

# Supervising PhD Candidates in Health and Medical Sciences: A Narrative Review of Strategies for Success

Patrick Juliebø-Jones<sup>1-3</sup>, Christian Beisland<sup>1-3</sup>

<sup>1</sup>Department of Clinical Medicine, University of Bergen, Bergen, Norway; <sup>2</sup>Department of Urology, Haukeland University Hospital, Bergen, Norway;

<sup>3</sup>The Clinical Research in Aging and NEphro-urology (CRANE) group, Bergen, Norway

Correspondence: Patrick Juliebø-Jones, Department of Clinical Medicine, University of Bergen, Bergen, Norway, Email [jonesurology@gmail.com](mailto:jonesurology@gmail.com)

**Purpose:** A PhD degree involves both structured and independent learning. It will allow the student to gain expertise and research skills. The supervisor is critical to this educational journey and can ultimately serve as a deciding factor as to whether the process is successful. There are a lack of studies synthesising evidence on what contributes to success. The aim of this narrative review was to identify and summarise the key elements contribute to successful doctoral supervision.

**Methods:** A comprehensive but non-systematic search was undertaken to identify relevant studies across all disciplines, with a focus on medical and health sciences. Search terms included (but were not limited to) 'PhD', 'success' and 'supervision'. Findings have been presented in a narrative format in three main sections: student-specific factors, supervisor-specific factors and shared themes.

**Results:** Key student attributes that influenced successful supervision included intrinsic motivation, commitment to the research topic, self-management, and adaptation to cultural and personal change. Supervisory influences encompassed supervision style, level of training, institutional support, and research culture. Shared elements of the relationship involved the establishment of mutual expectations, open and regular communication, appropriate contact frequency, professional conduct, and respect.

**Conclusion:** PhD supervision is a complex and evolving partnership requiring mutual engagement and reflection. Early clarification of roles and expectations, coupled with ongoing dialogue and professionalism, is essential to creating a positive supervisory environment and promoting doctoral success.

**Keywords:** education, PhD, supervision, doctorate, medical

## Introduction

A PhD degree involves structured and independent learning, which will help the student to develop expertise and research skills. Upon completion of the degree, they will be in a position to pursue further research independently should they wish to. New challenges arise when taking on a PhD and although the individual will have already completed many years already as a student prior to commencement, the learning model for a PhD is different, in so far as they will be expected to learn a lot more on their own.<sup>1,2</sup> To this end, it has even been described as a lonely process.<sup>3</sup>

In the health and clinical sciences, PhD training holds unique characteristics compared to other doctoral programmes. Students are often required to integrate their research training alongside ongoing clinical duties. At the same time, they aim to apply their research findings directly to real-world healthcare settings.<sup>4,5</sup> The supervisor–student relationship must therefore accommodate these dual demands, balancing scientific rigor with the practical realities of clinical work.

For persons taking up a PhD, they will have a main supervisor and co supervisor(s). This supervision is recognised to be a core part of the candidate's educational journey and can ultimately serve as a key contributor to whether it is successful. This is especially the case given, the journey is quite long. In a Dutch study, Van de Schoot et al reported that only 10% finished within the planned 4 years allocated.<sup>6</sup> Indeed, the average time from starting a PhD to the public defence in Norway, in the field of Health and medical sciences was recorded at 5.8 years in 2024.<sup>7</sup> In a study by Glorieux

et al, the authors found good support to be protective against dropping out from the programme.<sup>3</sup> In a study of PHD candidates in Australia, 20% were dissatisfied with their supervision.<sup>8</sup>

While those who take on the role of supervisor will have completed a PhD themselves and likely have an interest in teaching, they do not necessarily have a background in teaching and may begin as newcomers to this themselves. Indeed, as Madan et al state, PhD supervision is often learned 'on the job'.<sup>9</sup> At the same time, the requirements in term of responsibility, depth and range are highlighted by Olmos-Lopez et al as being much heavier than for undergraduate or even masters level.<sup>10</sup>

Even if the supervisor has great knowledge and potential as a researcher in the field, translating this to a supervisory and teaching role, is really a separate skill in itself. Having an understanding of what can enhance this educational relationship and help it to flourish in a healthy and effective way is therefore of great importance. Yet, the literature remains limited in terms of articles that summarise these elements.

The aim of this narrative review was to address this gap and to explore the scientific literature on this topic in order to identify the key factors associated with successful PhD supervision and to address the overarching research question of what determines success in this context.

## Materials and Methods

Comprehensive but non-systematic search was performed to identify relevant articles. Bibliographic databases searched included Pubmed/Medline and Google Scholar. Search terms included, but were not limited to, "PhD", "success", and "supervision. All article and study types were considered as long as written in the English language. Literature from all disciplinary fields was considered, and the review was not limited to the context of medical and health sciences, although these were prioritised. Reference lists from identified articles were also checked for possible additional studies.

## Data/Findings

The findings from the literature search have been presented and summarised in a narrative format. Studies identified through the search were reviewed for recurring concepts and patterns related to factors influencing PhD supervision and success. The extracted data were then grouped into the following three main categories: student-specific factors, supervisor-specific factors, and shared themes concerning the student-supervisor relationship (Table 1).

**Table 1** Summary of Factors, Themes, and Key Findings Related to PhD Supervision

Main Category	Theme	Key Findings
Student-Specific Factors	Core skills and attributes	Top student attributes are time management, independent learning, passion for the topic, and long-term planning.
	Cultural and personal transitions	International students face adaptation challenges. There is a key importance of faculty and peer support.
Supervisor-Specific Factors	Supervisory approach and style	Range from hands-on to hands-off. More supervisor engagement linked to completion and study progress
	Supervisor skills and training	Need for structured training Key areas that are currently lacking include feedback literacy, emotional intelligence, and intercultural competence Reflective practice is very valuable
	Challenges for supervisors	Increased workload, resource constraints, and expectations for research output.

(Continued)

**Table 1** (Continued).

Main Category	Theme	Key Findings
Shared Themes	Establishing clear expectations	Early alignment on roles, responsibilities, and project scope; promotes trust and efficiency.
	Communication and contact	Frequent meetings reduce burnout Digital and artificial intelligence applications are useful but cannot replace in-person engagement.
	Boundaries and professional relationship	Clear communication and respect for work-life balance support a healthy student-supervisor relationship.
	Well-being and mentorship	Recognising individual needs and offering supportive mentorship enhance student well-being and satisfaction.

## Results and Discussion

The following sections present and discuss the findings from the literature that has been reviewed.

### Student-Specific Factors

#### Core Skills and Attributes

A number of studies have sought to determine what skills pertaining to the candidate can ultimately contribute to success. These are not in any particular order but there appear to be a common set of attributes that are considered to be highly relevant when supervisors have been asked.<sup>11</sup> These include good time management and the ability to set both short- and long-term plans. In this higher level of learning, the student is often expected to show independence and not be spoon fed what to do. Passion for a topic seems to be seen as one of the most important, for example, as well as enjoying the work and holding on to their curiosity for the subject.

#### Cultural and Personal Transitions

A topic that appears to have gained increased attention in the literature, is the impact of cultural differences on the PhD process. An example of this is in the setting of the international student. As well as the student needing to adapt to life in a new country, there may be differences in terms of academic expectations, communications styles and hierarchy. All of these can have knock on effects on PhD supervision. While institutions will typically have guidelines for this group, Cree et al argue that such frameworks are insufficient.<sup>12</sup> Faculty and peer support is greatly important here.<sup>13</sup> Ryan et al highlight that this group do often need additional time and this can even lead to unintentional resentment from the supervisor.<sup>14</sup>

### Supervisor-Specific Factors

#### Supervisory Approach and Style

Gruzdev et al performed an institutional survey in an attempt to categorise the different styles of PhD supervision and also to see what impact this had on the outcomes of the PhD.<sup>15</sup> The authors concluded there were 6 main types, primarily based on the level of hands-on involvement and range from close involvement and lots of contribution to every aspect to a complete hands-off approach. There was a relatively even distribution of all types. Those students with highest level of engagement from their supervisor were most likely to complete their PhD in the specified time. Interestingly, two thirds of those with complete hands-off supervisors, did not wish to change their current supervisor. Li et al further examined supervisory styles and identified eight types representing a continuum from supportive to controlling approaches: leadership, helping/friendly, understanding, student freedom/responsibility, uncertain, dissatisfied, admonishing, and strict.<sup>16</sup> More empowering styles were associated with greater student motivation and progress. Importantly, these approaches were not fixed; supervisors often adopted hybrid or overlapping styles. How much assistance a supervisor

should give and finding the balance between freedom and neglect is argued by Eley et al to be the greatest challenge to the supervisor.<sup>17</sup>

### Supervisor Skills and Training

A main supervisor may be recommended to adopt a role of co-supervisor in the first instance. This allows experience to be gained. It has been debated, whether all supervisors should have equal academic experience, what is referred to as a 'horizontal team' by Fragouli et al, or whether a more hierarchical set up is preferable.<sup>18</sup> Both appear to have their own advantages and disadvantages. It may also be dependent on the research subject of the thesis. For example, if it is interdisciplinary, an expert in more than one field is of benefit— for example, surgeon and pathologist for PhD on renal cancer. Supervisor insight into their own abilities or areas for development and so engaging in courses and further education is to be encouraged.<sup>19</sup> Karampelias et al examined such courses across 17 academic institutions in Sweden and found three areas to be commonly lacking: feedback literacy, emotional intelligence, and intercultural competence.<sup>20</sup> Adding to this, Jacobsen et al highlighted value of supervisors undergoing reflexive training to self-reflect on their personal supervisor experiences and practices.<sup>21</sup>

Having more than one supervisor is arguably an advantage as it allows more perspectives but also less strain on 2-way relationship. However, it is important that all supervisors also maintain professional relationship and avoid arguing or generating disharmony.

### Challenges for Supervisors

There are additional pressures on academic staff that were less present before.<sup>22</sup> These include greater budgetary constraints and greater expectations on research output. Bøgelund et al noted that this is compounded further by the fact that, for example, in Denmark, the number of students each supervisor has has increased. These have greatly affected the working conditions for academic community. It also carries a negative impact on student learning although they may be less aware of these system pressures. It could be hypothesised that experience helps being a PhD supervisor, particularly when they actively reflect on each student upon completion.

Delamont et al found that supervisors often aim to improve on the experiences they had with their own PhD supervisor.<sup>23</sup>

## Shared Themes: Student–Supervisor Interaction

### Establishing Clear Expectations

PhD is often described as a 2-way process, with considerable input required from both student and supervisor. It is therefore recommended to establish expectations early. Having an in-person interview has been put forward. Here too responsibilities can be outlined, for example, that supervisor takes ownership for project funding and ethical approval of project. The supervisor also needs to have developed a project that is feasible within specified time frame and is high enough quality for the level of PhD. In this regard, the student is placing quite a lot of trust in the supervisor. One method is to trial a pilot project first before formally embarking on a formal PhD. In the medical setting, students will also vary in terms of whether the degree is being pursued in a full-time role with a stipend or scholarship or alongside clinical duties. For those in the latter group, it is important for the supervisor to adjust expectations and ensure the student is not overwhelmed.

### Communication and Contact

Regular contact is frequently recommended feature in the literature. Lack of frequent supervision was associated with higher chance of burnout in a study of 248 doctoral students in Finland.<sup>24</sup> In a study of 355 PhD students across a wide range of disciplines in Queensland, Australia, increased contact was observed at the beginning and then towards the end of the degree.<sup>25</sup> Sixty-seven percent had a formal meeting at least every 2 weeks in the early stages. Keeping a written log, or minutes, is also recommended.

In response to students finding their supervisors lacked sufficient time to support student skills, for example, writing, at Walter Sisulu University in South Africa, Grossman et al described setting up one on one consultancy sessions to support students for one hour periods on a weekly basis as required.<sup>26</sup> They refer to these as 'informal learning spaces' as

a means to complement formal supervision. The development of Zoom and other online tools seems to have facilitated the ability to converse with the supervisor when in different locations. However, Torcka et al found in their study recording supervision sessions online and in person that while one to one supervision is not really affected by this set up, the quality of group supervision appears to be more compromised.<sup>27</sup>

While platforms like Zoom™ and Microsoft Teams™ have also offered a means to supervise and communicate during the Covid-19 pandemic, Krumsvik et al highlight that, over time, this format alone was insufficient to follow up their students and that in person meetings really are pivotal.<sup>28</sup>

Jensen et al explored the role that generative artificial intelligence (AI), in the form of chatbots, can play in doctoral supervision.<sup>29</sup> The authors found that these tools can serve a practical purpose by supporting task-focused activities and providing direct feedback on assignments; however, they lack the depth necessary to foster the student's overall academic growth. They can therefore complement, but not replace, the developmental feedback provided through human supervision. Henderson et al surveyed more than 6000 students across Australian universities and found that trust in feedback provided by AI applications was lower than that placed in feedback from human supervisors; however, students rated the ease of access and rapid response time of AI tools highly.<sup>30</sup>

In some settings, the project will already have been decided by the supervisor, but in other situations, the general area may have been agreed upon, but the specifics of the thesis have not been decided. In the latter scenario, it can arise that the project the student may envisage as ideal may not be what the supervisor feels is most suitable or achievable. The expectations need to be managed accordingly. While the supervisor may not be able to accommodate all their wishes, efforts to address these early on are recommended. Clear thinking.

### Boundaries and Professional Relationship

As well as establishing expectations, boundaries should also be framed. This can include methods of contact and when it is appropriate to communicate, or at least when they could reasonably expect a reply. A supervisor should also reflect on the fact that if they Email in the middle of the night on a weekend with new update on the project, they may be unwittingly sending a message to the student that they expect this level of commitment from them. It could also inadvertently lead to the student trying to mirror this activity and potentially developing what could be considered unhealthy habits. The latter could be considered also a boundary that the student must learn to set for themselves in general, a life skill perhaps, and one that is separate from the student-supervisor relationship.<sup>31</sup>

It is therefore worth being open about working styles and the format communication will take. Pearson et al highlight the need for a student counsellor-mentor role within the university.<sup>32</sup> This role can serve to support these relationships and ultimately lead to higher student retention and satisfaction. Improving peer to peer support and student networks has been added as a means to support this also. This is especially important in the early stages of PhD life, when students can struggle with their new identity.<sup>32</sup> This can be especially the case if the student has had a time away from studies, for example, after a professional career.<sup>33</sup> Given the student is introduced to a new administrative system, the university can also help reduce stress, including on student-supervisor relationship, by having clear information and pathways for resources such as project funding.<sup>34</sup> In a study by Cao et al, the authors found that greater institutional support was a stronger predictor of academic engagement among doctoral students compared with peer or family support.<sup>35</sup>

### Well-Being and Mentorship

In a survey of PhD candidates at Maastricht University, The Netherlands, Woolderink et al identified that many students wished for their supervisor to be receptive to their personal life and seeing them as an individual.<sup>36</sup> This does not mean that a supervisor should take a deep interest in their private life, rather that they support their mental well-being. Becerra et al identified that a good supervisor-candidate relationship can contribute to higher candidate well-being.<sup>37</sup> Grevholm et al stress that the key element is about the supervisor respecting the different conditions of the student's private life.<sup>38</sup> Benmore et al recognise that not only is managing boundaries a complex process, but supervisors also have to negotiate multiple roles such as mentor and counsellor.<sup>39</sup> Orellana et al explored this further and determined that a supervisor has in fact at least 11 distinct sub roles, which also include examiner (for example having to assess their progress in reports), supporter (for example giving them encouragement they need) and teacher (eg research techniques).<sup>40</sup> More recently,

Zhou et al explored these additional roles undertaken by supervisors and found the list to have expanded to a total of 18, including roles such as administrator, career mentor, and institutional representative.<sup>41</sup>

Wu et al characterised supervisor–student communication types in three categories: friend (open communication and mutual respect), stranger (poor contact), and subordinate (clear hierarchy).<sup>42</sup> The friend approach was identified as the most beneficial for development. Supervisors can also assist their student in terms of career development and helping them make choices in terms of what they pursue once their degree is completed. Numerous studies report that the degree to which this occurs varies and in some areas, supervisors may be too negative on the potential benefits of choosing a path outside of academia.<sup>43</sup>

## Limitations and Strengths

Limitations of this study include its design as a narrative review rather than a systematic review, which limits reproducibility, increases the risk of selection bias, and prevents a formal assessment of the strength or quality of the evidence. There is also considerable heterogeneity, as the review encompasses multiple academic disciplines. However, this breadth allows for a more comprehensive understanding of the factors contributing to successful supervision across diverse contexts and offers practical insights that may be transferable between disciplines.

## Conclusion

PhD supervision is a complex and multifactorial process that requires a careful balance between fostering student autonomy and providing adequate support. Success depends not only on academic expertise but also on competencies related to communication, relationship building, and self-reflection. Strategies to enhance supervisor competence include structured training programmes and these should incorporate the development of emotional intelligence, reflexivity, and feedback literacy. While technologies such as AI can facilitate aspects of supervision such as practical tasks, they cannot replace the core human elements of mentorship in supervision. Academic institutions are encouraged to prioritise initiatives and frameworks aimed at advancing the quality of supervision and student support.

## Acknowledgments

Artificial intelligence software (Chat-GPT-4) has been used to improve grammar and spelling but not to create original content. The authors are accountable for the originality, validity, and integrity of the content of the article.

## Disclosure

The authors report no conflicts of interest in this work.

## References

1. mckenna HP, Thompson DR. Is the phd in nursing in terminal decline? *Inter J Nurs Stud.* 2025;170:105152. Doi:10.1016/j.ijnurstu.2025.105152
2. Mahsood N, Mahboob U, Khan NA. Facing the struggle alone; insights into the experience of PhD scholars in Pakistan. *Pakistan J Med Sci.* 2025;41(7):1866–1871. doi:10.12669/pjms.41.7.11414
3. Glorieux A, Spruyt B, Minnen J, van Tienoven TP. Calling it quits: a longitudinal study of factors associated with dropout among doctoral students. *Stud Continuing Educ.* 2025;47(1):155–173. doi:10.1080/0158037X.2024.2314694
4. Payne R, Frejah I, Abbey E, Badcoe R, Delaney B, Mitchell C. Transitioning between clinical and academic practice from the perspectives of clinical academic trainees, academic training programme directors and academic supervisors: a mixed methods study. *BMC Medical Education.* 2025;25(1):236. doi:10.1186/s12909-025-06803-w
5. Moradi A, Hashemi S, Sadeghi H, Jafari-Oori M. Exploring facilitators and barriers faced by PhD nursing faculty in clinical settings: a qualitative content analysis. *BMC Nursing.* 2025;24(1):250. doi:10.1186/s12912-025-02856-w
6. Van de Schoot R, Yerkes MA, Mouw JM, Sonneveld H. What took them so long? Explaining PhD delays among doctoral candidates. *PLoS One.* 2013;8(7):e68839. doi:10.1371/journal.pone.0068839
7. Statistics Norway, Table 13594 [database]. Statistics Norway. n.d. Available from: <https://www.ssb.no/en/statbank/table/13594>. Accessed July 1, 2025.
8. McGagh J, Marsh H, Western MC, et al. Review of Australia’s research training system. 2016.
9. Madan CR. *A Brief Primer on the PhD Supervision Relationship.* Wiley Online Library; 2021:5229–5234.
10. Olmos-López P, Sunderland J. Doctoral supervisors’ and supervisees’ responses to co-supervision. *J Further Higher Educ.* 2017;41(6):727–740. doi:10.1080/0309877X.2016.1177166
11. Gilmore JA, Wofford AM, Maher MA. The flip side of the attrition coin: faculty perceptions of factors supporting graduate student success. *Inter J Doctoral Stud.* 2016;11:419. doi:10.28945/3618

12. Cree VE. 'I'd like to call you my mother.' Reflections on supervising international PhD students in social work. *Soc Work Educ.* 2012;31(4):451–464. doi:10.1080/02615479.2011.562287
13. Schneider JK, Bender CM, Madigan EA, Nolan MT. Facilitating the academic success of international PhD students. *Nurs Educ Perspectives.* 2020;41(1):20–25. doi:10.1097/01.NEP.0000000000000489
14. Carroll J, Ryan J. *Teaching International Students: Improving Learning for All.* Routledge; 2007.
15. Gruzdev I, Terentev E, Dzhaifarova Z. Superhero or hands-off supervisor? An empirical categorization of PhD supervision styles and student satisfaction in Russian universities. *Higher Educ.* 2020;79(5):773–789. doi:10.1007/s10734-019-00437-w
16. Li Y, Xu W, Chen J. PhD student-supervisor relationship and its impacts: a perspective of the interpersonal relationship model. In: *Front Educ.* Frontiers Media SA; 2025;10:1570137.
17. Murray R, Eley A. How to be an effective supervisor: best practice in research student supervision. 2009.
18. Fragouli E. Postgraduate supervision: a practical reflection on how to support students' engagement. *Inter J Higher Educ Manage.* 2021;7(2). doi:10.24052/IJHEM/V07N02/ART-1
19. Phillips EM, Pugh DS. *How to Get A: Ph. D.* (Maidenhead: Open University Press); 2007.
20. Karampelias C, Stigmar M, Auer N. Behind the scenes of doctoral success: a mixed methods approach to exploring PhD supervision courses in Swedish higher education institutions. *Stud Higher Educ.* 2025;50(6):1138–1150. doi:10.1080/03075079.2024.2364066
21. Jacobsen M, Friesen S, Becker S. Learning doctoral supervision in education: a case study of on-the-job development of effective mentoring practices. *Inter J Doctoral Stud.* 2024;19:012. doi:10.28945/5375
22. Bøgelund P. How supervisors perceive PhD supervision: and how they practice it'. *Inter J Doctoral Stud.* 2015;10:39–55. doi:10.28945/2096
23. Delamont S, Parry O, Atkinson P. Creating a delicate balance: the doctoral supervisor's dilemmas. *Teach Higher Educ.* 1998;3(2):157–172. doi:10.1080/1356215980030203
24. Cornér S, Löfström E, Pyhältö K. The relationship between doctoral students' perceptions of supervision and burnout. *Inter J Doctoral Stud.* 2017;12:91–106. doi:10.28945/3754
25. Heath T. A quantitative analysis of PhD students' views of supervision. *Higher Educ Res Develop.* 2002;21(1):41–53. doi:10.1080/07294360220124648
26. Grossman E. 'My supervisor is so busy.' informal spaces for postgraduate learning in the Health Sciences. *South Afr J Higher Educ.* 2016;30(2):94–109. doi:10.20853/30-2-643
27. Torca M. The transition from in-person to online supervision: does the interaction between doctoral advisors and candidates change? *Innovations Educ Teach Int.* 2021;58(6):659–671. doi:10.1080/14703297.2021.1993959
28. Krumsvik RJ, Røkenes FM, Skaar ØO, et al. PhD-supervisors experiences during and after the COVID-19 pandemic: a case study. In: *Front Educ.* Frontiers Media SA; 2024;9:1436521.
29. Jensen LX, Bearman M, Boud D, Konradsen F. Feedback encounters in doctoral supervision: the role of generative AI chatbots. *Assess Eval Higher Educ.* 2025;1–14. doi:10.1080/02602938.2025.2478155
30. Henderson M, Bearman M, Chung J, et al. Comparing generative AI and teacher feedback: student perceptions of usefulness and trustworthiness. *Assess Eval Higher Educ.* 2025. 1–16. doi:10.1080/02602938.2025.2502582
31. Ylijoki O-H. Boundary-work between work and life in the high-speed university. *Stud Higher Educ.* 2013;38(2):242–255. doi:10.1080/03075079.2011.577524
32. Pearson M. Building bridges: higher degree student retention and counselling support. *J Higher Educ Policy Manage.* 2012;34(2):187–199. doi:10.1080/1360080X.2012.662743
33. Austin J, Cameron T, Glass M, et al. First semester experiences of professionals transitioning to full-time doctoral study. *College Stud Affairs J.* 2009;27(2):194–214.
34. Grebennikov L, Shah M, editors.. *Enhancing the Research Student Experience at University.* Australasian Association for Institutional Research; 2008.
35. Cao F, Li H, Chen X, You Y, Xue Y. Who matters and why? The contributions of different sources of social support to doctoral students' academic engagement. *Eur J Educ.* 2024;59(3):e12649. doi:10.1111/ejed.12649
36. Woolderink M, Putnik K, van der Boom H, Klabbers G. The voice of PhD candidates and PhD supervisors. A qualitative exploratory study amongst PhD candidates and supervisors to evaluate the relational aspects of PhD supervision in the Netherlands. *Inter J Doctoral Stud.* 2015;10:217. doi:10.28945/2276
37. Becerra M, Wong E, Jenkins BN, Pressman SD. Does a good advisor a day keep the doctor away? How advisor-advisee relationships are associated with psychological and physical well-being among graduate students. *Inter J Commun Well-Being.* 2021;4(4):505–524. doi:10.1007/s42413-020-00087-2
38. Grevholm B, Persson L-E, Wall P. A dynamic model for education of doctoral students and guidance of supervisors in research groups. *Educ Stud Mathematics.* 2005;60(2):173–197. doi:10.1007/s10649-005-4497-2
39. Benmore A. Boundary management in doctoral supervision: how supervisors negotiate roles and role transitions throughout the supervisory journey. *Stud Higher Educ.* 2016;41(7):1251–1264. doi:10.1080/03075079.2014.967203
40. Orellana ML, Darder A, Pérez A, Salinas J. Improving doctoral success by matching PhD students with supervisors. *Inter J Doctoral Stud.* 2016;11:87. doi:10.28945/3404
41. Guarimata-Salinas G, Carvajal JJ, Jimenez Lopez MD. Redefining the role of doctoral supervisors: a multicultural examination of labels and functions in contemporary doctoral education. *Higher Educ.* 2024;88(4):1305–1330. doi:10.1007/s10734-023-01171-0
42. Wu S, Oubibi M, Bao K. How supervisors affect students' academic gains and research ability: an investigation through a qualitative study. *Heliyon.* 2024;10(10).
43. Spronken-Smith R, Brown K, Cameron C. Retrospective perceptions of support for career development among PhD graduates from US and New Zealand universities. *Stud Graduate Postdoctor Educ.* 2024;15(3):273–289. doi:10.1108/SGPE-05-2023-0048

**Advances in Medical Education and Practice**

**Publish your work in this journal**

Advances in Medical Education and Practice is an international, peer-reviewed, open access journal that aims to present and publish research on Medical Education covering medical, dental, nursing and allied health care professional education. The journal covers undergraduate education, postgraduate training and continuing medical education including emerging trends and innovative models linking education, research, and health care services. The manuscript management system is completely online and includes a very quick and fair peer-review system. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <http://www.dovepress.com/advances-in-medical-education-and-practice-journal>

**Dovepress**

Taylor & Francis Group