International Journal of Doctoral Studies

An Official Publication of the Informing Science Institute
InformingScience.org

IJDS.org

Volume 14, 2019

A THEORETICAL PERSPECTIVE ON HOW DOCTORAL SUPERVISORS DEVELOP SUPERVISION SKILLS

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ABSTRACT

Aim/Purpose	The paper establishes how doctoral supervisors develop the supervision skills needed to handle the doctoral supervision process in the contemporary world.
Background	While the existing literature confirms that PhD holders can supervise doctoral students, there is a need to provide supporting evidence that the skills they possess qualify them to do this.
Methodology	Using the qualitative research approach, the study established the knowledge and skills that are needed to supervise doctoral students in the contemporary world. Through thematic analysis of 82 scholarly publications, the study established, in order of preference, five mechanisms through which doctoral supervisors develop supervision skills, i.e. the supervision process, doctoral education, institutional guidelines, institutional training courses and individualized learning.
Contribution	The study contributes to the ongoing research on the supervision of doctoral studies in the 21st century.
Findings	Findings show that a well-structured doctoral education, including the related processes, imparts the knowledge and skills needed for doctoral supervision. Likewise, a combination of the mechanisms and an individual's commitment, in terms of time and engagement, develop the skills that are relevant for doctoral supervision.
Recommendations for Practitioners	Higher Education Institutions need to make supervisors aware of the potential of these mechanisms for developing the skills necessary for doctoral supervision and encourage them to use them
Recommendations for Researchers	Further research on the development of doctoral supervision skills should broadly consider the role of different programmes in developing doctoral supervision skills in different contexts.

Accepting Editor ChipoMutongi | Received: March 21, 2019 | Revised: August 28, September 19, October 15, 2019 | Accepted: October 18, 2019.
Cite as: Fulgence, K. (2019). A theoretical perspective on how doctoral supervisors develop supervision skills. *International Journal of Doctoral Studies, 14,* 721-739. https://doi.org/10.28945/4446

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Impact on Society	The study has implications for doctoral supervisors and universities as regards the need to ensure that both mechanisms are instituted to enable doctoral supervisors to develop doctoral supervision skills.
Future Research	Since the study was done theoretically, it might be important to conduct further research using mixed-methods research with a phenomenological design to establish the skills possessed by doctoral supervisors and the mechanism they used to develop the supervision skills in any context.
Keywords	doctoral supervision, supervisors, principal investigators, doctoral education

INTRODUCTION

Doctoral studies are considered to be the highest level of education offered by universities, with the outcomes contributing to the knowledge economy and modern society (Barnacle & Dall'Alba, 2011). According to Muller (2009), doctoral education is a process through which knowledge is acquired (through education), and knowledge is generated (through research). Additionally, doctoral education is relevant as it develops transferable skills which are of value in a wide range of situations, subjects and jobs (Durette, Fournier, & Lafon, 2016). Transferable skills, which are among the key skills needed in the 21st century, enhance an individual's employability and ability to compete in the labour market (Dimitrova, 2016; Fillery-Travis et al., 2017).

Trends show increased enrolment in doctoral studies in developed and developing countries, because of their relevance at the personal and societal level (Cyranoski, Gilbert, Ledford, Nayar, & Yahia, 2011; Pearson, Cumming, Evans, Macauley, & Ryland, 2011). However, enrolment is limited by the ability of institutions to manage the doctoral education process, especially the related supervision (Saleem & Mehmood, 2018). Apart from the institutional mechanisms guiding supervision in line with the Salzburg Principles II (2010), the supervision of those pursuing modern doctorates (which include trans-, cross- and multi-disciplinary studies) and how doctoral supervisors develop the supervision skills in the contemporary world has not been theoretically researched (Bøgelund, 2015; Bacwayo, Nampala, & Oteyo, 2017; Fillery-Travis et al., 2017; Halse, 2011; Saleem & Mehmood, 2018; Sefotho, 2018).

Existing literature confirms that those with a doctorate can supervise students (Sefotho, 2018; Askew et al., 2017). Theory-based reasons make similar assumptions that supervisors possess doctoral supervision skills emanating from their previous experience as doctoral and masters students (Durette et al., 2016; Lee, 2008; Maguire & Delahunt, 2017) as well as from mentoring and postdoctoral programmes (Sefotho, 2018; Åkerlind, 2005). By and large, most supervisors rely on their experience of being supervised during their doctoral studies (Askew et al., 2016; Bastalish, 2017). There is a need to offer supporting evidence that the skills they possess qualify them to supervise doctoral students and the overall doctorateness process in the contemporary world (Trafford & Leshem, 2011; Yazdani & Shokooh, 2018). Yazdani and Shokooh (2018) define doctorateness as a process which enables an individual to become an independent scholar through undergoing a developmental and transformative apprenticeship under a supervisor in order to realize the highest level of degree. As an output, the individual contributes original knowledge and demonstrates the stewardship of his or her discipline across various dimensions (Trafford & Leshem, 2011, p. 38).

PROBLEM STATEMENT AND STUDY OBJECTIVES

Besides the existence of graduate and mentoring programmes (Linden, Ohlin, & Brodin, 2013; Sefotho, 2018) and post-doctoral studies (Åkerlind, 2005) aimed at developing supervision skills in line with the changes in doctoral education processes (in terms of programme modality, structure, supervision and the doctoral graduate labour market), limited research has been conducted to establish how supervisors develop doctoral supervision skills. Indeed, doctoral supervision in contemporary doctoral education requires a number of academic and professional competences beyond the

ability to advise and facilitate, which was applicable in the conventional PhD supervision process (Boud & Costley, 2007). There is, therefore, a need to establish the mechanisms to put in place through which doctoral supervisors, especially in developing countries, develop doctoral supervision skills, a view shared by Bacwayo et al. (2017) and Lee (2007). According to Lee (2018), the development of supervisors who can supervise doctoral students in the contemporary world in line with doctoral changes is a relatively new area that is under-researched.

Existing studies on doctoral education focus on the student-supervisor relationship and its role at different stages of the doctoral process (Bacwayo et al., 2017; Bui, 2014; Jones, 2013; Lee, 2008). Jones (2013), for example, established that from 1971 to 2012, research on doctoral studies through examining 995 publications focused on six themes: teaching (3%), employment and career (post-doc) (13%), writing and research (14%), the student-supervisor relationship (15%), doctoral students' experience (26%) and doctoral programme design (29%). Saleem and Mehmood (2018) explored the role of supervisors as perceived by supervisees at different stages of the doctoral supervision process. The findings established the need to train supervisors in time management in the areas of teaching and supervision that reflects the stage students are at in their doctoral studies. Sefotho (2018) is of the view that PhD supervisors can develop supervision as a career through the supervision of doctoral studies, the supervision journey and the in-service training in supervising PhD students. McCallin and Nayar (2011) proposed that strategies were needed, such as faculty development programmes, which provide doctoral students with supervision education and formalized training in research to enable them to acquire postgraduate research supervision skills.

Building on this background, this study established thematically how doctoral supervisors develop sufficient supervision skills through the existing institutional mechanisms that develop these skills. The study addressed the following questions: (a) How do doctoral supervisors develop supervision skills? (b) How do Higher Education Institutions impart doctoral supervision skills to doctoral supervisors? (c) How can the doctoral supervision skills gap (if any) among doctoral supervisors be enhanced both at the individual and institutional level?

The study is important, for it contributes to the ongoing research on doctoral education that is relevant for the 21st century. Given the relevance of doctoral education at the personal level and for the well-being of the economy, exploring how supervisors develop supervision skills will contribute to improved supervision, thereby realizing the prime objective of doctoral education (Barnacle & Dall'Alba, 2011; Muller, 2009). The study adopted the term 'doctoral supervisor' to mean a person who supervises all forms of programmes and/or candidates undertaking a Doctor of Philosophy programme (Pearson & Ford, 1997). Where relevant and given the context, doctoral supervisors are also called Principal Investigators, faculty or research mentors, especially in the health sciences (Hollingsworth & Fassinger, 2002; Byars-Winston, Gutierrez, Topp, & Carnes, 2011) as well as advisors (Lee, 2018) and co-supervisors (industrial or workplace advisors) working in industry and/or research institutes (Fillery-Travis et al., 2017; Lee, 2018).

LITERATURE REVIEW

SUPERVISION OF DOCTORAL EDUCATION

Doctoral supervision plays a critical role in realizing the aims of doctoral education and the doctorateness process. The parties accountable in this process comprise the student, the supervisor and the institution, with the role of a doctoral supervisor being emphasized (Reguero, Carvajal, García, & Valverde, 2017; Bastalish, 2017). While doctoral supervision is viewed as a special pedagogy (Grant, 2005), the doctoral supervisor is entrusted with overseeing the overall research project for the benefit of the student, the university and the global community (Reguero et al., 2017). This makes it imperative for universities to continuously professionalize doctoral supervision in line with institutional policies (Reguero et al., 2017; Salzburg Principles II, 2010). The Salzburg Principles II (2010), for example, view doctoral supervision as a collective and collegiate effort and stipulates the need for clear

roles and responsibilities among the actors, including the provision of professional development for doctoral supervisors. This brings with it the need for higher education institutions to develop policies to ensure doctoral rigour during the doctorateness process and develop relevant competencies among doctoral supervisors to realize the prime objective of pursuing this highest level of education (Boud & Lee 2008; Mowbray & Halse, 2010).

Trends, however, show that changes have taken place in the doctoral education process and supervision. These changes are reflected in the role and nature of supervision, including the workload (Jackson, Darbyshire, Luck, & Peters, 2009), changes in technology (Cruz, Costa, Martins, Gonçalves, & Barroso, 2015), changes in doctoral programme modalities, including modern doctorate types such as trans-disciplinary/cross-disciplinary, inter-disciplinary, multi-disciplinary, professional and industrial or practice-based PhDs (Fillery-Travis et al., 2017) as well as changes in practice and supervision styles, ranging from pastoral (high support and low self-direction), contractual (high support and high self-direction) and laisser-faire (low support and low self-direction) to directional (low support and high self-direction and other related co-supervision modes (Boehe, 2016; Halse & Bansel, 2012; Kobayashi, Grout, & Rump, 2015). Bøgelund (2015) further argues that it is becoming complex to be a doctoral supervisor in the contemporary world. This is because a lot of high-quality research is needed that is globally adaptable, as well as being economically viable and efficient, which dominates the understanding and practice of supervisors. Likewise, the increased number of candidates per supervisor leads to doctoral students spending less time with their supervisors, resulting in a limited transfer of adequate skills (Blitzer, Albertyn, Frick, Grant, & Kelly, 2104).

In this regard, the provision of modern doctoral supervision skills reflecting the stated changes needs to form part of the doctoral education process and continuous professional development training for doctoral supervisors. This will enhance the ability of supervisors to manage the demands of contemporary doctoral supervision (Fillery-Travis et al., 2017).

Skills Needed by Doctoral Supervisors

The literature shows diverse qualities and attributes of a doctoral supervisor (Halse, 2011; Dimitrova, 2016). According to Dimitrova (2016), a good supervisor is expected to offer professional guidance on the subject matter (discipline knowledge), to coordinate the doctorateness process, to be a flexible personal guide during and after the doctoral process and a resourceful person providing opportunities for professional development and relevant networks, and to manage the day-to-day progress of doctoral studies in line with the set timeline. Accordingly, a doctoral supervisor needs to be an active researcher in the subject area and research methodologies (Reguero et al., 2017). Novice doctoral supervisors might have limited knowledge in their field of study and of research methodologies. This makes it imperative for them to continuously engage in research and acquire relevant knowledge through learning at the personal and institutional level (Halse & Malfroy, 2010). Besides the discipline and methodological discourse, doctoral supervisors also need to possess transferrable and soft skills relevant for managing the supervision process and enhancing the employability of their doctoral students (Fulgence, 2016; Yorke & Knight, 2004). Fulgence (2016, p. 262-263), for example, puts employability into five broad categories: "Core skills (technical knowledge and academic skills of graduates), Personal qualities (fixed self-belief attributes that do not change over time and are incremental), Process skills (the ability to use technology, colleagues and one's potential to process and manage information, work and people), Initiative/Enterprise (the ability to initiate things and use relevant networks to realize them) and a Positive attitude (The 'can do approach' in all contexts)". Digital fluency is another dimension relevant for doctoral supervisors (Fillery-Travis et al., 2017; US Department of Educational Technology (USDET), 2016). Digital fluency refers to supervisors' knowledge of digital tools and the ability to be critical, creative and autonomous in using them in order to realize supervision goals. The USDET (2016, p. 26) identified the roles and practices of educators (including supervisors in the study context) in a technology-supported environment, which comprise col-

laborating with the community of learners, designing engaging tasks through technology, evaluating the implementation of new technologies and being a learning supervisor.

Furthermore, doctoral supervisors need to demonstrate the ability to handle multiple roles, such as being an expert, mentor, coach, manager and career guide (Cloete, Mouton, & Sheppard, 2010; Reguero et al., 2017). They also need to learn about the role of culture in the doctoral supervision process (Byars-Winston et al., 2018). Cultural differences emanating from personal values and local, institutional, and disciplinary contexts are revealed in individuals' ability to ask and respond to questions, perceive concepts, process information and react to situations. Table 1 provides the framework summarizing the knowledge and skills needed by doctoral supervisors in the contemporary world.

Table 1. Framework for assessing doctoral supervisors' skills

Skills	Attribute(s)	Based on
Discipline knowledge and expertise	Aim and content, disciplinary culture, discourse conventions in the topic/field/discipline, context and setting	Chiappetta-Swanson & Watt, 2011; Fillery-Travis et al., 2017; Lee, 2008; Petre & Rugg, 2010; Nerad, 2012; Walker, Golde, Jones, Bueschel, & Hutchings, 2008; Dimitrova, 2016
Research skills	Research process, techniques, data collection and analysis tools, analytical skills, presentation skills, report writing, questioning skills, Critical thinking	Boud & Lee, 2008; Mowbray & Halse, 2010; Nerad, 2012; Taylor & Beasley, 2005
Employability/ Transferrable skills	Communication skills, teamwork, personal qualities, willingness to learn, professional competencies, adaptability, business acumen, self-awareness, commitment, numeracy, proactiveness, flexibility, decision making, problem-solving, leadership, critical thinking	Bui, 2014; Durette et al., 2016; Fulgence, 2016; Lorraine & Sewell, 2007; Polziehn, 2011; Rae, 2007; Yorke & Knight, 2004
Management skills	Ability to manage time, the project, professional roles, academic and personal roles, cultural diversity, financing, multidisciplinarity, the doctoral supervision process	Chiappetta-Swanson & Watt, 2011; Doğan & Bıkmaz, 2015; Lee, 2008; Taylor & Beasley, 2005; Trafford & Leshem, 2009
Digital fluency skills	Online tools, resources, networks, communities of practice, Information Technology skills	Cruz et al., 2015; Fillery-Travis et al., 2017; Maor, Ensor, & Fraser, 2016; Nasiri & Mafakheri, 2015; Nerad, 2012; Samzugi & Mwinyimbegu, 2013; US Department of Education, 2016
Skills for the doctorateness process	Admission formalities, university procedures, programme modalities, topic conceptualization, supervision roles, styles, models and approaches, doctorate types, provision of feedback, publication formalities, transition to the world of work (networks)	Alberts, Kirschner, Tilghman, & Varmus, 2014; Chiappetta-Swanson & Watt, 2011; Doğan & Bıkmaz, 2015; Halse & Malfroy, 2010; Lee, 2008; Yazdani & Shokooh, 2018

Acquisition of Doctoral Supervision Skills

Knowledge and skills can be acquired through formal and informal education (personal experience and exposure of various kinds). Doctoral supervisors can, therefore, acquire supervision skills through the doctoral education process that integrates the stated supervision skills (Durette et al.,

2016), the doctoral supervision process (Halse, 2011), participating in doctoral supervision training courses (Botha & Muller, 2016) as well as self-directed and individualized learning (Gordon, 2014). Other mechanisms include graduate research training, whereby an individual develops an academic career through mentoring and career coaching by a senior faculty member (Rogers, Sorkness, Spencer, & Pfund, 2018; Wadee, Keane, Dietz, & Hay, 2010), an individualized career development plan (Sefotho, 2018) and post-doctoral education (Åkerlind, 2005). There also exist continuous professional development courses offered by various universities (Boud & Lee 2008; Mowbray & Halse, 2010), as well as online courses offered by various institutions (Lee, 2018; Taylor, 2016). Other universities have restructured their bachelor and master programmes to include more competencies, thereby having an impact on doctoral studies (Melin & Lenecke, 2006).

Reguero et al. (2017, p. 15) summarize three key elements aimed at improving the quality of doctoral supervision: first, making supervisors aware of the multi-faceted roles required by the current knowledge society; second, training supervisors so that they acquire and develop the skills to perform the new role; and third, providing them with ideas to allow them to self-manage and continue learning and generating their own PhD supervision tools as the needs of society continue to shape their role. Reguero et al. (2017) further comment that the training component matters in the professionalization of the doctoral supervision process, a view shared by Halse (2011). The training component should aim to enable the supervisor to provide support throughout the doctoral process. The content should include, among others, good supervision practices, the functions of supervisors, supervision styles, the candidates' transformation process, addressing supervision problems and aspects relating to candidates' selection, building professional relationships, guidance on the research project, personal and professional development, evaluation and promotion of the knowledge generated during the doctoral process (Lee, 2018; Turner, 2015). The study by Pearson and Brew (2002), for example, provides a course outline for developing the skills, knowledge and competencies of supervisors that embraces course rationale, learning outcomes of supervisors, the topics to be covered, approaches to learning and course evaluation formalities. Similar initiatives in the provision of doctoral supervision training programmes reflecting the content and objectives are reflected in studies by Lee (2018) and Taylor (2016). Byars-Winston et al. (2018) came up with a culturally aware mentoring programme as an intervention to build research mentors' capacity to enable them to engage directly with aspects of cultural diversity, such as racial/ethnic topics in the research mentoring relationship. As regards digital fluency skills, the training package should enable supervisors to create a supervision environment and experience that blends digital tools and resources (Borthwick & Hansen, 2017).

Besides the diversity of the initiatives, there also exist drawbacks as regards the development of supervisors' doctoral supervision skills. On individualized learning, also called self-directed, Turner (2015) comments that it is not sufficient to master educational knowledge, especially that relating to technology. There also exist limited continuous professional development courses on supervision skills for doctoral supervisors at the institutional level, although they are at the inception stage in developing countries (Botha & Muller, 2016). In other instances, doctoral supervisors view supervision as a process with minimal external accountability and experienced doctoral supervisors are reluctant and/or resistant to undertake professional development courses because some supervision aspects are contingent (Halse, 2011). Although the tradition has been that doctoral supervisors primarily supervise doctoral students while developing pedagogical practices, Halse and Bansel (2012) conclude that the goal of doctoral supervision is praxis and should involve a learning alliance between multiple institutional agents; that is, supervisors' time, position in terms of status, power and authority, and personal resources in terms of experience, knowledge, network's and commitment, a view shared by Stanton-Salazar (2011). Table 2 summarizes the mechanisms through which doctoral supervision skills can be acquired in the contemporary world.

Table 2. Acquisition of doctoral supervision skills

Knowledge acquisition means	Skills and/or Knowledge acquired	Reference
Training (formal training, self-directed learning, graduate training, post-doctoral studies)	Supervision process, new methodology, specific skills, project management, new discipline/area of specialization, the doctorateness process, emerging trends and new developments in the discipline	Fillery-Travis et al., 2017; Gordon, 2014; Halse, 2011; Halse & Malfroy, 2010; Reguero et al., 2017; Sefotho, 2018
The individual doctoral process (supervision background, quality doctoral education, mobility programmes, conference participation)	Management skills, transferable skills, research skills, methodological skills, the doctorateness process, learning about the social and political context of supervision, trans-, inter-, multi- and cross-disciplinary skills	Blitzer et al., 2014; Botha & Muller, 2016; Boud & Lee 2008; Lee, 2008; Mowbray & Halse, 2010; Sefotho, 2018; Yazdani & Shokooh, 2018
Doctoral supervision process and related exposure through research and publications	Developmental/transformational learning about the discipline, obtaining experience, learning about disciplined supervision, socialization (learning about self and others), acquisition of transferable and digital fluency skills, emerging research pedagogies and approaches in one's discipline, co-supervision, mentorship skills and co-authorship skills	Boud & Lee, 2008; Carter & Laurs, 2014; Halse, 2011; Kandiko & Kinchin, 2012; Keefer, 2015; Mowbray & Halse, 2010; Pearson, Evans, & Macauley, 2015; Pérez, Fain, & Slater, 2011; Petre & Rugg, 2010; Sefotho, 2018; Sweitzer, 2009; Yazdani & Shokooh, 2018
Institutional guidelines, procedures, documentation and programmes	Roles and responsibilities of supervisors, institutional structures regarding doctoral research programmes, mentorship and faculty development, assessment standards and supervision-related policies	Bacwayo et al., 2017; Botha & Muller, 2016; Fillery-Travis et al., 2017; Halse & Malfroy, 2010; Jackson et al., 2009
Conducting research on doctoral education and supervision	Supervision skills, the supervision and doctorateness process, doctoral education, institutional policies on doctoral education and supervision	Botha & Muller, 2016; Cyranoski et al., 2011; Halse, 2011; Fillery-Travis et al., 2017; Pearson & Brew, 2002; Yazdani & Shokooh, 2018

METHODOLOGY

Thematic analysis was used in this study (Braun & Clarke, 2006; Clarke & Braun, 2013; Maguire & Delahunt, 2017). According to Braun and Clarke (2006), thematic analysis is a systematic and comprehensive process of identifying themes (patterns) in qualitative data to address a research topic. According to Maguire and Delahunt (2017), the method is not attached to a theoretical perspective, making it flexible, given the diversity of work in learning and teaching. Besides different approaches to thematic analysis (Alholjailan, 2012; Javadi & Zarea, 2016), this study used the Braun and Clarke (2006) steps to thematic analysis given their suitability to this study. The approach has also been applied in several studies as it offers a clear framework for the process (Alholjailan, 2012; Jones, 2013; Maguire & Delahunt, 2017).

The first step was reading and re-reading the literature on doctoral supervision from journals. This guided the selection of the study search terms and provided a relevant range of references published on the development of supervisors' doctoral supervision skills. From the references, a total of 222 journal articles were identified. Of these, 82 were verified for content and included in the literature

search after accessing validation. The choice of the journals was based on the criteria that they are refereed journals, indexed by prominent databases, have been peer reviewed and have a publication history of more than 5 years. In terms of geographical distribution, while some studies combined more than one context, the 82 publications reflected studies from Africa (mostly South Africa), Europe (UK, Ireland, Netherlands and Italy), New Zealand, United States, Canada and Australia.

The second step was to search for literature using both institutional and freely available databases. The databases searched were Scopus, Web of Science, Google Scholar, Social Sciences Research Network (SSRN), PubMeb, Education Resources Information Center (ERIC), and ProQuest. The search terms and the related results are reflected in Table 3. The Appendix presents the distribution of the sources used and their URL.

Table 3. Search criteria and results

Search Terms	Doctoral Supervision	Supervisor/ Principal Investigator/ Mentor	Supervision	Skills	Graduate Training, Post-Doc	PhD Supervision	Faculty/ Supervision Development
Results	14	17	25	8	10	5	3

The third step was to identify the coding themes and the overall coding process. MAXQDA software was used for coding subsequent to analysis. Both open and pre-set codes were used for coding to ensure that new emerging themes not previously identified as per the study questions were reflected. Likewise, the constant comparison process of coding proposed by Jones and Alony (2011) was applied, whereby previously coded documents were recoded as the coding structure changed.

The fourth step was comprehensive coding, whereby the researcher went through all the identified paper titles, abstracts, the conclusion and introduction, where necessary. These limiting factors accurately represented the content of the entire document, as concurred by Jones (2013). The fifth step was a discussion of the themes obtained from the thematic analysis that is reflected in the findings section.

Figure 1 presents the established thematic areas addressing how doctoral supervisors develop doctoral supervision skills. The analysis reveals that doctoral supervisors develop supervision skills, in order of preference, through the supervision process (29%), the doctoral process (26%), institutional mechanisms (20%), individualized learning including conducting research (13%), and training in doctoral supervision (13%). Each mechanism is further discussed, reflecting how they develop the doctoral supervision skills needed.

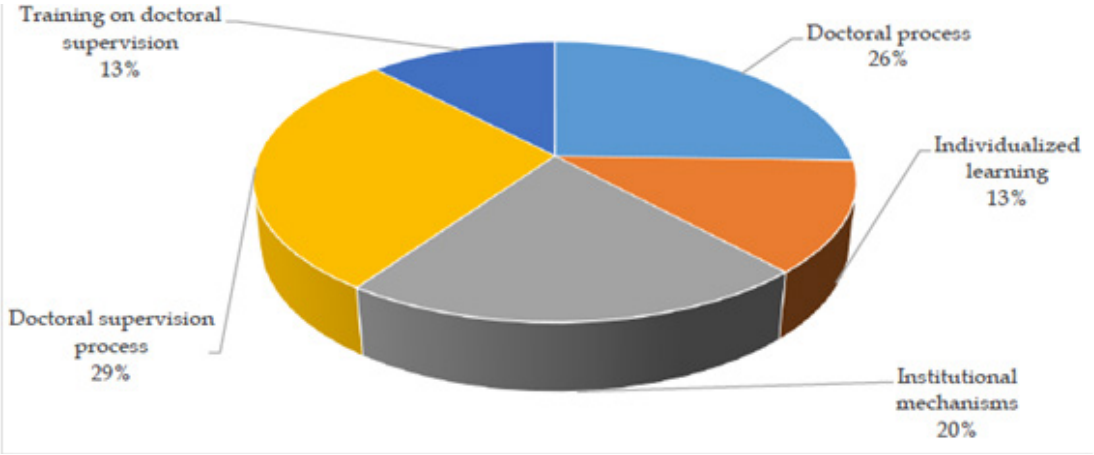


Figure 1. Developing doctoral supervision skills

FINDINGS

DEVELOPMENT OF DOCTORAL SUPERVISION SKILLS: THE ROLE OF TRAINING, RESEARCH AND INDIVIDUALIZED LEARNING

There exist various training programmes aimed at developing doctoral supervision skills, reflected in institutional websites and training institutions, in line with the views of Halse (2011) and Lee (2018). While some are offered during the doctoral process (Wadee et al., 2010), others are offered within structured institutional training programmes (Lee, 2018) and through participating in conferences (Costello, Waehning, Reed, & Shaw, 2013). Postdoctoral studies, mentorship and graduate training programmes have also been reported to enhance the development of doctoral supervision skills as well as preparing doctoral graduates for academic positions (Åkerlind, 2005; Wadee et al., 2017; Lee, 2018). A study by Wadee et al. (2010) further shows improvement in the supervision skills of senior doctoral students who attended a supervision mentorship and training programme for new doctoral students. Within the institutional framework, Reguero et al. (2017) argue that giving supervisors doctoral supervision training enables them to use a collaborative approach to doctoral supervision, encourages working across disciplines, improves research and publications and provides comprehensive support for both doctoral researchers and supervisors through communities of practice.

Outside the institutional context, there also exist open access courses on doctoral supervision (Blitzer et al., 2014) and professional development programmes (Pearson & Brew, 2002). There also exists PhD supervision training for emerging supervisors in South Africa, aimed at addressing supervision gaps among PhD graduates (Sefotho, 2018). Stellenbosch University also offers an online course on doctoral supervision for African universities. Other providers of massive online open courses to broaden supervisors' supervision skills include "Futurelearn" and "AuthorAID" to mention a few. While face-to-face training programmes and the blended training modes have a higher completion rate than fully online courses, the decision to participate in training and put into practice what has been learnt is made by the doctoral supervisor.

Research further provides many publications on doctoral research supervision; the pedagogy of graduate supervision and the supervision process (Grant, 2005; Vilkinas, 2008; Boehe, 2016; Taylor & Beasley, 2005). These resources can be found in institution libraries and online databases where doctoral supervisors can access and read them to enhance their doctoral supervision skills. Other factors, such as time constraints, commitment, institutional and administrative factors as well as competing priorities, may hinder doctoral supervisors from fully participating in a doctoral supervision training programme (Reguero et al., 2017), demanding individualized training approaches. Based on these arguments, with commitment and quality time, the available training programmes (whether within the institution and/or outside), provide relevant content that can enhance the development of doctoral supervision skills of doctoral supervisors.

DEVELOPMENT OF SUPERVISION SKILLS: THE INDIVIDUAL DOCTORAL PROCESS

The doctoral education process is viewed as a journey whereby, through orientation, information gathering, discovery and exploration, the researcher is transformed (Brew, 2001). According to Melin and Lenecke (2006), the doctoral competencies and abilities a PhD graduate acquires during the doctorateness process can be useful and are relevant for the supervision of doctoral studies. During the doctoral process, different from the traditional non-course work programmes and monograph write-ups, doctoral students undergo structured doctoral programmes (Fillery-Travis et al., 2017), participate in conferences (Wadee et al., 2010), publish papers and in other instances engage in programmes at the individual, institutional, national and global level (Melin & Lenecke, 2006). There has also been a trend in pursuing post-doctoral studies (Åkerlind, 2005) to enable doctoral graduates to further enhance their inter-, cross- and trans-disciplinary research. Engaging in the doctoral process and the

post-doctoral experience enable doctoral students and graduates to develop inter-disciplinary, communication, networking and project management skills, personal characteristics, and an understanding of the business, and the social, cultural and political context among others (Melin & Lenecke, 2006). Durette et al. (2016) summarizes the six competencies or skills developed through doctoral training, which comprise:

- Knowledge and technical skills;
- Formally acquired transferable/core skills, such as communication, innovation and project management;
- Non-formally acquired transferable skills (personal competencies and cognitive ability) to deal with complex problems
- Dispositions (such as rigour, creativity and autonomy);
- Behaviours (such as perseverance) and
- Meta-competencies (such as the ability to adapt to situations).

Durette et al. (2016) adds that these skills are shared by doctoral graduates regardless of variations in the discipline of study, individual engagements undertaken during doctoral studies (such as teaching, research consultancy assignments), the financing mode of the doctorate (whether it is fully or partly sponsored while in a professional or non-professional job) and the source of financial support (whether from a project, government or any other source). In this regard, individual engagements (both formal and informal) during the doctoral process can equally develop doctoral supervision skills. However, these skills can become weak over time, and so continuous professional development and lifelong learning are needed for updating their supervision skills.

Development of Supervision Skills: The Doctoral Supervision Process

During the doctoral supervision process, doctoral supervision skills are acquired through engaging in the process itself as they perform related roles (Reguero et al., 2017), through co-supervision and novices being mentored by experienced supervisors (Olmos-López & Sunderland, 2017), through conducting research and publishing (Reguero et al., 2017) and through PhD graduates being entrusted with the supervision of doctoral students (Halse & Bansel, 2012). Through the doctoral supervision process, supervisors can enrich their knowledge of the discipline, acquire new research skills, develop their relationship with the pedagogy, learn how to manage their time, develop the supervisory persona, and develop new and relevant networks for supervision (Halse, 2011). Transferable skills might not be developed during the doctoral supervision process, but are developed during the individual doctoral process. Likewise, novice supervisors might not be familiar with the doctorateness process unless they consult and review the institutional procedures and guidelines (Botha & Muller, 2016). Halse (2011, p. 8) concludes that all supervisors, regardless of seniority, discipline, gender or their doctoral experience, acknowledged that learning established a disciplined supervisory relationship that was key to shaping the identity of a doctoral supervisor. Based on these discussions, for novice supervisors, the doctoral supervision process is not sufficient to develop supervision skills unless supplemented by other mechanisms, such as institutional guidelines, mentorship through co-supervision and the individual doctoral process. For experienced researchers, the disciplined supervisory relationship is contextual and keeps emerging continually bringing new learning demands for supervisors throughout the supervision journey.

Development of Supervision Skills: The Role of Institutional Guidelines and Procedures

Most universities provide guidelines for the doctorateness process on admission to the course, stating the modality and duration of the programme, how it is assessed and how disputes are resolved, to mention a few (Botha & Muller, 2016). The Salzburg Principles II (2010) offer some universal guide-

lines on the doctoral process that can be modified for institutional purposes considering the context. These documents offer relevant guidance on the supervision of doctoral students as they stipulate the role of the supervisor, doctoral students and the institution in line with the doctoral education process. Institutional guidelines also provide for the type of doctoral programme (Reguero et al., 2017), and its duration (Blitzer et al., 2014), as well as criteria for selecting doctoral supervisors (Botha & Muller, 2016). To further provide doctoral rigour in line with university guidelines, there exist external teams of experts involved in the assessment and examination of doctoral studies. Such mechanisms are institutionally reviewed and over time have provided a valid basis on which doctoral supervisors develop the skills to manage the doctorateness process. Some institutions are also working towards creating an international community for the professionalization of the doctoral supervision process that allows for transferable accreditation of supervision training and transferable evaluation standards of PhD theses (Reguero et al., 2017). Building on these arguments, institutional guidelines facilitate the understanding of the doctorateness process as a key component of doctoral supervision skills. However, institutional guidelines are less likely to develop other dimensions of doctoral supervision skills.

DISCUSSION ON THE DEVELOPMENT OF DOCTORAL SUPERVISION SKILLS

Literature on the development of doctoral supervision skills has been growing, which is reflected in the study findings, where different mechanisms have been put in place by institutions and individuals, with the aim of developing doctoral supervision skills. Besides the existing mechanisms, studies on supervision practices over time, such as those by Lee and Williams (1999) and Denis, Colet, and Lison (2019), show that doctoral supervisors rely on past unexamined supervision practices and intuition rather than evidence-based research and theoretical frameworks reflecting the knowledge and literature on supervision, a view shared by Sefotho (2018). The study provides the rationale for doctoral supervisors developing supervision skills to align with changes in the doctoral education process in the contemporary world. According to Lee (2018), the development of doctoral supervisors takes many forms, one being collective institutional responsibility, which McAlpine (2013) and Hammond, Ryland, Tennant, and Boud (2010) agree with, another being the individual supervisor's reflection on the supervision process, supported by Pearson and Brew (2002) and Turner (2015).

Building on the study findings, Table 4 summarizes how the individual and institutional mechanisms enable the development of the doctoral supervision skills needed in the contemporary world, reflected in Table 1. The doctoral supervision process, for example, develops all the supervision skills needed except research skills, now that the supervisor does not actively participate in the research process, which includes among others the collection and analysis of data. If the doctoral education process is properly structured, it enables the development of all supervision skills as identified in this study. This is because a doctoral student interacts with knowledge of the discipline, studies the context both within and outside the institution, including the labour market, manages the doctoral project, learns about digital fluency aspects and the overall doctorateness process, including institutional structures, views shared by Sefotho (2018).

Institutional mechanisms provide a framework for understanding institutional structures, rules, supervision procedures, assessment criteria and requirements, ethical issues and the student-supervisor relationship. Institutions also provide faculty/supervisors/mentors with training in post-doctoral mechanisms to develop them, which enables the development of doctoral supervision skills. Besides institutional training, individuals can take the initiative to develop their doctoral supervision skills outside the institution. Individualized learning, however, needs to be supported by research in the area of supervision, to enable the doctoral supervisor to develop a broader set of doctoral supervision skills.

Based on the discussion, it can be concluded that other than the institutional mechanisms stated, most of the mechanisms aimed at developing doctoral supervision skills fall within the individual mechanisms. This concurs with the findings of literature that show the role of the supervisor in developing individual supervision practices (Denis, Colet, & Lison, 2019; Lee, 2018; Pearson & Brew, 2002; Guerin, Kerr, & Green, 2015; Turner, 2015). Furthermore, while the study's thematic analysis shows that doctoral supervision skills are largely acquired through the supervision process, based on the doctoral supervision skills established in this study, the doctoral education and doctorateness process seems to be the major mechanism for developing contemporary doctoral supervision skills. The doctoral education process needs to be supplemented by doctoral supervision process, institutional mechanisms, training programmes and individualized learning. Likewise, and given the range of digital fluency skills in line with the supervision role, more attention needs to be given to this, both at the individual and institutional level, views shared by the USDET (2016).

Table 4: Mechanisms in place for developing doctoral supervision skills

Mechanisms	Discipline Knowledge	Research Skills	Transferable Skills	Management Skills	Digital Fluency Skills	Doctorateness Process
Doctoral supervision process	√	X	√	√	√	√
Doctoral process	√	√	√	√	√	√
Institutional mechanisms	X	X	X	X	X	√
Individualized learning	√	X	√	√	√	√
Training in doctoral supervision	√	X	√	√	√	√

X stands for No; that is the mechanism is not sufficient for developing skills
√ stands for Yes; that is the mechanism is sufficient for developing the skills

CONCLUSION, RECOMMENDATIONS AND FUTURE RESEARCH

The study aimed to explore how doctoral supervisors develop doctoral supervision skills and the mechanisms in place at the individual and institutional level. While literature on developing the doctoral supervision skills of supervisors exists (see Lee, 2018), not much research has linked individual and institutional mechanisms and their role in developing the specific doctoral supervision skills needed in the contemporary world. Most existing studies focus on specific mechanisms and assess their impact on developing doctoral supervision skills (Halse, 2011), a critical review of doctoral supervision practices (McCallin & Nayar, 2011) and issues relating to doctoral education (Jones, 2013). The study was theoretical, and it first developed a framework for assessing doctoral supervision skills. These skills were put into six basic categories; namely, discipline knowledge, research skills, transferable skills, management skills, digital fluency skills and the skills relating to the overall management of the doctorateness process. To develop the established doctoral supervision skills, thematic analysis was conducted to identify from the literature what mechanisms were in place for developing doctoral supervision skills. From the literature, the study identified, in order of preference, that the doctoral supervision process, doctoral education process, institutional guidelines and policies, individualized learning and training, were the major mechanisms through which doctoral supervisors develop supervision skills. Likewise, in developing the doctoral supervision skills, the doctoral education process seems to be the major mechanism through which all the doctoral supervision skills identified in this study are developed, which is supported by Yazdani and Shokooh (2018), Boud and Lee (2008) and Mowbray and Halse (2010).

Establishing the doctoral supervision skills needed in the contemporary world, and linking this with how the existing mechanisms develop these skills is the new knowledge generated by this study. The study further shows the growing trend of using industry advisors, institutes, faculty, career and professional development programmes, post-doctoral studies and individual development plans to develop doctoral supervision skills (Lee, 2018; McCallin & Nayar, 2011). Such development is necessary given the changes in the labour market for doctoral graduates in the contemporary world, such as researchers, industry practitioners, advisors and academicians (Botha & Muller, 2016; Sinclair, Barnacle, & Cuthberty, 2014), compared to the past two decades, when most doctoral graduates pursued an academic career. The study further found that the term 'supervisor' varies among countries and contexts; namely, principal investigator, mentor, advisor and faculty (Lee, 2018; Botha & Muller, 2016), making it important to adopt the term that is appropriate for the context. In this study, the author found that 'supervisor' fitted the study context and is applicable in most African universities (Botha & Muller, 2016) and in Europe (Lee, 2018).

While this study managed to address some of these aspects, taking into consideration the term of 'supervisor', further research on the development of doctoral supervision skills should broadly consider the role of different programmes in developing doctoral supervision skills in different contexts. The study has implications for doctoral supervisors and universities as regards the need to ensure that both mechanisms are instituted to enable doctoral supervisors to develop doctoral supervision skills. Since the study was done theoretically, it might be important to conduct further research using mixed methods research with a phenomenological design to establish the skills possessed by doctoral supervisors and the mechanism they used to develop the supervision skills in any context.

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APPENDIX:DISTRIBUTION OF THE STUDY SOURCES

Journal	# of sources	URL
Assessment & Evaluation in Higher Education	**1**	https://www.tandfonline.com/loi/caeh20
Australian Universities' Review	**2**	www.aur.org.au/
Counselor Education and Supervision	**1**	https://onlinelibrary.wiley.com/journal/15566978
Business and Management Education in HE	**1**	https://www.tandfonline.com/loi/rhep18
British Journal of Educational Psychology	**1**	https://onlinelibrary.wiley.com/journal/20448279

Journal	# of sources	URL
Education+Training	1	https://www.emeraldinsight.com/loi/ET
Higher Education	2	https://link.springer.com/journal/10734
Higher Education Studies	1	www.ccsenet.org/journal/index.php/hes
Higher Education, Research & Development	9	https://www.tandfonline.com/loi/cher20
Innovations in Education and Teaching International	5	https://www.tandfonline.com/loi/riie20
Innovative Higher Education	3	https://link.springer.com/journal/10755
International Journal for Academic Development	2	https://www.tandfonline.com/loi/rija20
International Journal of Doctoral Studies	5	https://www.informingscience.org/Journals/IJDS
International Journal of Educational Development	2	https://www.journals.elsevier.com/international-journal-of-educational-development
International Journal of Educational Management	2	https://www.emeraldinsight.com/journal/ijem
International Journal of Nursing Education Scholarship	1	https://www.degruyter.com/view/j/ijnes
Issues in Educational Research	3	www.iier.org.au
Journal of Social and Behavioral Sciences	2	www.jbssjournal.org
Journal of Computing in Higher Education	1	https://link.springer.com/journal/12528
Journal of Education and Educational Development	1	https://doe.iobm.edu.pk
Journal of Further and Higher Education	2	https://www.tandfonline.com/loi/cjfh20
Journal of Higher Education Policy and Management	2	https://www.tandfonline.com/loi/cjhe20
Medical Teacher	1	https://www.tandfonline.com/loi/imte20
Pakistan Journal of Education	1	https://pje.aiou.edu.pk
Perspectives in Education	2	https://www.ajol.info/index.php/pie
Policy Futures in Education	1	https://journals.sagepub.com/home/pfe
Professional Psychology: Research and Practice	1	https://www.apa.org/pubs/journals/pro
Quality in Postgraduate Research	1	https://www.tandfonline.com
South African Journal of Higher Education	1	www.journals.ac.za/index.php/sajhe
Southern Review	1	https://thesouthernreview.org/
Studies in Continuing Education	1	https://www.tandfonline.com/loi/csce20
Studies in Higher Education	15	https://www.tandfonline.com/loi/cshe20
Teaching in Higher Education	5	https://www.tandfonline.com/loi/cthe20
Training and Education in Professional Psychology	1	https://www.apa.org/pubs/journals/tep/
Thinking Skills and Creativity	1	https://www.journals.elsevier.com/thinking-skills-and-creativity
Total number of sources	**82**	

BIOGRAPHY



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