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Martyn Polkinghorne, Julia Taylor, Fiona Knight and Natalie Stewart



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Doctoral Supervision: A Best Practice Review

Martyn Polkinghorne ^{1,*}, Julia Taylor ², Fiona Knight ² and Natalie Stewart ²¹ Business School, Bournemouth University, Poole BH12 5BB, UK² Doctoral College, Bournemouth University, Poole BH12 5BB, UK

* Correspondence: polkinghornem@bournemouth.ac.uk

Definition: A “doctoral student” is the term for a student undertaking the highest level of university degree (a doctorate). “Supervisor” is the term for the academic, or academics, who act as their guide. Unlike taught classroom-based degree courses, doctoral degrees in the UK are normally only, or mainly, focused upon a single intensive research study into a specific topic. Such degree courses facilitate the development of students into highly specialist autonomous researchers capable of independent thought. Typically, a blend of support is provided to each doctoral student which consists of an elective development program of research methods learning opportunities alongside dedicated supervisor support from one or more academic members of staff called “supervisors”. It is the expectation that each supervisor will act as a guide and mentor for the doctoral student, thereby enabling them to successfully complete their program of research. This entry relates primarily to the UK model of supervising a doctoral student. Doctoral programs in other countries may differ.

Keywords: postgraduate; researcher; doctoral; PhD; supervision; best practice; university

1. Introduction

Alongside the more common university-taught degrees, doctoral degrees offer a different experience for students. Whereas the traditional classroom setting for teaching facilitates the transfer of mainly explicit knowledge, research degrees offer an emphasis on the doctoral student developing tacit knowledge and understanding. Polanyi [1] defines explicit knowledge as being that which is theoretical and codified, and tacit knowledge as being based upon the development of an individual’s experience and skills.

Today’s doctoral degrees originate from early forms used within mediaeval universities and were based upon an apprenticeship model [2] which then later evolved in the nineteenth century [3] into the precursor for the current format in which the student undertakes a program of autonomous research [4].

The most common doctoral degree, the Doctor of Philosophy (PhD), which began in the nineteenth century, was a way of training people to become career academics, by using an experienced supervisor (advisor) as a guide [4,5]. In this scenario, the doctoral student gained new knowledge by sharing experiences, and working alongside their supervisor. This friendly one-to-one relationship has now been replaced with demands for a timely completion within a 4-year period, where each doctoral student makes an original contribution to the body of knowledge for their chosen discipline to demonstrate that they are “worthy” of the award. This contribution may be in the form of a better understanding of a topic, or in certain fields, may lead to the generation of important discoveries, and sometimes even new technologies.

Doctoral students are most often supervised by a main first supervisor (sometimes called a director of studies) and a second supervisor [6]. Doctoral supervision itself should be considered as a form of pedagogy [7] in which the supervisor takes the role of guide and critical friend. Recent moves to online teaching have opened up new opportunities for using educational technology to support supervision [8], and have proven to be beneficial for supervision in terms of flexibility, and also the encouragement of diversity and



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inclusion [9,10]. Whichever way supervision is actually delivered, there remains a lack of understanding concerning the requirements to make it successful [11]. Below we consider the dimensions of good supervisory practice and discuss the relevant implications and impacts which can occur.

2. Selecting the Right Doctoral Student

Students of all levels within higher education are increasingly considered to be consumers, and so the provision of imperfect supervision, by unsuitable academics, not only will impact upon doctoral student satisfaction and their chances of being successful, but is also simply unacceptable [12]. Conversely, new doctoral students with little research experience will not fully understand the commitment they are undertaking. The selection process for new doctoral students is therefore complicated and must consider the needs and abilities of both the potential doctoral student, and also the proposed supervisor/s.

Part of this selection process is to determine if the doctoral student can make the transition to become an independent researcher capable of autonomous working [13]. Through careful selection of doctoral students based upon working styles and beliefs, supervisors may be able to identify those whom they are best suited to support [14]. The quality of the potential doctoral student is often assessed based upon their research proposal, their alignment to the supervisor's personal research interests, and an evaluation of their potential to create an original contribute to knowledge [15]. If supervisors publicize research topics of interest in advance, then they are more likely to be approached by potential doctoral students seeking supervision in topic areas with which the supervisor feels most comfortable [13]. When supervisors are matched with doctoral students based upon joint areas of focus and interest, the relationship between supervisor and doctoral student is much stronger, and operates at a higher level [16]. Both supervisors and doctoral students will have individual supervisory preferences [17], and so this is a further consideration which needs to be explored before making a commitment to supervise [18]. In addition, to be successful, there is a need for doctoral students to demonstrate excellent verbal and written communication skills, a maturity of thinking, well developed emotional intelligence [19,20] and a high level of resilience [21].

Motivation is another key factor to consider when selecting potential new doctoral students. Doctoral students with appropriate motivations, and who are ready and prepared to fully engage with all aspects of their research studies, are much more likely to be successful [22]. Some doctoral students wish to gain a doctorate for job security, whereas for others, the motivation is career development and promotion [23]. Although not easy, supervisors need to consider not only how they will supervise a potential new doctoral student, but also how they will support the doctoral student to develop any personal, and professional, attributes necessary for their subsequent employment within either academia or industry [22].

Institutions should have in place, and enforce, a policy regarding the maximum number of doctoral students which a supervisor can accept for supervision to ensure that each individual doctoral student receives sufficient time and attention [15,24]. Supervision takes a significant amount of time and there needs to be a realistic workload recognition of this by the institution, so that adequate time across the academic year can be provided [15,25]. This time requirement must also be understood by the supervisor before they make a commitment to supervise a new doctoral student. From almost 1200 supervisors questioned on behalf of the UK Council for Graduate Education (UKCGE), first supervisors reported that they are spending an average of 52 h of time per year per doctoral student. This is a demanding and challenging workload for supervisors to be able to accommodate alongside their other teaching, research and management activities [15].

In reality, supervisors face many conflicting demands on their time, and also on their mental capacity, when it comes to supervision [26]. Being a doctoral supervisor can bring enormous benefits and satisfaction to an academic, but it also offers significant professional and reputational risks [27], which is why selection of suitable potential doctoral students

is important [28]. Furthermore, due to the intensity of the relationship, supervisors need to carefully consider recruitment and selection of doctoral students which they plan to supervise [13]. For all of these reasons, supervisors must be involved fully in the actual selection process of their new doctoral students [13]. Whilst the supervision of doctoral students is often a key aspect within institutional academic pay and promotion systems, it also forms an important part of an academic's personal legacy to their own discipline, which is why, despite the commitment, the supervision of doctoral students remains a popular and sought-after activity [29].

Concerns have been expressed relating to a potential decrease in the quality of doctoral students as the quantity of them within the education system increases [30], and as institutions are under increasing pressure to recruit more and more doctoral students [31]. In the case of international doctoral students, adequate structures must be in place to offer suitable levels of support [31], and this applies particularly to both language and cultural support. The ability to write fluently, academically, and critically are all key skills required by the doctoral student. Therefore, these skills need to be assessed at application and interview stage to identify the suitability of prospective new students to undertake doctoral studies [22].

3. Considering the Supervisor–Doctoral Student Relationship

Doctoral supervision is a collaborative process which means that the relationship between the supervisor and the doctoral student is of key significance [25]. In fact, the timely completion of a doctoral student is often dependent upon the quality of the relationship which they have with their supervisor [32]. A successful supervisor and doctoral student relationship considers more than just verbal communication, and therefore, non-verbal communication, such as emotions, behaviors, and body language, also form important elements [33]. Due to the intensity of this relationship, supervisors need to carefully consider the recruitment and selection of potential doctoral students whom they plan to supervise to ensure that a good match exists between each of their individual philosophies and approaches to research [13].

Once selected, effective relationships start with the setting of clearly defined expectations [34] and establishing agreed roles and responsibilities [29]. Clear expectations established from the beginning help to avoid subsequent confusion and misunderstandings. These expectations should be monitored and reviewed on a regular basis, by both the student and the supervisors, to ensure that they remain appropriate, as a good supervisory relationship needs to adapt to a doctoral student's needs and progress [34]. Expectations include barriers, and instead of implicitly assuming that barriers exist, they should be explicitly defined to avoid any confusion [31].

Maintaining clear inter-personal communication between supervisor and doctoral student is essential for effective supervision [19,29,33]. This is particularly true with new doctoral students, and is even more important in the case of international students, who may also be experiencing a transition of culture and expectations. Communication is also a key part of developing the necessary relationship of trust between supervisor and doctoral student [35]. Mismatched expectations can damage trust [32] and so, the more that such a mismatch of expectations concerning both the roles, and the responsibilities, of supervisor and doctoral student can be minimized, then the stronger the resulting relationship should be [36].

Because of these facts, doctoral students are significantly impacted by the communication skills of their supervisors, and a poor level of skill in this area will seriously impair the development of the necessary relationship, and potentially inhibit progression of the research towards completion [33]. Furthermore, according to data from the Higher Education Statistics Agency (HESA), 78% of UK doctoral students are aged 25 or over [37]. The majority of doctoral students are therefore mature learners, many of whom will have previous work experience alongside current personal, family and financial responsibilities [34]. Mature adults may conduct themselves differently in academic environments when compared

to undergraduate students [38], and supervisors need to develop appropriate ground rules to accommodate this [31]. Furthermore, although they are outside of the actual program of study being supervised, factors from the personal life of a doctoral student will heavily influence their on-going motivation, engagement and progress, and their overall ability to conduct their program of research [13]. Supervisors therefore need to remain vigilant so that they can make appropriate interventions as and when required [39]. This form of pastoral care, and the on-going monitoring of both opportunities and threats to the research, are key elements of the relationship between supervisor and doctoral student [32].

4. Understanding the Power Dynamics between Supervisor and Doctoral Student

Doctoral supervision is an ethical practice driven by a power relationship which exists between a supervisor and doctoral student [27]. These power dynamics exist due to the nature of the relationship, and mechanisms to diffuse them need to be identified as otherwise they can form unhelpful barriers which inhibit successful communication [40]. Whilst the role of power between supervisor and doctoral student is important, and possibly even key to ensuring a successful conclusion of the program of research, there is little discussion across the sector regarding how it should operate in practice, and how it might be managed appropriately [39]. If these power dynamics can be articulated, challenged, and deconstructed, doctoral students may find it easier to listen, respond and engage with their supervisor's advice [41].

Tensions can arise from the power imbalance between supervisors and doctoral students which can become disruptive over time [42], but if this supervisor-student relationship can evolve into a critical friendship, then this change in perspective will often minimize such tensions [43]. Whilst power relationships of this form are positive and helpful within the supervisory process, the relationship will stop operating well if either supervisor or doctoral student feels exploited [44].

The relationship between supervisor and doctoral student needs to have clear boundaries to prevent social relationships becoming confused with professional ones [31]. Alongside this, supervisors need to be aware that their doctoral students, particularly international students, may have different cultural values and expectations relating to their studies, their relationships with others, and their approaches to communication [45]. Because of this, supervisors need to be cautious to prevent relationships with their doctoral students from becoming too personal. All parties should maintain professional levels of engagement at all times, and at all stages of the research [29,44] to ensure that the relationship which needs to be friendly and supportive, remains appropriate so that it works effectively for all involved [13,31]. Should the supervisor and doctoral student relationship deteriorate, for whatever reason, there should be a clear institutional policy to ensure a smooth separation can be achieved. This separation needs to be managed by an independent senior member of staff who can be sensitive to the issues faced by both parties, and who can minimize the collateral damage for all involved [31].

Linked to both the power dynamic, and also to the evolving relationship, doctoral students may often find it difficult to challenge the advice of their supervisors' due to respect, insecurity and/or cultural values [46]. In the case of staff who are themselves a doctoral student, they may be less willing to seek help in case such action causes their colleagues to consider them less favorably [31]. In both cases, developing rapport is an important element of a successful supervisory relationship as it breaks down levels of formality which otherwise may stifle the open and honest discussion required for serious academic debate [47,48].

In some cases, doctoral students become dependent on their supervisor due to the intensity of the experience. Conversely, in other cases they may struggle to get sufficient time and support [31]. There can develop a tension between dependence and independence of doctoral students, of which supervisors need to remain aware [19]. In reality, to ensure that a doctoral student develops into an autonomous researcher capable of independent thinking and working [49], the process of supervision requires that the supervisor's support for

the doctoral student becomes less intensive over time, however, this is a process from which they can experience trauma [50]. This is a master–apprentice model of supervision [51] which operates as an expert to novice knowledge transfer process of guided practice [52] in which the expert (the supervisor) increasingly provides less support as the novice (the doctoral student) gains their own understanding, experience and independence. Alongside this process, a change in supervisor, for whatever reason, can destabilize doctoral students which in turn impacts upon the quality of both their own research, and often the research culture in which they are undertaking the research [53].

5. Integrating Doctoral Students into the Research Culture

Enhancing the research culture for doctoral students is recognized as being of increasing importance [54], and may, in fact, prove pivotal in enabling the doctoral student to achieve successful completion [55]. Without feeling part of the research culture, doctoral students do not experience a sense of cohesion [56], for example inclusion in writing groups [57], without which students can feel isolated [35] and so can fail to achieve social integration [39], which in turn limits their chances of reaching their full potential and may stifle their overall progression.

The development of informal groupings between doctoral students is helpful in creating a research culture in which students are able to share knowledge and experiences [34,58]. Professional development is best achieved when delivered as part of a community of practice [8,59]. Socialization is a useful process as it helps to embed academic norms and values [60,61], and informal learning opportunities through discussions with peers can be very effective [25,62]. Furthermore, cross-disciplinary groups are important to facilitate understanding of different disciplinary practices [63].

The long-term one-to-one relationship between supervisor and doctoral student places particular demands on both parties [31]. The high complexity, and increasing load of doctoral supervision is emotionally very demanding on its own [14]. In addition, the role of the supervisor needs to look far beyond just the research being undertaken, and should also include caring for the holistic needs of the doctoral student which is much more extensive in scope than just the academic support provided [15]. Whilst each supervisory relationship is unique [34], empathy and respect are key qualities of a successful supervisor [64]. Mindfulness traits such as emotion, authenticity and sincerity [65,66] are important elements within a supervisory relationship [67] and supervisors need to have a positive regard for the doctoral student's own thoughts and views. It is also important that supervisors have the opportunity to develop their ability to regulate their own emotional responses, and to be able to identify and evaluate the emotional responses of their doctoral students [14]. Operating as a supervisory team can lessen the intensity of such issues, and offer better support for both doctoral students and their supervisors [68]. However, adding more supervisors can also create disagreement, and a divergence of views within the team, which can be detrimental to the doctoral student's overall experience [13].

6. Protecting the Mental Health of Doctoral Students

Being a doctoral student is a unique and complicated journey which will include unpredictable events, and which leads ultimately to an uncertain outcome. There are a significant number of opportunities along this journey for potential emotional episodes to occur [69] which can lead to anxiety [70]. Doctoral students often face a wide range of challenges which together may contribute to the development of poor mental health and wellbeing [71]. Examples may include financial pressures based upon fees and living costs, the isolation of autonomous working and the uncertainty of progress and position within the institution [72]. Studies show that doctoral students often have significantly lower levels of wellbeing and resilience in comparison to the general population [21]. In fact, even in comparison to other student groups, doctoral students appear to be more likely to experience poor mental health and wellbeing [73].

Doctoral students will often feel insecure about their skills, abilities and progress. This is a form of imposter syndrome [74], and because of the prevailing power dynamics previously discussed, doctoral students may be unwilling, or unable, to express themselves to their supervisors, or even to family and friends [75]. Imposter syndrome can lead a doctoral student experiencing high levels of depression and stress [74]. Increasingly, attention is now being paid to the psychological wellbeing of doctoral students. Supervisors need to remain aware and be vigilant for early identification of issues, and then to monitor situations, and to signpost the doctoral student to support services if required [76,77]. If supervisors can increase the sense of belonging experienced by a doctoral student, then this can, to some degree, counteract the negative consequences of imposter syndrome [74].

Professional staff have a key role to play in both promoting, and supporting, good student mental health; however, they are often very undergraduate-focused, and so may miss the suitable nuances of the challenges faced by doctoral students. Professional staff in this sense may include a range of those with student-facing roles, such as program administrators, careers and library staff and also the chaplaincy [72]. With the mental health of doctoral students now being such a priority for universities, supervisors have a key role to play [72]. For example, supervisors can personalize the support which they provide to enable them to better address the needs of the individual doctoral student [78].

Whilst there is now a general acceptance that students are susceptible to mental health and wellbeing issues [79], we cannot remove the psycho-social irrationality of doctoral research [80] which may contribute to poor mental health [70]. However, we can, and we should, improve the reporting rates of mental health issues among doctoral students so that issues can be addressed, and support provided, from an early stage [81].

One action that we can take to reduce the stress experienced by doctoral students is to help them to plan their work more effectively [48], as this enables them to look ahead and understand their own research journey, and to focus on the important activities which are going to drive their progress forward.

7. Supervising Doctoral Students

The first supervisor's role is to develop the doctoral student into an autonomous researcher capable of independent thinking and working. The supervisor therefore needs to understand and support the supervisory process and checkpoints [28,29], provide specialist knowledge, and direct the student to appropriate training and personal/professional development opportunities. They also need to provide pastoral care, provide discipline and topic related knowledge and understanding, provide advice regarding research ethics, academic integrity and publishing, and support the writing of papers, presentation of findings and the development of the final thesis [15]. Supervisors need the ability to balance the requirements for compliance and monitoring with enabling and developing their doctoral students [82], and to support the ultimate goal, they should have a detailed understanding of how research degrees are examined [13].

Whilst doctoral supervision can be rewarding for the supervisor, it is, without doubt, also challenging, even for experienced academics [83]. Doctoral supervision is different to standard classroom teaching, yet there is clearly a significant pedagogical element to it [7,84]. It is more than just process [25], and a supervisor's own doctoral pedagogy is often linked to their personal experience of being supervised [85], for which any underlying emotions may have been subsequently repressed [27]. Supervisors may feel the need to use emotion regulation strategies [86]. Examples of this may include situation modification, in which the supervisor may actively avoid scenarios in which they expect to feel strong negative emotions, and/or extrinsic emotion regulation, in which the supervisor may discuss their own personal experiences with other supervisors to seek assurance from their peers regarding the normality of their own situation [58]. This provides an opportunity to share solutions and coping strategies.

To increase their chances of successful completion, doctoral students need to acquire appropriate research skills and the ability to write for an academic audience [22]. It is

essential that supervisors have these skills themselves. It is therefore important that supervisors are active researchers who contribute to their own academic community so that they can act as role model examples for their doctoral students [22,87]. In reality, academics are often under pressure to supervise in subjects at the periphery of their expert knowledge [68]. The shortage of available supervisors may cause a mismatch in terms of topic and methodological expertise which will inhibit the development of the doctoral student [88] and negatively impact upon the potential for timely completion. As a result, there are cases in which supervisors offer poor advice due to them having inadequate knowledge and skills [6].

Supervisors need both to understand, and implement, their institution's policies and procedures for supporting and monitoring the progress of students [15], but they also need to address challenges which occur to enable the doctoral student to maintain momentum and progression [13,22], and reach agreed checkpoints in an appropriate timeframe [34]. Where draft material is provided for critique, supervisors need to provide detailed and timely feedback on work and should encourage critical discussion [13,34]. Doctoral students need personalized supervision which addresses both their own needs, and the needs of the research being undertaken. Trying new things, and adopting a trial-and-error approach, are important elements of this process to ensure that supervision is bespoke [25]. Furthermore, a doctoral student's needs will change over the course of their studies [13], and review should be undertaken at least annually to identify any new needs, or any on-going poor performance by students [31].

Whilst it is often assumed that doctoral supervision uses common sense, and that all academics can do it, this is not necessarily true [89]. In fact, a supervisor requires a blend of attitudes, behaviors, and skills [42], and, in order to be properly equipped for the role, supervisors need to have appropriate personal and professional qualities necessary for developing the doctoral student [22]. It is not unusual for doctoral students to experience uncertainty due to the ambiguous nature of their research [47], yet there is also evidence that supervisors experience similar anxiety, both in terms of their ability to guide the student to a successful conclusion, but also with regard to their judgement relating to when the students work is of an acceptable quality to proceed [90]. In reality, supervision is a learning process for the supervisor as well as for the doctoral student, and academics need to find time to think and reflect on the progress, barriers and challenges which they have faced, and to consider how they may respond differently in similar scenarios should they occur in the future for their students [91]. A supervisor must understand themselves, and their own strengths and limitations, if they are to effectively manage and support the research being undertaken by others [22].

8. Training Supervisors

There is evidence that supervisors often receive insufficient preparation for supervision roles, which means that they lack the required confidence and skills to ensure that their doctoral students reach a successful conclusion [92]. This is particularly so in terms of not receiving adequate training in the management and leadership of doctoral students [92,93]. Supervisors are also often untrained in the types of interpersonal communications skills which we have established to be necessary [94]. Furthermore, there is evidence that, on many occasions, supervisors are not adequately supported by their workplace in terms of dealing with either their own mental health, or the wellbeing of their doctoral students [15]. Supervisors need to be developing their own emotional management skills [42], but need support and guidance to be able to do this. To be an effective supervisor you first have to know and understand yourself [25]. Ultimately, supervisors are often inadequately prepared for the role which in turns impacts upon their confidence [88].

Effective training provides supervisors with some of the necessary skills and knowledge to be able to operate successfully, and provide a high-quality experience for doctoral students [4], but what they are trained on, how they are trained, and when they are trained, is of great importance [95]. Increasingly, mandatory institutional training is being provided

which, whilst this is a significant step in the right direction [7], is often inadequate in terms of both content and delivery [25]. Even after attending supervisory training, academics are often not prepared for the role of being a supervisor [96]. Far too often, such mandatory supervisory training often has a purely administrative focus, and so does not address the pedagogy of supervision [97]. This is a major oversight, as supervision is actually a highly specialized form of teaching which requires specific knowledge and skills for it to be delivered effectively [25,98]. Mandatory training, by its very nature, means that attendance is compulsory to ensure that a supervisor is compliant with the institutional requirements [99]. However, in reality, any training onto which supervisors are forced to attend, is unlikely to inspire and motivate them into becoming better supervisors, and as a result, supervisors attending mandatory training may not engage and learn fully [63].

In addition to formal training, supervisors learn how to supervise by being mentored by colleagues, seeing colleagues as role models, and through a process of trial and error [25]. Being mentored like this is important when developing as a supervisor [25]. Some supervisors also learn how to supervise through actually supervising under the tutelage of more senior colleagues [100], being part of peer groups, and learning from more experienced colleagues on supervisory teams [25].

Whilst supervisors are often not convinced regarding the value of the centralized and generic training being offered by their institution [101], their engagement can be improved by ensuring that mandatory training is taught by those with relevant experience [25]. In particular, institutions should use supervisors to deliver training who are both credible and research active [7]. Without any such centralized training, the quality of supervision being provided in many instances is of a notably lower quality [102]. However, supervisors must also be responsible for their own appropriate professional development to enhance their practice [13]. Using case studies and scenarios to provide supervisors with a better understanding of the challenges and impact of different situations which they as supervisors may face, or which their doctoral students may face, can be an effective way of sharing lessons learnt [103]. In such case studies, supervisors can reflect on their own experiences and write up their learning journeys [104]. Writing and analysing doctoral student diaries as part of supervisory training can also be an effective alternative method [105]. The provision of realistic scenarios helps supervisors to understand key concepts, and to be able to visualize when they can be applied in practice [106]. In both examples, the discussion of case studies, scenarios and diaries in groups, and the sharing of experiences with colleagues, and then reflecting on personal practice, can provide immensely useful developmental opportunities [107]. Whilst often overlooked, this form of learning from supervisor colleagues is highly important [25] and enables supervisors to reflect upon their own practice to ensure that they grow and learn over time [13].

Emerging supervisors are often incorrectly assumed to be already competent supervisors [108]. Early career academics may be asked to supervise as soon as their own doctoral degree is complete, which is often too soon, as they are often unready [96]. A supervisor's own experience of being supervised is a single and quite narrow example of a pedagogical approach to supervision which may not be appropriate for all students, especially when doctoral students come from such a diverse variety of backgrounds, cultures, and experiences [4]. Training programs therefore need to be offered specifically to new supervisors, and these should include both process and pedagogical support [107]. Training aimed at resolving low retention and completion rates ignores the heart of the problem, i.e., that supervisors operate within a structured and process-orientated system [109] which inhibits their ability to personalize the experience to the needs of the individual doctoral student as much as they may wish to. Supervision needs to provide a personalized approach which acknowledges the different abilities of each individual doctoral student so that a bespoke package of support can be delivered within the constraints of the overall process [22], and methods need to be found to enable this within institutional constraints. Training provided to supervisors should therefore be critical, supportive, and contextualized [7], should be offered in bespoke formats to address the needs of different disciplines [7], and should

be accessible when required at the point of need [106]. The provision of online learning resources, guides, tutorials and checklists can facilitate this [10].

9. Mentoring Doctoral Students

Doctoral students need to develop into contributing members of their academic community both within their university, and within their discipline. To achieve this, the supervisor must mentor them, and enable them to acquire the skills to critically review their own work, and the work of others [19,20,33,48]. Mentoring relationships need to mature into critical friendships based upon honesty and trust [22,43], although in some cases, the use of ineffective mentoring practices by supervisors may harm doctoral students' progress and wellbeing [4,43]. The doctoral student may find it helpful to create a record of the lessons learnt using a reflective log [4].

In reality, in many instances, both supervisors and students may feel uncertain and apprehensive about the research process which they are undertaking, and especially regarding the need to make an original contribution to knowledge [42]. Whilst supervisors do need to be experienced academics, they also must have the personal attributes required to successfully mentor their students [30].

Supervisors should create a learning environment in which doctoral students feel comfortable to express their opinions and to be open and honest in their discussions [34]. Good-quality feedback and communication between supervisors and doctoral students is important, and when feedback is provided, it should be constructed in such a way that it enables the student, and their research, to grow and develop [22].

10. Assisting Doctoral Students to Complete Their Studies

There is continuous pressure to ensure that doctoral students complete their studies in the shortest possible time [98]. It should be recognized that the successful completion of a program of doctoral study is challenging for the supervisor as well as for the doctoral student [14]. The reality is that, however disappointing for both supervisor and doctoral student, it is acceptable for doctoral students to withdraw and not finish [29]. It is important to reflect upon, and understand, why such an event has occurred so that lessons can be learnt and applied in the future [61]. In such circumstances the best interests of the doctoral student need to be considered, and not institutional retention rates [110]. Knowing this is an acceptable outcome removes pressure from both supervisor, and doctoral student, and, counter-intuitively, may actually increase the chances of successful completion.

Whilst institutional policies are often focused upon completion rates [111], this may neglect to consider the quality of the graduates produced, and the supervision provided to reach completion [30]. The role that supervisors play in enabling doctoral students to reach a successful conclusion to their studies is actually vital [107]. Supervisors need to have the confidence to be able to consider the quality of a doctoral student's work, and to be able to assess when they consider that the student is ready to complete their studies [22]. Supervisors need to consider how they can best support the doctoral student through their thesis submission and final examination stages [13]. As part of this process, supervisors should prepare the doctoral student for their final viva voce examination [28] which will often include undertaking a mock viva voce examination facilitated by independent academic colleagues who have little knowledge of the research, and who reside outside of the supervisory team.

There is evidence to indicate that doctoral students often lack the necessary academic writing skills [112], but supervisors must avoid becoming overly involved in the writing process for the thesis, which they may be tempted to do, to facilitate timely completion [31]. Supervisors do need to keep a close watch on the process to ensure that the social conventions of their discipline for the reporting of knowledge are followed, and that institutional regulations are applied [47]. Post the viva voce examination, and when there is an opportunity to do so, supervisors often have a pivotal role in supporting the doctoral student to revise their work in accordance with the comments of examiners [4]. In the small num-

ber of cases in which the doctoral student submits their thesis against the advice of their supervisor, there can be a range of resulting complications, but it should be recognized that good record-keeping in such situations can reduce any reputational damage for the institution [31].

Completion is more than just the successful examination and defense of the research undertaken. This is the end of a phase in the life of the doctoral students, and possibly the start of the rest of their career. Supervisors therefore need to be aware of the career aspirations of their doctoral students [28], to help them to develop appropriate transferable skills [111], and to make efforts to support their professional development by embedding them within their discipline and/or profession [4,113,114]. The careers of doctoral students are now more varied, and, as the percentage of the population with a doctorate increases, most will seek careers outside of academia, and often this is now perceived to be the most likely career path in certain discipline areas [115]. A total of 88% of doctoral students think that their doctorate will enhance their career prospects, and of these, 81% are confident their doctoral research degree is preparing them well for an academic research career [93]. Although not all doctoral students (only 67%) aim to stay working within academia, for those that wish to, opportunities for teaching are essential for developing their experience, and the publication of papers relating to their research is highly valuable to them. However, tensions can occur between the supervisor and doctoral student in terms of publications with regard to who will be named as the author [31]. Supervisors should therefore discuss career options with their doctoral students to enable them to decide how best to support them to work towards their specific career goals [34]. With regard to publications, supervisors should be open about their expectations and discuss options for the authoring of papers before starting any such joint activities.

11. Conclusions

The supervision of doctoral students is a long, challenging, and yet often very rewarding, experience for academics who offer to undertake a supervisory role. Selecting the right doctoral student is pivotal in terms of ensuring the potential for a productive relationship, i.e., doctoral students who will be suitably motivated and engaged, and who plan to undertake research in a topic area which corresponds to the supervisor's own discipline and research endeavors.

The time, effort, and emotional journey for both supervisor and doctoral student should not be underestimated. The supervisor will become the doctoral student's guide and mentor, and their first port of call to discuss issues relating to their progress towards institutional checkpoints, the provision of knowledge related to their research direction, and the provision of pastoral care. This resulting power dynamic is helpful, but needs to be managed carefully. In addition, the supervisor is responsible for preparing the doctoral student for the final viva voce examination, and for embedding the doctoral student within their own discipline, as appropriate to their career goals. This supervisory support is the foundation upon which a doctoral student can fulfil their future academic, or industrial, career aspirations, and is crucial in terms of establishing the appropriate research culture which underpins their whole student experience.

We have discussed and explained key elements of the supervisory process which the supervisor needs to consider and respond to. Furthermore, we have described institutional requirements which should be put into place to provide the necessary level of support to enable a supervisor to supervise their doctoral students to the best of their ability, and so provide the high-quality educational experience which all doctoral students can quite reasonably expect. The supervision of doctoral students is evolving, and with this new understanding, we all have responsibilities to modify and develop our practice accordingly.

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