked to remind their students about the questionnaire. The survey forms were sent out to students in the end of April 2013 by email. To ensure anonymity, in this email students received login and password details for an email account created specifically for the survey. Students were asked to log into this email account and send their completed surveys to one of the investigators. This email account remained open until the end of May 2013. During the survey period, three reminders were sent to students to encourage them to respond. The investigators involved in this project were researchers from the institution, but not affiliated with the PhD program, and not involved in any supervision at that time.

The PSSS involved three main parts, A, B and C. To provide 'face validity', all questions of the survey were reviewed by two senior researchers from the Griffith Institute for Higher Education, and by two research ethics advisors. Further validation of the survey through pilot testing with a segment of the sample population and confirmatory factor analysis was balanced against maintaining the largest sample population possible. With the knowledge that the survey was constructed from previously validated and tested instruments it was decided to defer this step as an item of further study.

The survey form is provided in the Appendix section of this article. Part A of the survey 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.

Part B included questions about the students' perceptions of their roles and of the roles of their supervisors within a doctoral candidature, and was design to address Objective 1. A survey instrument ("Moses Schema") retrieved from the work of Kiley (1998; 1999), which has been widely used in similar research (e.g. McGinty, Koo, & Saeidi, 2010) and by universities worldwide to assess student perceptions of roles, was given to the students. They were asked to use a Likert scale from 1 to 5 to indicate their perception of the roles, where 1 represented a role solely the supervisor's responsibility and 5, a role solely the student's responsibility. The perceptions of the students were later compared with the roles described in codes of practice for higher degree research supervision available in the websites of the ten largest Australian institutions.

Part C of the PSSS included questions about the students' supervision experiences. The first question was about the reasons students selected their principal supervisors. This question and responses helped address Objective 2 of this study. Students were given a list of various reasons, as per the survey instrument developed by Garrett (2006), and adapted from Golde and Dore (2001). Students were asked to select the three main reasons for choosing their supervisors.

The second question in Part C was about their experiences regarding different aspects of supervision. For example, they were 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, 2016) and the "2010 Graduate Student Satisfaction Survey" (UC Berkeley Graduate Assembly, 2010). For this question, the students again used a Likert scale from 1 (low) to 5 (high) to indicate their experiences. The third question of part C was about the students' overall satisfaction with their principal supervisors, which was again based on a scale from 1 (low) to 5 (high). These questions and student responses were used to address Objective 3.

In the fourth question of Part C, students were asked to list positive and negative characteristics of their supervisors or supervision experience. In the fifth question, students were asked to list qualities that they felt would make an effective supervisor. The responses of these two questions were organized into themes, including "*direct participation and involvement in the research project and feedback*", "*knowledge, skills, experience and reputation in the field*", "*friendliness, approachability, patience, understanding and kindness*", "*conduct of the supervision process, professionalism, attitude and communication skills*", "*motivation, encouragement and emotional support*", "*provision of resources, facilities and collaboration*". These questions and responses were later analyzed to address Objective 4.

The last part of this study (Objective 5) was based on a review of extant literature including more than 65 peer-reviewed journal articles related to PhD supervision. Supervision practices were recommended on the basis that evidence exists to prove that these practices are correlated to PhD student performance and satisfaction.

RESULTS AND DISCUSSION

This section follows the structure of the survey instrument, as described above. The sample population demographic data is presented followed by findings relating to each of the five research objectives. In sections addressing the first four research objectives, relevant survey results are presented, and outcomes of their analysis contrasted against findings in extant literature. The final section relates recommendations for improving supervision practice and PhD student satisfaction derived from an extensive review of literature.

DEMOGRAPHICS OF THE SAMPLE POPULATION

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 from the GSE. Results of the demographic questions indicate that of the 30 respondents, 16 were aged below 30 years, and 14 above 30 years, indicating a balanced distribution between mature and non-mature students. Regarding citizenship status, 13 of those doctoral students were either Australian citizens or permanent residents, and 17 were international students. Most 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 paid work either within or outside the university. Students in early to mid-candidature (i.e., 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 the doctoral thesis) numbered 13 (43.3%). These demographics seem to be a reasonable foundation for an accurate analysis.

STUDENTS' PERCEPTIONS OF ROLES (OBJECTIVE 1)

The perception of the roles of students and supervisors according to the GSE doctoral students is summarized in Table 1. Table 1 shows the perceived responsibilities of different roles according to the majority of the GSE doctoral students, and in accordance with the roles described in most codes of practice for higher degree student supervision from Australian universities, referred here as CP's.

Table 1. Comparison between engineering doctoral students' perceptions of roles and roles established in Australian universities' codes of practice for HDR supervision (n = 30)

Aspect of candidature	Role according to engineering students	Role according to HDR Codes of Practice
Selection of research topic	both	both
Selection of the theoretical framework of the research	supervisor/both	both
Development of an appropriate program and timetable of research and study	student/both	student
Introduction of the student to the services and facilities of the department and University	supervisor	supervisor
Information about the relevant policies, procedures and requirements relating to PhD candidature	supervisor	both
Decision of when to have meetings	supervisor/both	both
Coordination of all communication between supervisors and the student	supervisor/both	supervisor
Ensuring that student is working consistently and on task	supervisor/both	both
Ensuring that the thesis is finished by the maximum submission date	supervisor/both	both
Verification of all drafts of work	supervisor	both
Writing, editing and presentation of the thesis	Undetermined	student
Standard and format of the thesis	supervisor	both
Provision of emotional support & encouragement	supervisor/both	supervisor

According to the results, most of the students from the GSE (60%) agreed that the "*selection of research topic*" is the responsibility of both supervisor and student. The finding of most students agreeing that the choice of research topic is a responsibility shared by student and supervisor is in accordance with the findings of McGinty et al. (2010) and with the CP's provided by Australian institutions.

According to the respondents, six roles were perceived as the responsibility of either the supervisor or of both supervisor and student. These are the "*selection of the theoretical framework for the research*", the

"*decision of when to have meetings*", "*coordination of all communication between supervisors and the student*", "*ensuring that student is working consistently and on task*", "*ensuring that the thesis is finished by the maximum submission date*" and the "*provision of emotional support and encouragement*". Except for "*coordination of all communication between supervisors and the student*", which is clearly defined in the Australian CP's as a role of the supervisors, there is enough evidence showing that the other aspects should be the shared responsibility of both student and supervisor. However, there is not enough information on "*provision of emotional support and encouragement*" which, intuitively, could be a role of all members of the supervisory process.

Four roles were regarded by the majority to be the sole responsibility of the supervisor. These were "*introduction of the student to the services and facilities of the department and University*", the "*provision of information about the relevant policies, procedures and requirements relating to PhD candidature*", the "*verification of all drafts of work*" and "*decision on the standard and format of the thesis*". As opposed to the students' overall perceptions, the three latter roles can be interpreted in the Australian CP's as the responsibility of both student and supervisor. For "*provision of information about the relevant policies, procedures and requirements relating to PhD candidature*", for instance, the Griffith Code of Practice (GCP) for higher degree research supervision (Griffith University Board of Graduate Research, 2019) states that it is the supervisor's responsibility to "(...) discuss in detail and ensure the student is aware of University policies and procedures relating to HDR candidature", and it is also a responsibility of the student to "become familiar with, and abide by, University policies and procedures (...)". For "*verification of all drafts of work*", the GCP emphasizes that it is the supervisor's role to "provide constructive, detailed and timely feedback on the content and drafts of the thesis (...)" and it is the student's responsibility to "present written material (to supervisors) in sufficient time to allow for comments and discussions (...)". As for the role "*decision on the standard and format of the thesis*", the GCP states that it is the supervisor's responsibility to "ensure the thesis is being prepared and that it is not unnecessarily long and does not exceed the upper limits for the length of higher degree research theses". It also says the supervisor should "certify that the thesis has been read in its final form, is properly presented and is prima facie worthy of examination". Further, students are responsible for "(...) writing up the thesis and be aware of the requirements for content, style and standard of presentation". For the role "*introduction of the student to the services and facilities of the department and University*", in agreement with the students' perception, the GCP specifies that it is the responsibility of the supervisor to "advise the students on their rights and responsibilities in accessing and using the resources and facilities available from the element/group and the University".

Most students perceived the role related to the "*development of an appropriate program and timetable of research and study*" as being the student's responsibility. This role is a student's responsibility according to the majority of the Australian CP's, but supervisors should assist and give advice during this development process.

The role related to "*writing, editing and presentation of the thesis*" was not clearly defined according to the respondents, with the results showing that 33% of the students believed this to be a student's responsibility, 37%, a supervisor's responsibility, and 30%, the responsibility of both. That nearly a third of students in the study believed that presentation of the thesis was the supervisor's responsibility contrasts with the survey results of McGinty et al. (2010) who found that most students felt responsible for production of the thesis. On the other hand, these findings are in line with Murphy, Bain, and Conrad (2007) who observed that doctoral students in engineering programs largely perceived supervision as task-focused as opposed to person-focused in nature. As another hypothesis, the results from the current study may be attributed to many GSE supervisors requiring that students organize their theses in chapters that are each a journal or conference article. As such, it could be argued that these students feel that, as authors of these articles, supervisors should also collaborate in the writing process. However, the GCP states that students are responsible for "(...) writing up the thesis and be aware of the requirements for content, style and standard of presentation", although supervisors should "ensure that the thesis is in an appropriate format and ready for submission".

This ambiguity demonstrates again the need for clarification of the roles and expectations of supervisor and student early in the PhD candidature. Moses (1984) argues that too much input from the supervisor into the thesis writing might impinge on the student's claim to originality and independent achievement. Supervisors however, may be expected to anticipate examiners' criticism and communicate them to the student.

STUDENTS' REASONS FOR CHOOSING A SUPERVISOR (OBJECTIVE 2)

Table 2 summarizes the results regarding the reasons why GSE doctoral students have chosen their current principal supervisors. More than half of the respondents were supervised by two or more co-principal supervisors. The resulting number of evaluations was therefore 50, though the respondent sample size (n) remained 30.

The main reason for choosing their current supervisors was because the supervisor was "conducting interesting research and offered the student an interesting project" (13.5%). The second reason was that the supervisor "had intellectual interests that match the student's" (11.7%) and the third most chosen reason was that the supervisor "was willing to supervise the student" (9.9%). Other significant reasons were the "reputation of the supervisor as a good researcher" and the "supervisor's knowledge of the techniques to be employed in the research project" (9.0% each).

Table 2. Engineering doctoral students' main reasons for choosing supervisors at an Australian engineering school (n = 30)

Reasons for choosing principal supervisor (s)	Responses (%)
Is doing interesting research / offered me an interesting project	13.51%
Has intellectual interests that match mine	11.71%
Was willing to supervise me	9.91%
Has a reputation of being a good researcher	9.01%
Is knowledgeable in the techniques and methods I will employ	9.01%
Has a reputation of being a good supervisor	8.11%
Was recommended to me by other people	6.31%
Has money to support me	6.31%
Has a reputation of getting students through the process in a timely manner	4.50%
Fosters a working environment I like in his/her research group	4.50%
Gives me opportunity to work	3.60%
Will make sure I do a rigorous thesis	3.60%
Has great motivation	2.70%
Can write a good reference letter that will help me find a job in the future	2.70%
Other: *(inform reason)*	1.80%
Has a reputation of being a good teacher	0.90%

The findings with respect to student choice of supervisor align with the findings of Golde and Dore (2001) who investigated the reasons why students choose their supervisors across 27 universities in the USA. They also found that the two main reasons were related to the research being conducted by the supervisor and having similar intellectual interests. Golde and Dore (2001) also found that the third main reason was the reputation of the supervisor as a good researcher, and the fourth reason was the knowledge of the supervisor in the techniques to be employed in the research.

STUDENTS' SUPERVISION SATISFACTION (OBJECTIVE 3)

Table 3 summarizes the results of the question about overall satisfaction with supervisors. The students were asked to rank their satisfaction from 1 (low) to 5 (high). 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 (i.e., chose 4 or 5), and 24.5% were shown to be dissatisfied (i.e., chose 1 or 2). Also, 26.5% of the students responded they were neither satisfied nor dissatisfied (i.e., selected 3). The students were also asked whether they would recommend their principal supervisors to a friend wanting to conduct research aligned with the supervisors' research area. 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.

These findings seem to indicate a lower level of student supervision satisfaction in GSE when compared to other institutions. For example, a study conducted in 1991–1993 reported that 85% of doctoral students at the Australian National University were satisfied with their supervision (Cullen et al., 1994). Heath (2002) found the same percentage of agreement in a similar survey of doctoral students conducted at the University of Queensland. Ainley (2001) analyzed the PREQ results from Australian universities and also concluded that Australian higher degree research students were highly satisfied with their supervision. Govendir and Govendir (2010) found 75% of doctoral students at the University of Sydney were satisfied with their supervision. Further, Harman (2003) found that 62% of doctoral students were either satisfied or highly satisfied with their supervisors in two of the '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 with their supervisors in the GSE is significantly lower than the overall satisfaction identified in other Australian research institutions, as reported in the literature.

In agreement with the 2010 UC Berkeley Graduate Assembly survey, the current study indicated that the level of satisfaction with the supervision process was lower for candidates in their final stages of candidature. It was found in this study that only 35% of students in the final stages of candidature were satisfied, whereas the percentage of satisfied students in early candidature was close to 60%. The rate of students who would recommend their supervisors to a friend interested in the same field as the supervisors was 50% for students at the end of candidature, and 70% for students in early candidature. Some possible interpretations for these results are that poor-quality supervision may increase the duration of candidature (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. This theory is supported by McAlpine and McKinnon (2013) who found that doctoral students need for supervision is critical during the transition out of the doctoral program when students expect more contribution of supervisors in the writing process and a higher level of employment guidance. Other parameters such as age, scholarship status, citizenship status, amount of paid work and the number of principal supervisors did not appear to influence the results of satisfaction.

Table 3. Engineering doctoral students' overall satisfaction with supervision at an Australian engineering school (n = 30)

Question about supervisors	Results
Overall satisfaction (average)[1]	3.3
Overall satisfaction (mode)[1]	4
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%

Question about supervisors	Results
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

When asked about particular aspects of the doctoral supervision process, a higher level of agreement was demonstrated in comparison with the overall supervision satisfaction results presented 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 notable was that 30.6% of the students appeared to feel that their supervisors were more concerned about the production of publications than about the student's overall learning experience.

WHAT STUDENTS CONSIDER ESSENTIAL FOR EFFECTIVE SUPERVISION (OBJECTIVE 4)

In the survey, the students were first asked to list positive aspects of their supervisors and aspects for which supervisors needed improvement. For the positive characteristics, 117 comments were provided. Most of the comments were related to the theme "*knowledge, skills, experience and reputation in the field*" (33 comments – 28.2% of the responses), for instance, "supervisor is knowledgeable" or "supervisor has knowledge of the research topic", or "supervisor has the appropriate skills and experience". The next most popular theme was "*friendliness, approachability, patience, understanding and kindness*" (28 comments – 23.9%), for instance, "supervisor is friendly" or "supervisor is approachable". There was also a significant number of comments on "*direct participation and involvement in the research project*" (18 comments), as in "supervisor provides valuable feedback" or "supervisor helps me write".

For the negative characteristics of supervisors (100 comments in total), most comments were related to "*direct participation and involvement in the research project and feedback*" (30 comments – 30% of the responses), with comments along the lines of "supervisor does not show interest in the research project" or "supervisor should fix my writing", or "supervisor should help me with lab work". Comments about students wanting more meetings with supervisors were also included in this theme. Also significant was the number of comments related to "*knowledge, skills, experience and reputation in the field*" (21 comments), such as "supervisor doesn't understand my topic" or "supervisor has no experience in my topic". Comments on "*conduct of the supervision process, professionalism, attitude and communication skills*" were also popular (18 comments), as in "supervisor needs better communication skills" or "supervisor should answer his emails").

When asked to list qualities that students feel would make an effective supervisor, of the 105 comments provided, 20% were related to "*direct participation and involvement in the research project and feedback*", and 20% were related to "*knowledge, skills, experience and reputation in the field*". The other comments were evenly distributed across the remaining themes, these being: "*friendliness, approachability, patience, understanding and kindness*" (15.2%), "*conduct of the supervision process, professionalism, attitude and communica-*

tion skills" (15.2%), "*motivation, encouragement and emotional support*" (14.3%) and "*provision of resources, facilities and collaboration*" (15.2%).

It should be noted that the two top characteristics listed by the students as qualities of an effective supervisor (i.e., participation and involvement in the research project, and knowledge, skills, experience and reputation in the field) are well-aligned with those aspects students listed as negative and positive aspects of their supervisors/supervision. This demonstrates how important these aspects are in a supervision process in the view of the GSE students. Also, these aspects have also been outlined by Phillips and Pugh (2005) under the list of the nine most important supervision expectations of higher degree research students. The results are also in line with the results of McAlpine and McKinnon (2013) who found supervisor's 'intellectual knowledge' to be the most important factor to avoid student frustration.

RECOMMENDATIONS FOR BETTER SUPERVISION PRACTICES AND INCREASED STUDENT SATISFACTION (OBJECTIVE 5)

There are factors regarded as "essential" and factors regarded as "supplemental" for a successful supervision process. The "essential" factors are those closely related to the traditional definition of "effective supervision", that is, factors that help students successfully finish their candidatures within a reasonable timeframe. Essential elements are, for instance, the availability of a supervisor, a well-structured and robust research plan, the delivery of supervision and guidance (regular meetings, feedback, close monitoring of the research development), an institutional framework (guidelines), and infrastructure and resources for the development of the research project. "Supplemental" factors are those fine factors that will help students enjoy the PhD experience. These factors will help students develop a sentiment of fulfilment and satisfaction, making the doctoral experience enjoyable. The term "effective supervision" should perhaps be revisited to also incorporate how students feel about their candidatures (i.e., their level of satisfaction). PhD supervisions resulting in timely completion of candidatures, but with students unhappy, discouraged or disappointed with the process, should not be regarded as "effective". "Supplemental" factors would involve those aspects that seek the enhancement of the traditional effective supervisory process, including, for instance, the clarification of roles in early candidature, integration of the student into the academic environment (socialization), the recognition of the student's achievements, and professional development for supervisors (training). Below is a summary of how various factors could make supervision more effective:

Clarification of roles: The clash of expectations and clarity in the roles of students and supervisors might decrease student satisfaction and affect PhD completions. The clarification of the roles and expectations should be made early in the candidature to avoid potential frustrations and dissatisfaction in the course of the PhD project. This clarification will optimize both the enjoyment of the experience and the chances of a successful outcome. Both the department and supervisors must be attentive in working with students to establish mutual expectations, responsibilities and benefits for working together. It is highly recommended that institutions adopt survey tools developed to assist in clarifying role expectations in supervision between the supervisor and student;

Socialization: Student socialization and academic integration into the departmental community is critical for doctoral student satisfaction, and it is the supervisor's role to involve students in the social life of the department. Student socialization and integration could be achieved, for example, by inviting the students to represent the other postgraduate students in schools committees, or to participate in social events run by the department/school;

Recognition: Giving students' publications public recognition, and recognizing students for their achievements, could provide students with more motivation to continue with their research, and produce better quality outcomes. Recognition could be effectuated by, for instance, circulating student publications among the department and/or school staff. This action would also enhance student reputation in their research field, and open opportunities for future collaborative research work;

Research supervisor training: Supervisor training is essential to guarantee the overall professionalism of supervision, for it provides pedagogical support for supervisors and further supervisory knowledge and skills. Supervisors should also make more use of information disseminated through scholarly literature, codes of practices and the 'how to supervise' literature;

Co-supervision: Supervisors can improve their supervision practices by co-supervising, that is, by learning from a more experienced colleague. It is with a combination of training and co-supervision practice that supervisors will be in a position to supervise candidates positively and effectively. The establishment of supervisory panels as opposed to individual supervisions is recommended to ensure that responsibilities are shared, and to increase the range of advice and support available to the student;

Revision of codes of practice, policies, procedures and guidelines: Most supervision improvement practices or programs will require a review of codes, policies and regulations to ensure they are effectively implemented, and that there are compliance and consistency among staff and students. Also important is to increase the level of awareness of newly introduced policies to ensure supervisors and students are prepared to comply with them;

Doctoral education reform and professionalism: Doctoral supervision could be moved from an individual to an institutional level, aiming at more transparency and better regulation and organization of doctoral programs. This change would include, for instance, student admission at institutional level, supervisions based on supervisory panels, the establishment of doctoral committees to oversee supervision, and regular progress reports and PhD agreements. This system is to some extent linked to the increasing demands for "quality assurance" and "quality enhancement" in supervision practice;

Tools for supervisor selection: The selection of a supervisor is often based on a set of criteria, such as supervisors' reputation, knowledge, and matching of research interests, which is done by the student in an unplanned manner, later becoming one of the reasons for their regret, lack of motivation, and poor quality of research output. Research institutions should develop and make available to their potential candidates, tools that help them choose a supervisor in a more objective manner, taking all factors and their own priorities into account. Ray (2007), for example, defends the use of a multi-criteria decision tool based on an analytical hierarchy process for the selection of a supervisor. This tool adds value to human judgment by introducing objectivity and quantification of priorities, allowing students to make a more informed choice of supervisor. Tools like this can help student become more confident about their decisions concerning selecting their PhD supervisor.

CONCLUSIONS

The GSE doctoral students are clear about most roles (i.e., their perceptions closely align with the roles described in the Australian CP's) but seem to be uncertain about the responsibilities regarding "*writing, editing and presentation of the thesis*". This role is also not clearly articulated in most Australian CP's. This uncertainty suggests that the GSE should ensure that more clarification about this role is provided to students by supervisors at the beginning of their PhD candidature. The unclear perception regarding thesis writing and preparation is a concerning issue, particularly when this is compared with the results from other similar surveys, in which students generally feel they are responsible for the preparation of the thesis. The disagreement of the findings of this study with the literature could be, to some extent, related to the fact that a large number of GSE supervisors encourage their students to organize their PhD theses with each chapter being a journal or a conference article. As such, it could be interpreted that these students perceive that, as co-authors of these articles, supervisors should also help to write their theses. It is important to note, however, that too much input from the supervisor into the thesis writing may impinge on student's claim to originality and independent achievement. Supervisors, however, should anticipate potential criticisms from examiners, so that these aspects are well addresses by the students in their theses.

The results showed that the main reason for choosing a supervisor among the GSE students is the alignment between students' and supervisors' research and intellectual interests. This demonstrates

that supervisors should continue making their research interests and outcomes visible (e.g., via institution or research Centre websites, personal webpages, etc.) to potential PhD candidates, since this seems to be the main criteria used by the student to select a supervisor.

This study also showed that approximately 50% of the engineering PhD students in the GSE were satisfied with their supervision experiences. This percentage led to an interpretation that the overall satisfaction in this engineering school is below the average level of satisfaction reported in the literature for other Australian universities. It could be speculated that the satisfaction of engineering students is lower than the satisfaction of students in other fields, due to the higher complexity and demands of engineering projects. Further work investigating the relative supervision satisfaction of PhD students from different disciplines may provide a clearer indication of the relative position of student satisfaction in engineering PhD programs. In agreement with other similar studies, it was demonstrated that there was a significant decrease in the level of satisfaction amongst doctoral students in their final stages of candidature. Some possible explanations for this outcome are, for instance, that poor quality supervision may increase the 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. As per specific aspects of supervision, this study revealed some areas of concern for which students were highly dissatisfied, such as "provision of meetings" and "provision of clear directions".

According to the surveyed students, the most cited positive aspects of supervision in the GSE is that their supervisors are knowledgeable, skilled, experienced and have reputation in their fields. Also popular were comments about supervisors being friendly, approachable, patent and kind. The most cited negative points of supervision in this school were the lack of involvement of supervisor in the research project, and supervisor's lack of knowledge, skill, experience and reputation in the field. Students often commented that they had no one to count on when facing problems with research methods or tools they were supposed to employ in their research. Several students mentioned that the addition of one or more associate supervisors to the supervising team would help minimize these issues, as long as the additional members could assist students with those specific problems with which principal supervisors were unable to help. Comments about supervisors needing to collaborate more and/or develop their research skills further were also very popular. These initiatives could minimize the negative aspects of supervision prevalent in this school. According to the students, the main supervision qualities to foster effective supervision are those related to "*direct participation and involvement in the research project and feedback*", and "*knowledge, skills, experience and reputation in the field*". This suggests that students would like to have a knowledgeable and experienced supervisor, who could also actively participate and work with the student in the research project. Giving growing teaching and administrative demands of faculty staff, the second aspects seems to be quite challenging. This suggests again that roles and expectations regarding the participation of the supervisor in the project should be clarified at the beginning of the PhD candidature.

Various straightforward actions could be implemented in the short term to address some of the supervision issues identified in this study. With respect to lack of supervisor participation and involvement, for example, the clarification of roles and expectations of student and supervisor, particularly in the early stages of candidature, is widely supported in the literature. It is recommended that supervisors should consider clarifying and negotiating expectations with their students in the following areas: 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. Supervisors and students might regularly review these expectations to ensure a mutually satisfactory agreement for each stage of the PhD candidature. Concerning the perceived lack of knowledge in the field, at relevant stages, the student and supervisor might openly discuss and de-

termine the limitations of 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 the development of a knowledge base from which directions to the required expertise can be derived. This issue directly relates to many of the students' comments, such as "supervisors don't have much interaction with other centers 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 centers or universities, so that the spectrum of expert supervision is enlarged, will be helpful.

FINAL CONSIDERATIONS

We are aware that our study has limitations. The study was conducted in a particular university in Australia, and it should be noted that the sample is representative of the PhD engineering students of that institution only. Caution should be taken when generalizing these results to other engineering PhD programs, particularly in other countries, as our sample may not represent the opinion of PhD engineering students in different settings. This is particular important for the results related to 'student perceptions of roles', 'student satisfaction with supervision' and 'negative and positive aspects of PhD supervision', which can be largely influenced by the way each institution run their PhD programs and prepare their faculty staff and PhD candidates.

Nevertheless, despite the sample size limitation, the results are meaningful in practice as they provide some evidence for what engineering students consider good and bad in supervision, and why engineering students choose a PhD supervisor. These results are more generic in nature as they do not depend on the way institutions run their PhD programs and prepare their academics and PhD candidates.

Based on the results of this study, supervisors can self-reflect on their own supervision and improve their supervision practices. For the GSE in particular, as the number of students evaluated in this study is relatively small, supervisors from this school should be able to identify the issues related to their supervision practices and try to improve upon them. For other institutions, the findings of this research can inform supervisors on students' perspectives regarding doctoral supervision and as such, assist these institutions to set further plans for current and future supervision improvements that consider the point of view of engineering doctoral students.

With respect to actions arising from this study, findings will be disseminated internally within this engineering school; a draft good practice guide for PhD supervision will be developed; results will be used in the development of appropriate quality assurance structures to support enhanced PhD supervision experiences; and a Community of Supervision Practice will be proposed within the school, in which good practices can be shared and discussed for the benefit of students and supervisors.

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APPENDIX

Survey

PART A – General questions

Mark with an X:

1) Age:

Under 30		Above 30	

2) Citizenship status:

Australian citizen or permanent resident		International student	

3) Scholarship status:

No scholarship	
Living allowance scholarship	
Tuition fee scholarship	
Both living allowance and tuition fee scholarships	
Other:	

4) Enrolment status:

Full time		Part time	

5) How many <u>principal</u> supervisors do you have?

Number of principal supervisors:	

6) Did you do any type of paid work during the last year? How many hour per week did you work (please do not include hours spent working on your PhD) – inform an average value per week based on work done in the last 12 months.

No paid work	
< 10 hours per week	
10 – 20 hours per week	
20 – 30 hours per week	
30 – 40 hours per week	
> 40 hours per week	

7) Which stage of PhD candidature best describes your current status?

Early: I haven't completed my confirmation seminar	
Early/Mid: I have just completed my confirmation seminar	
Mid/Final: I am in the middle stage of my PhD	
Final: I am writing my PhD thesis	
Other:	

PART B – Perception of supervision's roles and expectations

Read each pair of statements below and then estimate your position on each. For example with statement 1 if you believe very strongly that it is the supervisor's responsibility to select a good topic you would put a cross (X) in column '1'. If you think that both the supervisor and student should equally be involved you should put a cross in column '3' and if you think it is definitely the student's responsibility to select a topic, put a cross in column '5'.

Supervisor's responsibility →	1	2	3	4	5	← Student's responsibility
It is the supervisors' responsibility to select a research topic						The student is responsible for selecting her/his own topic
It is the supervisor who decides which theoretical framework is most appropriate						Students should decide which theoretical framework they wish to use
The supervisor(s) should develop an appropriate program and timetable of research and study for the student						The student should develop an appropriate program and timetable of research and study
The supervisor(s) is responsible for ensuring that the student is introduced to the appropriate services and facilities of the department and University						It is the student's responsibility to ensure that she/he has located and accessed all relevant services and facilities for research
It is the supervisors' responsibility to advise the students of the relevant policies, procedures and requirements relating to their candidature						The student is responsible for being familiar with the relevant policies, procedures and requirements relating to his/her candidature
The supervisor(s) should insist on regular meetings with the student						The student should decide when she/he wants to meet with the supervisor(s)
The principal supervisor is responsible for coordinating all communication between supervisors and the student						The student should coordinate all communication between the members of the supervisory team
The supervisor should check regularly that the student is working consistently and on task						The student should not have to account for how and where they spend their time
The supervisor(s) should ensure that the thesis is finished by the maximum submission date						As long as a student works steadily, she/he can take as long as she/he needs to finish the work
The supervisor(s) should insist on seeing all drafts of work to ensure that the student is on the right track						Students should submit drafts of work only when they want constructive criticism from the supervisor
Supervisors should assist in the writing, editing and presentation of the thesis if necessary and should ensure that the presentation is flawless						The writing and editing of the thesis should be the student's own work and the student must take full responsibility for presentation of the thesis
The supervisor(s) is responsible for decisions regarding the standard of the thesis						The student is responsible for decisions concerning the standard of the thesis
The supervisor(s) is responsible for providing emotional support & encouragement to the student						Students should have their own support networks and this is not the responsibility of the supervisor

The above instrument was adapted from a version developed by Kiley (1999), from an original scale developed by Moses (1985).

PART C – Specific questions about <u>principal supervisors</u>

1) Reasons for choosing principal supervisor #1. Choose three main reasons. Type 1 for the main reason, 2 for second main reason and 3 for the third main reason.

Has intellectual interests that match mine	
Is doing interesting research / offered me an interesting project	
Has a reputation of being a good researcher	
Has a reputation of being a good supervisor	
Has a reputation of being a good teacher	
Has a reputation of getting students through the process in a timely manner	
Is knowledgeable in the techniques and methods I will employ	
Was willing to supervise me	
Will make sure I do a rigorous thesis	
Fosters a working environment I like in his/her research group	
Can write a good reference letter that will help me find a job in the future	
Was recommended to me by other people	
Has money to support me	
Gives me opportunity to work	
Has great motivation	
Other: *(inform reason)*	
Other: *(inform reason)*	
Other: *(inform reason)*	

2) Reasons for choosing principal supervisor #2: *(leave blank if you only have one principal supervisor).* Choose three main reasons. Type 1 for the main reason, 2 for second main reason and 3 for the third main reason.

Has intellectual interests that match mine	
Is doing interesting research / offered me an interesting project	
Has a reputation of being a good researcher	
Has a reputation of being a good supervisor	
Has a reputation of being a good teacher	
Has a reputation of getting students through the process in a timely manner	
Is knowledgeable in the techniques and methods I will employ	
Was willing to supervise me	
Will make sure I do a rigorous thesis	
Fosters a working environment I like in his/her research group	
Can write a good reference letter that will help me find a job in the future	
Was recommended to me by other people	
Has money to support me	
Gives me opportunity to work	
Has great motivation	
Other: *(inform reason)*	
Other: *(inform reason)*	
Other: *(inform reason)*	

The above instrument was adapted from a version developed by Garret (2006), from an original instrument developed by Golde and Dore (2001).

3) About your supervision experience with principal supervisor #1 (mark with an X):

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Does not apply
This supervisor is available when needed						
This supervisor is friendly and approachable						
This supervisor makes a real effort to understand difficulties I face						
This supervisor provides additional information relevant to my topic						
I was given good guidance in topic selection and refinement						
This supervisor provides helpful/quality feedback						
This supervisor provides timely feedback						
This supervisor has contributed significantly to my PhD						
I'm happy with the meetings scheduled by my supervisor						
This supervisor encourages me to attend conferences and other research events						
This supervisor encourages me to write articles and submit for publication						
This supervisor thinks about my goals rather than publications that will be generated from my research						
This supervisor has high motivation and inspires me						
This supervisor gives me clear directions						

4) About your supervision experience with principal supervisor #2 (mark with an X, *leave blank if you only have one principal supervisor*):

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Does not apply
This supervisor is available when needed						
This supervisor is friendly and approachable						
This supervisor makes a real effort to understand difficulties I face						
This supervisor provides additional information relevant to my topic						
I was given good guidance in topic selection and refinement						
This supervisor provides helpful/quality feedback						
This supervisor provides timely feedback						
This supervisor has contributed significantly to my PhD						
I'm happy with the meetings scheduled by my supervisor						
This supervisor encourages me to attend conferences and other research events						
This supervisor encourages me to write articles and submit for publication						
This supervisor thinks about my goals rather than publications that will be generated from my research						
This supervisor has high motivation and inspires me						
This supervisor gives me clear directions						

The above aspects were retrieved from the "Postgraduate Research Experience Questionnaire" (Australian Department of Education, Training, and Youth Affairs & Australian Council for Educational Research, 2000), from the survey "Qualities of an Ideal Supervision" (The University of Otago, 2016) and the "2010 Graduate Student Satisfaction Survey" (UC Berkeley Graduate Assembly, 2010).

5) On a scale of 1 to 5, <u>where 1 is low and 5 is high</u>, how would you rank your overall satisfaction with <u>supervisor #1</u>?

6) On a scale of 1 to 5, <u>where 1 is low and 5 is high</u>, how would you rank your overall satisfaction with <u>supervisor #2</u>? *(leave blank if you only have one principal supervisor)*

7) List the three (3) best aspects of <u>supervisor #1</u> in your opinion:

8) List the three (3) best aspects of <u>supervisor #2</u> in your opinion: *(leave blank if you only have one principal supervisor)*

9) List three (3) aspects of <u>supervisor #1</u> that need improvement:

10) List three (3) aspects of <u>supervisor #2</u> that need improvement: *(leave blank if you only have one principal supervisor)*

11) Would you recommend <u>supervisor #1</u> to a friend that wants to carry out research in the same field as the supervisor's field? (yes or no)

12) Would you recommend <u>supervisor #2</u> to a friend that wants to carry out research in the same field as the supervisor's field? (yes or no) *(leave blank if you only have one principal supervisor)*

13) List 3 (or more) characteristics of an excellent supervisor in your opinion:

BIOGRAPHIES

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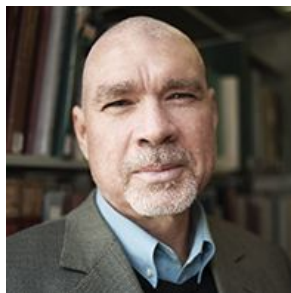
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