Doctoral Education in Context

Perspectives from Africa

Edited by
Jan Botha, Liezel Frick, Nompilo Tshuma

AFRICAN
MINDS

Published in 2024 by African Minds
4 Eccleston Place, Somerset West, 7130
Cape Town, South Africa
info@africanminds.org.za
www.africanminds.org.za

All contents of this document, unless specified otherwise, are licensed under a Creative Commons Attribution 4.0 International License.



ISBNs:
978-1-0672535-3-0 Print
978-1-0672535-4-7 e-book
978-1-0672535-5-4 e-pub

Copies of this book are available for free download at www.africanminds.org.za

ORDERS
For orders from Africa:
African Minds
Email: info@africanminds.org.za

For orders from outside Africa:
African Books Collective
PO Box 721, Oxford OX1 9EN, UK
Email: orders@africanbookscollective.com

CHAPTER 11

A reflection on doctoral supervision in the School of Natural Sciences at the University of Zambia

Wilma Sithabiso Sichombo Nchito

Zambia's population according to the last census is 19.6 million. The country has 9 public universities and 54 private universities with a total enrolment of 126 739 students. Doctoral enrolments in Zambia are still very low but are slowly increasing with more universities offering them. Figures collated by the Higher Education Authority are of PhD candidates and not those who have completed. The number of candidates registered for PhDs increased from 987 in 2020 to 1 325 in 2021 (HEA, The State of Higher Education in Zambia). The number of PhD graduates nationwide is not collated by any institution. In 2023 the University of Zambia graduated 71 PhDs which was the highest the institution had ever graduated.

The **University of Zambia** (UNZA) was established in 1966 through the University of Zambia Act. Established after independence, it was the first university in the country and was given the mandate of producing professionally trained human capital for the young nation. It currently has 12 faculties, 810 academic staff and over 14 676 students.

1. Introduction

The University of Zambia (UNZA) offers both undergraduate and postgraduate qualifications. As the oldest university in the country, it initially concentrated on undergraduate training to supply an educated workforce for the newly independent country. With time the university developed a few postgraduate programmes in some of its schools. The university has not had deliberate

policies or plans for postgraduate education. Postgraduate training has generally evolved based on the interests and competencies of individual departments or schools. Historically, supervision was not closely monitored and directed by specific guidelines. This chapter considers the practice of supervision in one department in the School of Natural Sciences at the University of Zambia and outlines the benefits and pitfalls of the various supervision processes. The chapter provides a brief reflection on the prevailing situation in the institution and evaluates recent proposals that have the potential of transforming doctoral training. The chapter will also present some of the guidelines used for postgraduate training at the university, as they relate to the issues covered herein. Some Schools and individual programmes in the institution are better funded and have stronger collaborative relationships with external institutions that continue to guide and support doctoral training. Other schools have lagged behind and do not have adequate human resources to sustain doctoral training. The Department of Geography and Environmental Studies may not be the best example, but it represents a unit that has the potential to improve doctoral training in the institution. In my view it lies mid-point on the continuum in terms of the quality of doctoral training offered at UNZA.

When Zambia gained independence in 1964, the nation did not have an institution of higher learning. The colonial territory of Northern Rhodesia, as Zambia was known then, had contributed immensely to the creation and running of the University College of Rhodesia and Nyasaland that had strategically been located in Harare, Zimbabwe (then Salisbury, Southern Rhodesia) (Ajayi et al., 1996). The University of Zambia opened its doors in 1966 and in the early years, from 1966 to the mid-1980s, the university grew rapidly and gained momentum. Like other post-colonial universities on the continent, the University of Zambia set out to train professionals and expand the frontiers of knowledge in order to serve local economies (Knight, 2017). These new universities were also modelled on institutions of their former Western colonizers (Mohamedbhai, 2017). To make up for deficits in the education sector, funding was provided for the training of secondary school teachers at universities like the University of Zambia. Funding for research was limited but postgraduate studies were eventually introduced in most schools and departments in the mid-1980s.

This limited progress was dealt a major blow when the Zambianization policy which had initially started with secondary schools in the early 1980s was eventually actualised at tertiary level. Zambianization was envisioned from the inception of the university as it was argued that students needed to be taught by people with shared cultural backgrounds (Kashoki, 1994). It came out of the

nationalisation policies that were aimed at ensuring that jobs which could be done by Zambian citizens were taken up by Zambian citizens. The country was also spending colossal sums of money on emoluments for expatriate staff who were paid more than the locals. At the time, the Zambian government, like her Tanzanian, Ugandan and many other counterparts, was guided by the global impression that tertiary education was a waste of money (Ajayi et al., 1996; Freisenhahn, 2014; Hayward & Ncayiyana, 2014). Therefore, the government was no longer willing to pay the high salaries of both academic and administrative expatriate staff.

The 1990s saw a revived drive to recruit and train staff, and the university sought external scholarships for potential staff, which was in line with the changes taking place globally (Friesenhahn, 2014). A staff development programme was launched to try and fill the gaps left by expatriate staff who had opted to leave at the end of their contracts. Training staff was simple enough but retaining them proved to be more problematic and the institution suffered a 'brain drain' of its brightest staff who did not return once they had been trained (Ajayi et al., 1996). By the late 1980s the situation was at its most critical due to the failing economy hence the increased recruitment in the early 1990s. Efforts were made to change the scholarship requirements and many sponsors ensured that once a programme of study ended, trained staff had to return to their home country. Those who were awarded scholarships also had to agree to be 'bonded' and had to return to their employers once their study programme was over. This, as well as the slowly improving economy, saw many academics trained abroad return to Zambia. Faculties which previously had depleted numbers were almost reaching or even exceeding establishment sizes. For instance, the Department of Geography and Environmental Studies (GES) dropped to only six members of staff in 1991 but has now exceeded the original establishment size of 18, with 21 academic members of staff. The improvement in staffing levels by the mid-1990s allowed some departments in the school to reintroduce the original MSc programmes which had started in the 1980s. The Department of GES revived its MSc programme around 1996 but did not fare very well due to long completion times and shortage in teaching staff since, at the time, though the staffing levels had increased many still did not hold PhDs. The department eventually introduced two new MSc programmes and shelved the old one in order to revise it. In the process a PhD was launched in 2003. The first PhD candidate in geography graduated after 10 years of study. This situation reflected what was taking place in the rest of the university.

Since then, doctoral training has definitely seen a rise at the university and the number of locally trained staff is increasing. A similar rise in PhDs is taking

place in the new universities that have been founded in the past 10 years. It is not clear whether the causes of this are similar to the global rise in PhDs (Cyranoski et al., 2011). Wachira (2018) refers to this as unplanned expansion of tertiary education. This chapter intends to interrogate the doctoral supervisory roles pertaining to the School of Natural Sciences.

2. Background

2.1 The supervisory role

It is clear from existing literature that doctoral education is important for the development of the continent (Friesenhahn, 2014; Wachira, 2018). Certain preconditions must be met for education to be used as a driver of economic development, and well thought out postgraduate and research programmes are among them. The School of Natural Sciences' approach is that of the final research product constituting 'doctorateness' (Trafford & Leshem, 2009, cited by Bitzer, 2016). This 'product view' entails that there is minimum concern about the processes that take place in order to train the candidate and yet, according to Bastalich (2015, p. 1145), "supervision is key to both quality and efficiency in higher degree research". Griffiths et al. (1999) on the other hand consider the selection of a supervisor as the most 'influential' aspect of one's PhD. Their view stems from contexts where students are at liberty to select supervisors, which is not always the case. Clearly, supervision is very important whether the supervisor is selected by the candidate or not. Griffiths et al. (1999) consider the three important characteristics of a supervisor to be (i) expertise in the research area, (ii) showing support to student and, (iii) having a balance of creativity and criticism. Added to this list are those qualities presented by Vilkinas (2002) who in the competing values framework (CVF) model considers the supervisor as a manager who should have a variety of qualities and proficiencies. Whilst the supervisor's expertise is verifiable at the onset the other two are not quite obvious and this is where many problems emanate from. Supervisors need to know how and when to be supportive. Some do not know how to be mentors, or they simply overlook the role (Katz, 2015). Since supervision is not the only role that supervisors have, getting them to learn these skills may not be that easy since many universities assume that since the supervisor has a PhD they will learn from their own experience.

The styles and approaches of supervision that are predominant in an institution such as, laissez faire, pastoral, directional, contractual, functional, enculturation, critical thinking, emancipation among others (Lee, 2018, 2008;

Mouton et al., 2015; Gatfield, 2005), need to be reviewed from time to time to assess their effectiveness and relevance. The supervisory relationship is also one aspect which requires constant review and having an MoU (memorandum of understanding) between the student and supervisor is ingenious as it outlines the roles of both parties (Boughey & McKenna, 2019). However, since most supervisors would not have had training in adult education there needs to be a forum through which they can be taught different supervisory styles and approaches. It is the experienced supervisor who is able to identify when for instance a candidate is experiencing doctoral liminality (Keefer, 2015). Supervisors are also responsible for training their candidates in responsible conduct of research (RCR) (Titus & Ballou, 2013). Benderly (2003) included career development as a mentor's role beyond the usual feedback and advice. Lee (2018) also adds the aspect of supervisor training. Her assessment of a 2016 Training of trainers project for supervisors in Norway found that not only were participants encouraged to try out different pedagogical approaches but that as a result of the training many universities had instituted teams which oversaw supervisor development. This is the best way for universities to ensure their supervisors are fulfilling their roles accordingly and that candidates are getting the best guidance. The fact that supervision does not take place in a vacuum entails that it is complex and there cannot be only one recommended style or approach (Pyhältö et al., 2015).

2.2 PhD delivery in the School of Natural Sciences

From the time departments started offering PhDs, very little has been done to formulate the actual structure of the programmes. This implies that the value that doctoral education can add to our knowledge economy is not taken into consideration (Mouton et al., 2015). This was around when the World Bank had shifted its emphasis on education towards higher education so in terms of funding, a few master's students were able to receive funding from their employers. Unfortunately, there were no arrangements made to fund doctoral students, and the cost of postgraduate education has disproportionately been borne by the students themselves. Many potential candidates prefer to do their studies abroad because employers tend to give them paid study leave when one is studying abroad but expect the person to report for work when they study locally. This implies a current lack of understanding of the advantage of PhDs by employers. However, in some cases candidate's choice of subject is irrelevant to their line of work and therefore the employers do not deem it necessary to

support them in their studies. A PhD as a qualification is still largely seen as only being relevant for academics.

The school suffers mainly from not having focused policy and approaches to doctoral learning, poor-quality supervisors, low institutional capacity, lack of funds and weak links to industry. The situation in the school to a large extent mirrors Bastalich's (2017) list of problems facing African scholarship. The other problem is that there has not been much, if any, research on doctoral education by the institution or by individual students so there is a dearth of information on doctoral education in general.

3. What needs to change and why?

Doctoral student supervision needs a major overhaul if doctoral education is going to contribute to the knowledge economy and the institution is going to train researchers and future academics. Among the several changes to doctoral studies necessary include admission processes as well as the management of the relationship between the supervisor and doctoral candidate. Admittedly, it is not always possible to screen candidates before admission (Mouton et al., 2015). There is definitely some level of training required for supervisors in order to increase their effectiveness (Lee, 2018). Supervisors often model their supervision on the supervision that they experienced during their own doctoral studies. As a result, bad experiences are often replicated. Supervisors need to be equipped with skills in how to give feedback and how to provide mentorship and support to their students.

Currently, students are assigned to supervisors who are conversant with or have an interest in their field. For the most part, supervisors volunteer and are not coerced to take on doctoral students. In some instances, the students seek out possible supervisors before registration and prospective supervisor and student agree on the possibility of working together once the student is accepted for the programme. This is helpful because it reduces the tension and uncertainty in the supervisor–student relationship. Mouton et al. (2015) are of the view that rigorous screening of candidates is important for effective and efficient supervision. The role of the supervisor has over the years not been given the attention needed to ensure that supervisors have the requisite skills. It appears there has been an assumption that once a member of staff has acquired experience in supervising at master's level, they should be able to do the same at the doctoral level, which is often not the case. The result has been a tortuous process for students and supervisors alike. This chapter will now

consider this process from the application stage to graduation. Proposals for improvement will be presented at each stage.

3.1 Admission and funding

Prospective doctoral students are expected to look for advertisements of doctoral programmes of the School of Natural Sciences in the national newspapers and apply either online or in person. Online applications were introduced in 2020. At this stage some students will contact a member of staff to find out if there are possibilities for supervision. At this point the potential student may be advised to tweak their topic to suit the interests and competencies of available staff. This enhances the chances for the student's application to be successful and helps the future supervisor in preparing to receive a student. Those who do not approach the department before applying will sometimes have their application rejected because there is no one with the required competencies in their proposed field. Since they are not present to explain their flexibility or willingness to change topic, such students lose opportunities to study at the university. Some end up going to private universities which are more flexible, admitting students first and looking for supervisors second.

Admitting potential PhD candidates without engaging or screening them can be precarious for two reasons: first, no one in the department will claim candidates as their responsibility and such candidates may be forced upon unwilling supervisors. Second, this route holds the potential of the student not having the required competencies that could have been noted through prior engagement. Since departments in the school are understaffed, not admitting such students saves valuable time. Mouton et al. (2016) agree that it is not always possible to screen students before they are admitted. They reported that some faculties turn away 54 % of applicants. Admission, which previously has been all year round, has now been streamlined to twice a year.

Introducing a meeting with potential supervisors or heads of department as a prerequisite for doctoral applicants would be an instrumental part of a screening process. It is not easy for potential candidates to know whether the area of their interest has adequate staffing. This initial contact could help increase the number of doctoral students accepted in the school. A thorough screening of potential candidates is proposed as the best way forward. The Department of Geography and Environmental Studies has introduced pre-entry interviews with potential candidates. These have been done virtually and have given the department the opportunity of getting a better understanding of the potential candidate's research ideas. Potential candidates are requested to make a brief

presentation and then they are asked questions by various members of the faculty. This method is not fool proof, and candidates have been taken on based on their presentation who have then gone on to not meet expectations. Two main questions asked during the interview are about the proposed candidate's motivation and whether they think they will have adequate time to do a PhD. If they are in full-time employment, they are asked if they will be able to get time off from work to pursue their studies.

The other way of resolving this problem is for the departments in the school to offer specified programmes as opposed to the current status of simply offering a PhD in geography, physics, chemistry, etc. Project funding enables some universities to link PhD programs to these initiatives, attracting students in specific fields. However, this approach is not applicable to the school. Typically, projects prioritize funding master's students due to the shorter duration of most projects, which usually span 2–3 years. There have been some projects which do this in a few other schools, but this is not the norm. This is an approach the school could seek to follow in attracting doctoral students. Funding of these projects also needs to be from within the country to ensure that the focus is relevant. Externally funded projects typically align with the funders' priorities, requiring the school to adapt its approach to fit within the framework of these projects. In order for projects to be developed the school needs to decide what it wants to achieve with doctoral education and concentrate on those fields which will benefit from research. For instance, most universities offering doctoral studies in geography will specify whether it is in human, physical, planning or earth sciences. This helps eliminate those students who do not have an interest in these fields. Some departments have distinct research groups which invite students to take up studies under teams of supervisors who have specific topics in mind. For a country with limited funding this is also a way of increasing research output.

The past three to four years have seen an introduction of a few scholarships offered at postgraduate level by the Ministry of Higher Education (MOHE). This is a very positive move. The scholarships try to target women in STEM, offering them 70% and the remaining 30% to male applicants. The total number offered in the 2019-2020 academic year were only 11, with 6 being at doctoral level and five for master's. The scholarships are tenable in any of the following fields: "Geology, Engineering, Bioinformatics, Biotechnology, Pharmacognosy, Forensics, Renewable Energy, Food Science, Agriculture, Nutrition, Pathology, Physics, Chemistry, Biology, Mathematics, Medicine, Veterinary Medicine, Mining, Fourth Industrial revolution courses (4IR) Nuclear Science and

Technology, Space Science and Technology and Education with Science subjects" (MOHE, 2019). The website goes on to say that

> *is in line with the Ministry's long-term objective of promoting a cadre of researchers at postgraduate level, especially increased participation of women in Science and Technology studies for the purposes of lecturing in the universities or conducting research in the scientific institutions.*

The aim is mainly to produce academics. It is not clear whether the ministry carried out a survey to create a database of available PhD programmes especially when one considers the inclusion of space science and technology. Public universities in their current state are not able to adequately offer such a programme. Apart from limited capacity in terms of manpower UNZA also lacks infrastructure dedicated to postgraduate training.

3.2 Supervisor allocation

Supervisors are allocated by departments either through the supervisor having met the prospective student and taken an interest in the subject matter or by the department's graduate committee meeting and deciding which supervisors would be suitable for the topics at hand. In other instances, students are assigned to supervisors and depending on the relationship the supervisor has with the head of the unit they may or may not accept the appointment as supervisor. A supervisor may be deemed suitable by the department even though they themselves may think otherwise. This relationship may not work if the supervisor is reluctant to take on the student from the start. The reasons could be a general lack of knowledge of the field of study, lack of interest in the field or heavy workload. If the targeted supervisor feels their head of unit may think they are being insubordinate, they will reluctantly take on the student. Progress is guaranteed to be slow in these instances. There has not been any formal training for supervisors and the only requirement is that the supervisor should have qualified for their own PhD two years prior to their supervising a student. Recently, the Directorate of Research and Graduate Studies (DRGS) has been working in conjunction with Vanderbilt University in the United States on a mentorship and supervision curriculum for lecturers. With the highly competitive academic landscape there is an urgency for improving the student experience at doctoral level. The university also envisions positioning itself as a postgraduate institution. There have also been moves to structure doctoral training across the whole university.

3.3 Improving the PhD process

The university has not had a standard structure for the PhD process. This has been identified as a problem contributing to slow graduate output. In 2020 the School of Veterinary Medicine, School of Medicine and School of Health Sciences started the process of developing structured PhDs. The School of Medicine additionally felt that mentoring skills were lacking amongst faculty members and in 2020 developed a mentoring curriculum for staff. These efforts have yielded results, leading to the adoption of the PhD framework as a university-wide process. This ensures that PhD students follow a structured program, including courses and assessments, before advancing to candidacy. Beyond establishing a standardized process, it was recognized that certain competencies often missing in applicants could be addressed and evaluated during the first year of study. This way, a student who lacked certain competencies could attain them before embarking on the doctoral process. It would also eliminate those who would not successfully complete the first year of assessments. The framework provides guidance on expected competencies, structure, admission requirements and progression. It also outlines the different types of PhDs that will be offered by the institution. Members of the Department of GES have collectively gone through the framework and developed the required course work to be undertaken by a student. Specific doctoral programmes have also been created, which is a deviation from past practice.

The fact of only a few students enrolling makes it easy for lonely student syndrome to set in from very early into their studies. This situation also makes it difficult to create a postgraduate community so that students can benefit from being in a group. It is difficult especially for a candidate who did not previously study in the school to find their feet. In most cases this loneliness comes about because there are usually no other students doing similar doctorate studies as most departments usually have one or two students. The student has no one to act as a sounding-board for their ideas and some supervisors do not have planned feedback sessions but instead ask candidates to drop off their work, and once they have read through it and made comments, they leave it for the student to collect. There is barely any contact between the two and therefore very limited supervision and mentoring. Training of supervisors is required so that they fully understand what is expected of them. It is hoped that the curriculum on supervision and mentorship will improve supervision in the institution. The intended purpose of the curriculum is to make supervisors aware of their roles and equip them with the skill to carry them out effectively.

3.4 Write up and submission

Once the supervisor and student feel that the work is ready the process of submission can begin. The student officially has to have a paper published in a refereed journal by the time they are submitting their work for examination, but this does not always happen. However, a published paper needs to be presented with the final thesis before the candidate can graduate. Despite this requirement, many supervisors are not aware of their role in the writing process. Aitchinson et al. (2012:440) report that those supervisors who try to assist their students to write often express "frustration, irritation and even anger over a student's writing", indicating that this is not a pleasant or easy task. The student should then submit an 'intention to submit' form at least three months before the actual submission. This is meant to allow time for examiners to be allocated. The supervisor is expected to submit a list of examiners who are ratified first by the department and then by the school. In some instances, supervisors are not aware of the requirements of the university, and this can cause delays. External examiners are not easy to find.

4. Conclusion

Castells's (1991) view of the university as an engine of development should guide universities in developing countries to think of the role their institutions should play in economic development (Mouton et al., 2019). In a brief survey of what members of the Department of Geography and Environmental Studies felt we were trying to achieve in our PhD programmes, all three members who responded stated that it was not clear what our doctoral studies were intended to achieve. When asked whether we needed to create specific programmes, all three respondents answered positively. This should be the starting point for the transformation of doctoral education in the school and the whole institution. Programmes should be aligned with research groups as well as with industry for increased relevance and for possible sponsorships. This will also help attract more students, which would make group work possible. Thereafter, training of supervisors is the next necessary step. The traditional supervisory methods practised in the school need to be revised to make them more practical and productive. All aspects of the PhD process need serious rethinking if the school is going to attract, retain and graduate doctorates who will be able to contribute positively to society and the economy.

References

Aitchison, C., Catterall, J., Ross, P., & Burgin, S. (2012). Tough love and tears: Learning doctoral writing in the sciences. *Higher Education Research & Development, 31*(4), 435–447. https://doi.org/10.1080/07294360.2011.559195

Ajayi, J. F. A., Goma, L. K. H., & Johnson, A. G. (1996). *The African experience with higher education.* Association of African Universities; James Curry.

Bastalich, W. (2017). Content and context in knowledge production: A critical review of doctoral supervision literature. *Studies in Higher Education, 42*(7), 1145–1157. https://doi.org/10.1080/03075079.2015.1079702

Benderly, L. B. (2003). Mentoring and PI productivity. In *Taken for granted: Issues perspectives, Postdoc Academic Americas*. https://doi.org/10.1126/science.caredit.a0700140

Bryan, B., & Guccione, K. (2018). Was it worth it? A qualitative exploration into graduate perceptions of doctoral value. *Higher Education Research & Development, 37*(6). https://doi.org/10.1080/07294360.2018.1479378

Cloete, N., Mouton, J., & Sheppard, C. (2015). *Doctoral education in South Africa: Policy discourse and data.* African Minds.

Cyranoski, D., Gilbert, N., Ledford, H., Nayar, A., & Yahia, M. (2011). The PhD factory. *Nature, 472*, 276–279. https://doi.org/10.1038/472276a

East, M., Bitchener, J., & Basturkmen, H. (2012). What constitutes effective feedback to postgraduate research students? The students' perspective. *Journal of University Teaching and Learning Practice, 9* (2). Available at http://ro.uow.edu.au/jutlp/vol9/iss2/7

Fraser, R., & Mathews, A. (1999). An evaluation of the desirable characteristics of a supervisor. In K. Martin, N. Stanley, & N. Davison (Eds.), *Teaching in the Disciplines/Learning in Context* (pp. 129–137). 8th Annual Teaching Learning Forum, The University of Western Australia.

Friesenhahn, I. (2014). Making higher education work for Africa: Facts and figures. Retrieved from https://www.scidev.net/global/education/feature/higher-education-africa-facts-figures.html

Gatfield, T. (2005). An investigation into PhD supervisory styles: Development of a dynamic conceptual model and its managerial implications. *Journal of Higher Education Policy and Management, 27*(3), 311–325.

Griffiths, A. W., Blakey, H., & Vardy, E. (2015). The role of supervisor and the impact of supervisory change during PhD. Retrieved from https://www.researchgate.net/publication/309487103_The_role_of_a_supervisor_and_the_impact_of_supervisory_change_during_your_PhD

Hampwaye, G., & Mweemba, L. (2020). Zambia. In Kotecha, P., Wilson-Strydom, M., & Fongwa, S. M. (Eds.), *A Profile of Higher Education in Southern Africa – Volume 2: National Perspectives* (pp. 105–114). SARUA.

Hayward, F. M., & Ncayiyana, D. J. (2014). Confronting the challenges of graduate education in Sub-Saharan Africa and prospects for the future. *International Journal of African Higher Education, 1*(1). https://doi.org/10.6017/ijahe.v1i1.5647

Hyatt, D. F. (2005). Yes, a very good point!: A critical genre analysis of a corpus of feedback commentaries on Master of Education assignments. *Teaching in Higher Education, 10*(3), 339–353.

Kashoki, M. (1994). The African university: Towards innovative management strategies for the 21st century. In *Higher education staff development*. UNESCO.

Katz, R. (2016). Challenges in doctoral research project management: A comparative study. *International Journal of Doctoral Studies, 11*, 105–125.

Keefer, J. M. (2015). Experiencing doctoral liminality as a conceptual threshold and how supervisors can use it. *Innovations in Education and Teaching International, 52*(1), 17–28. https://doi.org/10.1080/14703297.2014.981839

Knight, J. (2017). The concept and process of higher education regionalization. In J. Knight & E. T. Woldegiorgis (Eds.), *Regionalization of African Higher Education: Progress and Prospects* (pp. 11–28). Sense Publisher.

Lee, A. (2018). How can we develop supervisors for the modern doctorate? *Studies in Higher Education, 43*(5), 878–890. https://doi.org/10.1080/03075079.2018.1438116

Masaiti, G., & Mwale, N. (2017). University of Zambia: Contextualization of contribution to flagship status in Zambia. In D. Tefarra (Ed.), *Flagship universities in Africa* (pp. 467–506). Palgrave Macmillan.

Mouton, J., Boshoff, N., & James, M. (2015). A survey of doctoral supervisors in South Africa. *South African Journal of Higher Education, 29* (2), 1–22.

Nakweya, G. (2018). PhD training – Why African government funding is needed. *University World News.* Retrieved from http://www.universityworldnews.com/article.php?story=20180509132730221

Phyalto, K., Vekkaila, J., & Keskinen, J. (2015). Fit matters in the supervisory relationship: Doctoral students and supervisors' perceptions about the supervising activities. *Innovations in Education and Teaching International, 5* (1), 4–16.

Titus, S. L., & Ballou, J. M. (2013). Ensuring PhD development of responsible conduct of research behaviours: Who is responsible? *Science and Engineering Ethics*. https://doi.org/10.1007/s11948-013-9437-4

Vilkinas, T. (2005). The PhD process: The supervisor as manager. *Education and Training, 44*(3), 129–137.

Wachira, K. (2018). Higher education caught in a double bind. *University World News.* Retrieved from http://www.universityworldnews.com/article.php?story=20180328162530835

Woolston, C. (2019). PhDs: The tortuous truth. *Nature, 575*(7782), 402–406. https://doi.org/10.1038/d41586-019-03459-7