

INGREDIENTS OF GOOD PHD SUPERVISION – EVIDENCE FROM A STUDENT SURVEY AT STOCKHOLM UNIVERSITY

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SAMMANFATTNING

Doktorandhandledning är en relevant fråga för en pedagogisk forskarutbildning vid universitet vilket har betydande implikationer inom rad sammanhang, såväl inom industrin som för grupper av arbetsgivare, studentföreningar och akademiker. Denna studie undersöker centrala aspekter av handledning utifrån doktoranders perspektiv vid Stockholms universitet baserat på en undersökning med 761 forskarstuderande. En konfirmatorisk faktoranalys genomförd med strukturell ekvationsmodellering visade sig ge stöd åt en endimensionell modell för handledning som exemplifieras av givandet av konstruktiv kritik till studenter, handledarens tillgänglighet, tillräckligt med tid för handledning, möjlighet till självständigt arbete och en kreativ miljö för forskarutbildningen. Handledningsindikatorerna var även signifikant och positivt korrelerade. Att studera dessa indikatorer spelar stor roll för riktlinjer inom utbildning och metoder för undervisning i avsikt att kunna förbättra forskarutbildningen. Studenter skulle kunna bli tydligt informerade om viktiga faktorer att överväga när de väljer samt påbörjar sina studier. Universitetsledning och handledare kan upprätthållas i sin roll att säkerställa en fullgod doktorandupplevelse för deras studenter.

Nyckelord: Doktorandhandledning, forskarutbildning, konfirmatorisk faktoranalys

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INTRODUCTION

Good PhD supervision is a relevant issue for pedagogical research training at university with significant implications in a variety of settings, including industry and employer groups, student associations and academics. Effective supervision has been referred to high quality research training for students, access to resources, expertise, flexibility and choice of learning and research, opportunity for engagement with experts, and responsiveness to a broader community (Harman, 2002). Yet, despite considerable debate over various aspects of the PhD supervision, this area has until recently been relatively under-researched and particularly in Northern compared to Central Europe, USA and Australia (Hockey, 1996; Sinclair, 2004). This study examines key aspects of supervision, as viewed by PhD candidates at Stockholm University as to provide a basis to enhance the effectiveness of PhD supervision. The study was conducted at Stockholm University, the largest university in Sweden with a full range of professional disciplines and a strong commitment towards research and postgraduate education.

WHAT MAKES A GOOD SUPERVISION?

Recent research has indicated that effective supervision is crucial to doctoral students' successful career and satisfaction on a number of grounds. A good supervision and satisfactory relationship between students and advisors are essential components of successful doctoral training (Zhao, Golde, & McCormick, 2007). A constructive supervision is associated with beneficial outcomes for students, including a positive work environment, successful departmental socialization and timely completion of the degree (Kam, 1997; Lovitts, 2001; Golde, 2000).

What makes the PhD supervision effective and rewarding experience? Research shows that students' definition of good supervisor refers to reliability, confidence in the student, encouragement, knowledge, and sharing information (Denicolo, 2004). Listening skills, encouragement and debate, continuous feedback and support, enthusiasm, warmth and understanding are also defining ingredients of a good supervisor. The qualities of a good supervision include also supportiveness, high levels of communication, accessibility, frequent informal interactions, helping students in a timely manner (Lovitts, 2001), and treating the student as a junior colleague (Girves & Wemmerus, 1988). Yet, little is known about how students at Stockholm University perceive their supervision and advising relationship, and if this perception differs by relevant factors involved in the PhD program (e.g. age, gender, place of Master thesis defense, reason for choosing PhD, choice of thesis topic, type of thesis and faculty affiliation). This study set out to address these issues with a large sample of PhD students at Stockholm University.

International Research on Doctoral Students

Available international research regarding PhD students, supervision, progress and satisfaction with their studies is predominated by English speaking countries such as United Kingdom, United States, and Australia. Extant research in these

countries has examined various aspects of doctoral programs at institutions of higher education built on a cohort-based model targeting higher student retention rates as well as the optimal shared educational experience (Lei, Gorelick, Short, Smallwood, & Wright-Porter, 2011; Maher, 2005). Specifically, this model refers to a group of about 10-25 students who study together and develop a series of experiences in the context of doctoral program of study (Lei et al., 2011). Such model fosters cohesion through mutual academic, emotional, and logistical support for program success, collaborative learning and timely completion as well as ongoing professional growth and career development. The model focuses on developing leadership skills, advanced research, critical thinking, and problem solving skills for various administrative and leadership positions (Bista & Cox, 2014). In various universities in the United States, research has examined students' perceptions of their doctoral preparation programs where the cohort-based model was rated extremely beneficial for their interpersonal development, project management, and communication (Freeman & Kochan, 2012). Similar work has shown that educational doctoral programs have been successful in the United Kingdom (Poole, 2011) and South Africa (Govender & Dhunpath, 2011) by fostering successful collaboration and collegiality among students and supervisors and providing new insights for faculty to bring changes in their doctoral programs.

An outstanding research example can be found in Australia where a national cross-disciplinary investigation of PhD supervision has been conducted (Sinclair, 2004). This study involved a large scale national survey of 5450 students and 1032 supervisors in 26 state and private universities across all Australian states and territories. The pedagogy of 'good' PhD supervision with faster and more PhD completions has been associated with supervisors who are more 'hands on' in their supervision, actively assist candidates and provide support and project logistics, institutional quality checks, check project specific milestones and the production of thesis text. Major ingredients of successful and timely completion of PhD was related to supervisors who have been supervising for longer times, have candidates who submit within five years, publish and present papers with present or former PhD candidates, have full-time candidates who do not change supervisors or topics. An important basis of successful PhD experience was also the achievement of early and lasting agreement between supervisors' and candidates' expectations, communication, constructive feedback and agreements by consultation policy combined with supervisors regularly initiating contact with candidates.

Similar components of PhDs have also been investigated in the latest report from Graduate Careers Australia (GCA) overview of the 2014 Australian Graduate Survey (AGS). Major topics of interest regarding the postgraduate research experience regarded views and comments of PhDs concerning their experience of research at the institution such as overall satisfaction on supervision, intellectual climate, skill development, environment and infrastructure, feedback, goals and expectations. Finally, Cullen and colleagues (1994), carried out a large scale study at the Australian National University, reporting a list of the characteristics of a 'good supervisor' who has to be approachable and friendly, supportive and positive, open

minded, prepared to acknowledge error, thorough and stimulating and conveying enthusiasm for research.

Based on this broad international research evidence, several relevant factors for good supervision and successful PhD programs can be envisaged. These are mainly related to relational (availability and feedback from the supervisor) and structural aspects (learning opportunities for new skills as independent researcher and appropriate stimulating environment to do so) of the PhD program. Building on this prior work conducted in international setting, this study sought to examine major relational and structural determinants of satisfaction and quality of supervision PhD students perceive at Stockholm University.

THIS STUDY

This study examines key aspects of supervision, as perceived by PhD candidates based on a large survey conducted by the PhD Student Council at Stockholm University in 2012. The value of investigating how PhD students see their immediate educational environment at Stockholm University has relevant implications on a number of grounds. The University is the Sweden's largest university and a leading European institution characterized by openness and innovation. Recently, it has been ranked the best student city in the Nordic countries and among the top universities with prestigious academic reputation according to a new ranking from the World University Rankings (2015). What also makes the University unique is its traditional association with the Nobel Prize as this institution has educated many Laureates in the literary and science fields, and hosts the annual prizewinners lecture in the university's Aula Magna. Being one of the world's top 100 higher education institutions, Stockholm University has 70,000 students with equal distribution at undergraduate and gradual levels. The University also attracts increasingly relevant numbers of students, who can contribute to individual and social change through acquired top quality education and outstanding research. Therefore, when students are deciding where to study, a prestigious university that meets their expectations and satisfaction during their stay at the institution plays a significant role and is becoming increasingly important in determining the flow of future students. From a scientific point of view, the study of PhD student satisfaction with supervision is theoretically relevant as to advance new knowledge and insights for the institution to be a better place for PhD students and promote updated international student strategy, services and recruitment targets in line with the student needs.

In this study, supervision is operationalized as a set of characteristics such as constructive feedback to students, availability of supervisor, sufficient time dedicated to students, possibility for independent work and creative environment for students. The focus on these factors is based on prior work presented in the introduction that has been conducted in various international settings. Such work has identified major factors promoting good supervision and successful PhD programs - availability and feedback from the supervisor, learning opportunities for new skills as in-

dependent researcher and appropriate stimulating environment. Such components of PhD supervision have been shown as central to students' well-being and academic achievement in research predominated by studies conducted in UK, USA and Australia (Hockey, 1996; Sinclair, 2004). These factors relate to the purposes of the survey conducted by the PhD Student Council at Stockholm University in a relevant way. Most importantly, they reflect salient structural, organizational and relational aspects tackled by the survey that have been identified through theory and research as promoting a good PhD experience. The goal of this survey was to provide students and the university management team with tangible indicators on what important aspects of a PhD experience at Stockholm University are and how they can design improvements in program planning and evaluation to make the most of PhD programs across variety of faculties' and disciplines. This study directly addressed these questions by providing empirically sound information on major factors involved in the perception of PhD students about how they experience their doctoral programs. In so doing, this study fills in relevant theoretical and practical gaps. Little is known about the applicability of these components in Sweden, an area of research that deserves special attention given the importance of good supervision for educational and academic success, satisfaction and career prospects of students. This study reports the first results of the PhD supervision characteristics with a sample of students from Stockholm University. In so doing, it extends prior work on relevant factors of supervision in other nations such as UK, USA and Australia, but with a focus now on less represented in the literature country in Europe.

This study aims to examine 1) how students at Stockholm University perceive their supervision and what are the major components of this supervision; 2) whether perceived supervision differs by relevant factors involved in the PhD program (e.g., age, gender, place of Master thesis defense, reason for choosing PhD, choice of thesis topic, type of thesis and faculty). These goals are addresses by testing a) factorial validity of the supervision items in a confirmatory factor analysis (CFA); b) interrelations among supervision components in terms of constructive feedback provided to students, availability of the supervisor, sufficient time of received supervision, possibility of independent work and creative environment for the PhD studies; c) relations between supervision and factors such as student age, gender, place of Master thesis defense, reason for choosing PhD, choice of thesis topic, type of thesis and faculty by means of analysis of variance.

METHOD AND SAMPLE

This study uses data collected as part of on-line bilingual (Swedish and English) survey conducted by the Student Union at Stockholm University with all active PhD students during the 2011-2012 academic years (Table 1). The goal of the survey was to obtain better knowledge about how PhD students experience their working environment, supervision, and scientific quality of their PhD programme. This is the first recent survey to examine the PhD programmes from the perspective of the PhD students at Stockholm University aiming to provide guidelines for the

Student Union and the University as a whole. The data are based on 761 completed surveys from active PhD students across all faculties collapsed into four broad disciplinary areas: humanities (24% of the sample), social sciences (31%), science (42%) and law (3%). Most of the respondents obtained their Master degree at Stockholm University (40%), compared to other Swedish universities (33%), other countries (22%) or those who declared not having such a degree (5%). The majority of students indicated as main reason pursuing PhD being their personal interest in a specific subject or a general interest in research (82%), followed by a desire to have a career in teaching/research within academia (10%), some other professional career (5%) and career in research outside academia (3%). Main reason for a choice of the PhD research topic was based on own initiative of the student (55%) and a proposal from the department or supervisors (45%). Prevalent in the sample was a review thesis as a review of collection of articles (62%) compared to empirical studies in a monograph form (38%). Supervision was evaluated by five items rated on 4-point Likert scale ranging from “not at all” to “very great extent” (e.g., “To what extent have your supervisor(s) provided constructive criticism of your research”, “To what extent during the academic year of 2011/2012 have your supervisors been available in person at the university” etc.).

RESULTS

First, supervision model was examined via confirmatory factor analysis (CFA) in a structural equation using AMOS software (Arbuckle, 2009). Model fit was tested with the Comparative Fit Index (CFI, recommended value $> .90$) and the Root Mean Square of Approximation (RMSEA recommended value $< .08$) (Hu & Bentler, 1999). The CFA testing a single factor model showed a very good fit, suggesting that constructive feedback provided to students, availability of the supervisor, sufficient time of received supervision, possibility of independent work and creative environment, load significantly on one supervision factor, $\chi^2(5, N = 761) = 9.80, p = .081, CFI = .988,$ and $RMSEA = .036$. As can be seen in Figure 1, perceived PhD supervision was represented by five indicators with stronger contribution of constructive feedback (standardized coefficient .67) and sufficient time dedicated by the supervisor (standardized coefficient .70).

Second, bivariate Pearson correlations among all five indicators of supervision were explored showing that all correlated positively and significantly (Table 2). Third, the influence of relevant factors (e.g., age, gender, place of Master thesis defense, reason for choosing PhD, choice of thesis topic, type of thesis and faculty) on supervision indicators was tested by means of multivariate analysis of variance. Results showed that only age was related to one supervision indicator – sufficient time dedicated by the supervisor. Older PhD students between 41-50 years perceived to have received more time by their supervisors for the completion of their studies, $F(8, 632) = 2.27, p < .05$. Also, reason for choosing PhD (specifically due to career and teaching in the academia) was significantly related to greater perception of creative environment, $F(3, 402) = 3.40, p < .05$.

DISCUSSION

Research on supervision in different academic settings is needed to allow valid evaluations in different national programs and successful academic career. This study is among the first to examine the perceptions of students regarding their PhD supervision based on a survey conducted by the PhD Student Council at Stockholm University. The target groups were PhD students enrolled at various doctoral programs at Stockholm University - the Sweden's largest university ranked the best student city in the Nordic countries and among the top universities with prestigious academic reputation (World University Rankings, 2015). The study goals were twofold. First, it aimed at examining how PhD students perceive their supervision in terms of major components addressed by the survey (e.g., supervisor's feedback, availability, sufficient time of received supervision, independent work and creative environment). Second goal was to examine the influence of relevant factors (e.g., student age, gender, place of Master thesis defense, reason for choosing PhD, choice of thesis topic, type of thesis and faculty) on their perception of PhD supervision.

In line with the first goal, a confirmatory factor analysis (CFA) showed good factorial validity of the supervision factors as well as strong interrelations among supervision components in terms of constructive feedback provided to students, availability of the supervisor, sufficient time of received supervision, possibility of independent work and creative environment for the PhD studies. This is in line with earlier investigations in pedagogical research on the quality of perceived PhD supervision. For example, a large scale national study in Australia reports that ingredients for a good supervision relate to supervisors who are more 'hands on' in their supervision, have sufficient time and availability for feedback, actively assist students and provide support and quality environment (Sinclair, 2004). Related work with Israeli and UK PhD students examined good practices in supervisory quality, dialogues and support of research development curricula. The study focused on identifying research-as-learning approaches and development practices to empower students by developing learning conversation in which supervision is conceived as a form of teaching and doctoral research as a form of learning. Results from in depth interviews and action research showed that successful supervisory dialogues encourage supervisors and students to share, develop good feedback for research, and focus on appropriate research and learning approaches. In the context of this study, the development of sensitive supervisory dialogues enabled students to take initiative, engage and be successful in their work (Wisker, Robinson, Trafford, Warnes, & Creighton, 2003). Similar work in the UK also resonates with these findings in focusing on processes of collaborative creativity within the context of PhD supervisory practice. Results from a series of interviews with supervisors and students, identify the relevance of pedagogic processes to encourage and support creativity. Undoubtedly, formal instruction and monitoring processes lead to the acquisition of research skills during the doctoral training, but more open-ended and creative environments as well as interactions (e.g., informal reflection, relationship building, communication) are equally relevant for a good supervision and successful

PhD experience (Whitelock, Faulkner, & Miell, 2008). Similar results emerged in one international study including a Swedish sample lead by the Swedish Coordinating Centre that published a comparative review of postgraduate student's attitudes in Sweden, Finland, and Ireland. The report investigated student perceptions concerning their postgraduate life and supervision in terms of dialogue with supervisor and supervision in action. With regards to dialogue with their supervisors, all students valued the supervisor's interest in their studies, constructive criticism, degree to which their supervisor engaged in discussions about the project and the student's future career plans (Swedish Coordinating Centre, 2006).

The results of the present study mirror these prior findings in confirming the relevance of relational (availability and feedback from the supervisor) and structural components of PhD supervision (learning opportunities for new skills as independent researcher and appropriate stimulating environment) that inevitable lead to successful PhD studies. In fact, consistent with expectations, a uni-dimensional factorial structure provided good fit to the data, suggesting that core elements of supervision relate to constructive feedback provided to students, availability of the supervisor, sufficient time of received supervision, possibility of independent work and creative environment. Results also confirm a high level of factorial consistency at single supervision level and that supervision components are significantly and positively related to each other.

In line with the second goal, relations between supervision and student age, gender, place of Master thesis defense, reason for choosing PhD, choice of thesis topic, and type of thesis were examined. Results showed three major relevant associations. First, age was related to sufficient time dedicated by the supervisor to the PhD students. Second, the results also showed that older PhD students (41-50 years old) reported higher perception of time that their supervisors dedicated them to complete their studies. These results are in line with the literature on graduate education and supervision that has shown the impact of student variables such as age and gender on the PhD experience for students. For example, Cullen and colleagues (1994) report that the demographics of the supervisor such as age and gender, also affect their supervision. Third, the reason for choosing PhD program in terms of career development and teaching experience in the academia was significantly related to greater perception of creative environment. This result is conceivable in light of the intrinsic motivation guiding academicians in their work and overall positive effects of creativity in work settings. As reported in more detail in the previous section, past research has shown the significant role of creativity in collaboration and environment for successful PhD supervision and overall PhD experience among students (Whitelock et al., 2008).

LIMITATIONS

This is a first time study with a sample of students from Stockholm University and replications of these findings are needed prior to generalizing results further in a Swedish or international academic context. Future studies could explore additio-

nal indicators of supervision such as relationships with the supervisor and psychological well-being of students. Relatedly, some methodological concerns regarding the kind of questions that were asked in the survey must be acknowledged. The items about quality of the supervision were limited to questions regarding the major components reported and examined in the model. A more in depth investigation on what set of skills and behaviors constitutes a good PhD supervisor and how students experience these during their PhD training might enlarge the scope and quality of investigations on PhD supervision. For example, such items may revolve around set of the characteristics that have been reported through in depth empirical investigation to define a 'good supervisor'. Future studies may address this methodological shortcoming by asking students the extent to which their supervisors are approachable and friendly, supportive and positive, open minded, prepared to acknowledge their mistakes, organized and thorough, stimulating and conveying enthusiasm for research and academic career (Cullen et al.,1994).

Additionally, multi-method studies of supervision (e.g., teacher/advisor and student ratings) are important to complement these student reported only findings. It is also worth noting that this investigation included one university only, which of course limits the generalizability of the current findings to other higher educational institutions in Sweden. For example, in the period between 2006 and 2009, the Swedish University of Agricultural Sciences (SLU) conducted a survey to describe the situation of PhD students and obtain information regarding areas that should be prioritized to improve PhD studies and the position of PhD students (Swedish University of Agricultural Sciences, 2011). Similarly in 2013, Lund University conducted a PhD survey among PhD students at the Faculty of Social Sciences to obtain a better and more detailed picture of how PhD students at the Faculty perceive their psycho-social environment and health (Lund University, 2014). These surveys differ greatly in their content, implementation and scope. A more global effort to unify such relevant assessment tools across universities within the country might be useful. In line with this relevant work in other universities in Sweden, future studies may also analyze commonalities and similarities among results of corresponding surveys conducted across universities within the country. Finally, promising extension of the present study would be to link supervisors' perceived satisfaction of their supervision, which would yield richer information for the university management plans.

CONCLUSIONS AND IMPLICATIONS

This study provides new and preliminary evidence for the validity and utility of supervision constructs in a Swedish based sample of PhD students. The study adds to the existing pedagogical literature and provides diversity to a research pool that has been dominated by Australian, British and American samples. How students experience supervision has the profound influence on their approach to research and future professional prospects. One general issue universities are faced with regards the need to demonstrate excellence in postgraduate research supervision

at both individual and faculty levels. Identifying supervisory excellence should be a major priority for supervisors, faculties and institutions to promote such excellence. This priority meets the increasing international importance of innovation and knowledge that have also prompted interest in investigations about research supervision. Therefore, further investigations on supervisory models with a rich array of factors associated with effective supervision are still in need of systematic empirical validation. Supervision models can affect student academic success, career and positive well-being outcomes. Measurement tools on these models play important role for educational policy and teaching practices to improve doctoral education. Students could be explicitly informed about important factors to consider when choosing and pursuing their studies. Advisors can be sustained in their role in promoting a satisfactory doctoral experience, and of the particular ways they can be sensible to ensure constructive feedback, availability, sufficient time, independent work and creative environment to their students.

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Table 1

Sample

	Descriptives
Age range	< 30 – 50 years
Gender, %	
Male	44
Female	56
<i>Supervision Indicators</i>	
Mean (Standard Deviation)	
Constructive feedback	2.46 (.58)
Availability	2.59 (.51)
Sufficient time	1.81 (.45)
Independent work	2.72 (.52)
Creative environment	2.25 (.45)

Table 2

Correlations among Supervision Indicators

Indicator	1.	2.	3.	4.	5.
1. Constructive feedback	-				
2. Availability	.22**	-			
3. Sufficient time	.47**	.27**	-		
4. Independent work	.28**	.18**	.23**	-	
5. Creative environment	.22**	.18**	.26**	.14**	-

Note. **All correlations are significant at $p < .01$.

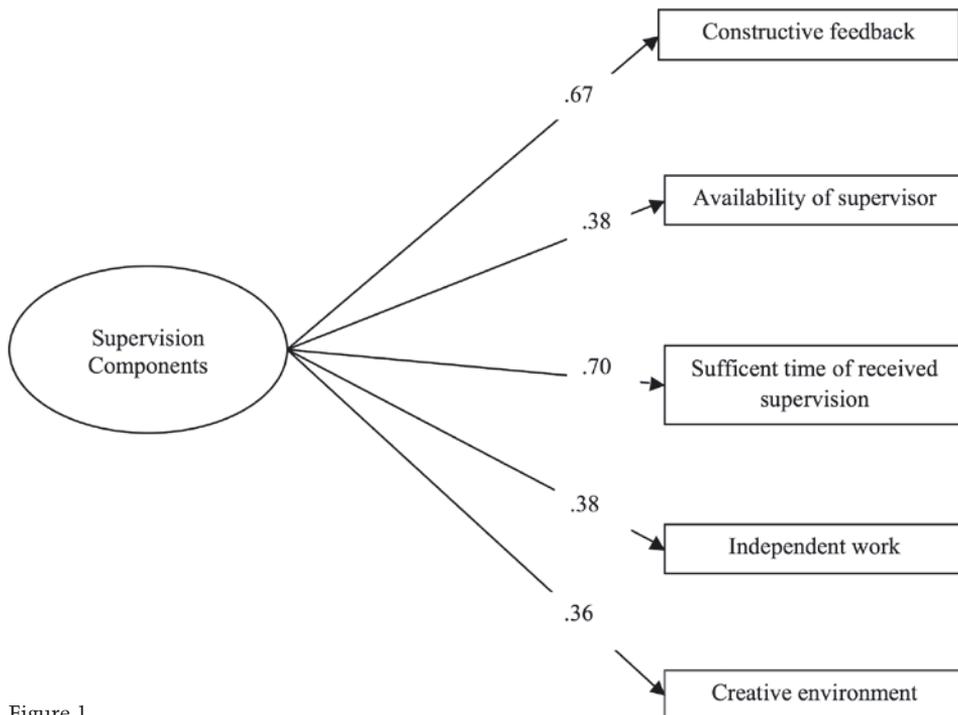


Figure 1

Estimates of the One-Factor Model of Supervision

Note. All standardized coefficients are significant at $p < .001$.