Hidden Players of Ethical Mentoring for Women Graduate Students in Science and Engineering

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ABSTRACT

The relationship a graduate student and their research advisor have while they work together in academia is pivotal to the development and success of the research and involved parties (Polson, 2003). Students rely on their advisor to guide them through the academic and research process while also being a role model of professional and ethical behavior (Johnson, 2016; King, 2003). In essence, a research advisor must accept the trust and confidence of the graduate student to act in their best interest by following ethical mentoring principles. However, if the advisor is unaware of the best interest of their students or how to be an 'ethical mentor', they may overlook a student's unique needs and risk relationship dysfunction. This work aims to explore the hidden players of ethical research mentoring perspectives, principles, norms, and issues of inclusivity for women graduate students in science and engineering. Particularly, we are interested in understanding six ethical mentoring principles: (1) Beneficence, (2) Nonmaleficence, (3) Autonomy, (4) Fidelity, (5) Fairness, and (6) Privacy, all which require an in-depth understanding for a productive research relationship. Preliminary qualitative analysis has revealed the importance of effective communication; how power imbalances are reinforced between the research advisor and graduate student; and how awareness of hidden norms and expectations within the research culture can shape research relationships.

INTRODUCTION

The relationship between faculty-advisor and graduate students is one of the most important factors in persistence and retention of students (Barnes, 2010; deValero, 2001). Advisors act as an informational source, departmental negotiator, advocate, a role model, and gatekeeper of success (Grady, La Touche, Oslawski-Lopez, Powers, & Simacek, 2014; Johnson, 2016; Polson, 2003). A good mentoring relationship with an advisor (one that is dynamic, emotionally connected, and reciprocal) has been associated with greater emotional well-being and promoting time to degree completion rates in graduate students (de Valero, 2001; Hyun, Quinn, Madon, & Lustig, 2006). However, a mentoring relationship can potentially put both mentors and mentees at risk for inadvertent harm, whereas an ethical mentoring relationship that adheres to the six ethical mentoring principles of beneficence, nonmaleficence, autonomy, fidelity, fairness, and privacy can benefit both mentors and mentees (Johnson, 2016).

While mentoring may be encouraged, there is little incentive for faculty advisors to "go above and beyond" their supervisory duties (King, 2003, p.1). This is because of the institutional or departmental focus on productive research output, as well as the fact that mentoring is not a criterion for promotion and tenure decisions (Johnson, 2016; Margolis & Romero, 2001). Regardless of the type of relationship graduate students have with their advisor, students internalize the intellectual, methodological, and ethical norms of their discipline and department through implicit and explicit messages (Acker, 2001; King, 2003). These hidden messages and expectations may be based on individual disciplines and may affect how ethical mentoring is received by graduate students. The goal of this work was to explore six ethical mentoring principles for women graduate students in science and engineering and how "hidden" norms and expectations within the research culture can shape these relationships.

METHODS

A collective case study methodology was used to conduct a semi-structured interview with open-ended questions using targeted case studies from the book: *On Being a Mentor, A Guide for Higher Education Faculty, Second Edition* (Johnson, 2016). Eight female graduate students were purposively recruited as participants for this study from the Colleges of Science and Engineering at a western institution of higher education with varied roles (e.g. Masters student, Ph.D. student) and disciplines (e.g. Biology, Aerospace Engineering) (Creswell, 2013). These participants were given pseudonyms to protect their identity. Interview data from audio and visual recordings were transcribed and coded. All responses and memos were qualitatively coded using the six ethical principles as a basis for *a priori* coding although we were open to emerging themes as well. Multiple coding methods were used to "capture the complex processes or phenomena" in our data (Saldaña, 2016, p. 75). Triangulation was done through researcher journals, interrater reliability checks, and member-checking sessions following the interviews. For all instances, interrater coder reliability exceeded 97%. For all results, hidden norms and expectations were extracted from the major themes and sub-themes identified

ETHICAL MENTORING PRINCPLES

(Adapted from Johnson, 2016)

Beneficence: Mentor/mentees obligation to promote best professional interests.

Autonomy Mentor/mentees avoidance of promoting dependency vs. independence.

Fairness Mentor/mentees safeguarding of equal treatment.

Nonmaleficence Avoidance of using mentor/mentees role for harm.

Fidelity Mentor/mentees sense of loyalty.

Privacy Mentors/mentees avoidance to reveal sensitive material without consent.

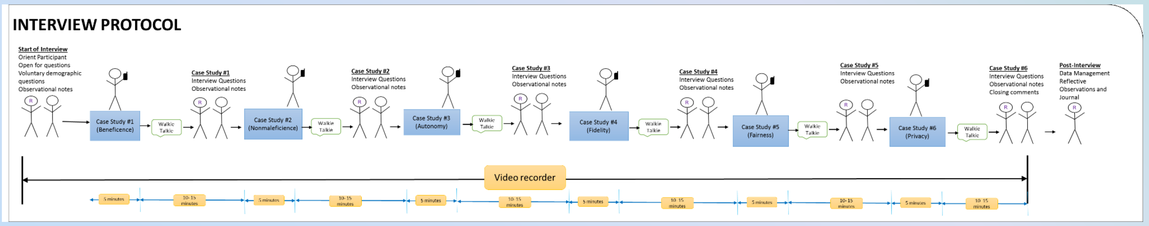

Figure 1. Protocol for the interview showing the researcher leaving the room to let the participant read individual case studies to minimize coercion by the researchers.

PRELIMINARY RESULTS

A priori coding revealed that participants were most aware of and described the principles of **beneficence** and **fidelity** while they described **fairness** and **privacy** the least. Three emergent themes were found in the case studies: effective communication, power relationship, and awareness. Effective communication was highly valued and was frequently mentioned as one of the strategies graduate students used to resolve the negative situations mentioned in the case studies. Participants were acutely aware of the power imbalance between mentor and mentee especially centered around how much time a mentor gave them. An emergent theme that came out of the analysis was awareness. Participants frequently mentioned going to their peers to establish what was 'normal' for how their mentor ethically interacted with them.

Theme	Subtheme	Question	Quotation
Effective Communication	Clarifying Expectations	What do you consider are the positive attributes of a productive mentoring research relationship in your field?	"I think it's important that the communication between the major professor, or the mentor and the mentee because the communication is if the professor wants you to do something or to achieve something, and you expect something as well from what you are doing, the research, it is good to be communicated, otherwise there could be some misunderstanding and…well, I think communication is key." -Carla, Demographics, Engineering
	Strategies	What advice would you have given to the individuals involved in the case study?	"I would probably tell Sandra to, again, consider approaching her advisor and letting her know that she has different ideas about where she sees herself going. And um, I would advise for Dr. Copie to, you know, accept that about Sandra and not push her further and still be supportive. Um, because I think that these types of things--this case study and the last case study--are the things that turn people away from completing their program or going into academia in general. And so, I would tell Dr. Copie to still be supportive even if it's not exactly what she wanted." -Kate, Case Study #3 (Autonomy), Science
	Decision Transparency	If you were placed in the situation of the case study, how would you have responded in your current role as a mentee? Please explain	[translated] "I would have done the same. I would have done the same thing he did in reality. I think I would have come with all my educational background in hand and I would have asked for an explanation as to why I was not considered when in reality my background is more important than the person who got the position." -Beatrice, Case Study #5 (Fairness), Science
Power Relationship	Pushing/challenging	What take-home message could you apply to your mentoring research relationship after reading this case study?	"I would just say that a mentor needs to be hard and understanding at the same time. It's very hard, but then nobody said mentoring is easy. So, yes, one has to be hard and pushing the student but also have to be aware that that push is not so hard that the student topples over. That should not be. That student should succeed and if, as I said earlier that different students have different needs. While some need push, some need a little good words--helpful and sympathizing words--and that does the work. So, one has to understand how to handle a student. " -Brija, Case Study #1 (Beneficence), Engineering
	Time	What was the most negative information you found when reading the case study? Why?	"I think lack of dedicated time for students. Like, I know professors have a lot of administrative work and other works--their own research stuff--but if you're a mentor you will have to dedicate some time to the students so that they can come up with their questions, their works, and you can properly advise them. Otherwise mentoring doesn't really make much sense." -Brija, Case Study #4 (Fidelity), Engineering
Awareness	Peers and Environment	If you were placed in the situation of the case study, how would you have responded in your current role as a mentee? Please explain	"Probably ask my friends first, like do any of your professors ask questions like this and if they said no that's really weird I'd probably, there start to back off and see if the professor just thought that was alright and quit trying to be involved like that." -Chelsea, Case Study #6 (Privacy), Engineering
	Awareness and Ethical	Do you think that this case study contains ethical issues? Please explain.	"I'm not sure how much, like, awareness factors into ethics. Like, it says that he's, well at least he appeared, entirely unaware of the effect of his behavior. So like if he knew that he was like shredding his grad students. Like that's hugely an issue." -Lindsay, Case Study #2 (Nonmaleficence), Engineering

EXAMPLE CASE STUDY (AUTONOMY)

A first-year graduate in a history Ph.D. program, Sandra was initially delighted when one of the few female full professors in the department began to show an interest in her. Dr. Copie encouraged Sandra to join her small research group of graduate students and junior faculty focused on historical criticism from a feminist perspective. Over three years and a successful master's thesis, it became clear to Sandra that the more Dr. Copie invested in their relationship, the more pressure she felt to research only in Dr. Copie's area of interest, to pursue a career trajectory very similar to that of Dr. Copie, and even to forego a family until after completion of her doctorate—as did Dr. Copie. Although her mentor appeared entirely unaware of it, it was crystal clear to Sandra that her mentor's approval and interest hinged directly on Sandra's willingness to follow Dr. Copie's own career path.

LIMITATIONS

This study was limited in that it was conducted on a narrow population in a predominantly white institution in the western United States. Recruitment of participants, while initially purposeful, became based on convenience through personal connections with these graduate students. One interview was conducted with a bilingual participant who choose to express most of her responses in her native language. There could have been interpretation complications when analyzing this translated interview. Lastly, most participants indicated they did not know what resources were available for them at the institution if they experienced mentorship dysfunction. We believe it would have been more beneficial for the participants if we offered these resources and shared the ethical mentoring principles with them after their interviews.

CONCLUSIONS/ NEXT STEPS

Collectively, these findings suggest that for many science and engineering disciplines, ethical mentoring issues center around communication, power dynamics, and awareness of ethics behind mentoring relationships. Interestingly, some of these principles were more explicitly stated among participants while others (e.g., awareness) were implicitly assumed and led to dissonant perceptions and responses by participants. More work is needed to distinguish between implicit and explicit ethical mentoring for additional graduate students as well as faculty mentors.

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