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The need for revision of selected aspects of online Master's and doctoral student supervision

Abstract

Since the onset of the COVID-19 pandemic, higher education institutions have been concerned about their Master and doctoral students, in particular how and when they would be able to continue and complete their research activities and dissertations. Scholars have noted the potential deterioration in the quality of research projects for a variety of reasons (transformation and/or abandoning of approved research methods, anxiety-related lowered performance rates, altered modes of supervision and delays in completion times). In this article, I discuss the findings of a small-scale study, undertaken in July 2020, on whether there has been a significant change in the supervision of Master's and doctoral students in Africa due to the outbreak and impact of the COVID-19 pandemic. I used a Google Form online survey to obtain participants' opinion on the frequency of interactions between supervisors and supervisees, the medium of interaction as well as the Master's and doctoral candidates' general progress. The study participants were all instructors in higher education who supervise Master and PhD students. There has been a change in frequency and means of supervision, that there is more reliance on videoconferencing tools and interaction "at a distance". However, the data cannot conclusively confirm that there has been a significant transformation in the way students are supervised because many study participants indicated their wish to return to the way things were done pre-pandemic. Nevertheless, there will probably be more reliance on social media, email and other online tools such as Zoom and Skype post-pandemic. In the words of the study participants, "online supervision is developing" and "the pandemic has also given us more tools of engagement, which is good".

Keywords: *doctoral supervision; Master's supervision; Africa; COVID-19 pandemic; online supervision; transformation.*

1. Introduction

The COVID-19 pandemic has had many consequences, both positive and negative. Since its onset, universities have been worried about their Master's and doctoral students. The concerns are related to the students' wellbeing and the study-related progress they were able to make during these trying times. Higher education institutions' worries included finding out how and when Master's and doctoral students

continued and completed their research activities and dissertations (for a general overview of doctoral supervision in Africa, see Jowi, 2021). Motala and Menon (2020), talking about what happened during the lockdown, noted the possible decline in the quality of research projects due to, among others, the modification and/or discarding of accepted research methods, reduced performance rates due to pandemic-related stress and anxiety, changed supervision modes and longer completion times.

My main research goal was to discover whether there had been a noteworthy change in Master and doctoral supervision due to the outbreak and impact of COVID-19. Below, I first describe the study context and background.

2. Background and study context

After the initial outbreak of COVID-19 in December 2019 (World Health Organization, 2020a: 1), the virus started spreading rapidly all over the world in the early months of 2020. The outbreak was declared a pandemic on 11 March 2020 (WHO, 2020b: 1), and, from then on, the cases and related deaths increased daily. Soon after the global onset of the pandemic, sanitary measures were imposed in most countries. These consisted of social/physical distancing, lockdowns, isolating (the impact of isolation on Master's and doctoral students before COVID-19 was already significant, see Mason [2012], for example – we can only imagine how much more this effect will be on students and supervisors during the pandemic), quarantining and working from home. Schools and universities were closed, which meant that physical access to the school or campus was no longer possible.

With working from home and studying away from the "normal" academic environments (classrooms, laboratories, libraries, etc.) came an expanded use of digital technologies to counteract the far-reaching interruptions of higher education and related research activities (Motala & Menon, 2020). In many places worldwide this is ongoing. For example, in the kingdom of Eswatini, universities opened again in August 2020 but with limited access: final-year students came to write examinations, and, as the new academic year started, only first-year students were allowed on campus for limited face-to-face sessions combined with online course delivery modes.

These drastic changes foreseeably affected the relationship between supervisor and supervisee, as well as impacting the duration and frequency of interaction, and the means of communication between the parties involved in doctoral studies, seeing that communication between both parties is essential (Ives & Rowley, 2005; Koen, 2007, cited in Prinsloo, 2016; Carpenter, Makhadmeh. & Thornton, 2015). Alternative educational and supervisory activities were actively researched in order to minimise any possible adverse impact on the continuity of academic life and research.

The present study was undertaken during the researcher's participation in the DIES/CREST Online Course for Doctoral Supervisors at African Universities (July–October 2020). This is normally organised once a year, face-to-face, in South Africa and brings together young and more experienced doctoral supervisors from African universities for extensive training. In 2020, due to the pandemic, the course was held online for the first time. The final assignment in this course is a research report of a study on any aspect of doctoral supervision. I chose to look into the transition from face-to-face to blended/online doctoral supervision.

3. Problem statement, aim and objectives

The research discussed in this article was designed with the overall purpose of exploring whether Master and doctoral supervision had undergone transformation due to the pandemic. The particular focus was to explore doctoral supervision. What happened before the onset of the pandemic? What is going on now during the pandemic? These were the main questions I wanted to investigate.

According to Gardner (2007), supervisors of doctoral candidates need to be "accessible", they should provide regular positive criticism and feedback (Botha, 2010; Nurie, 2018; Neupane Bastola & Hu, 2021) on the work undertaken by the candidates, they should show empathy towards their students while also treating them as colleagues or peers (also echoed by Turner, 2015). Finally, supervisors should support their students in their research (Lee, 2008). The question arises what accessibility and frequency of interaction mean. In the case of doctoral supervision, appointed supervisors often have no real idea of what constitutes acceptable supervision (Dietz, Jansen & Wadee, 2006).

Therefore, the current study's major research question was whether the pandemic brought about a transformation in the way doctoral students are supervised.

This translated into many related questions, namely:

1. How often did supervisors see their doctoral students face-to-face before COVID-19?
2. What was the main means of communication between supervisor and supervisee before COVID-19?
3. What are the main means of communication between supervisor and supervisee during COVID-19?
4. Which videoconferencing tools were used to interact during COVID-19?
5. Has there been a change in frequency of supervisor-supervisee interaction between "before" and "during" COVID-19?
6. How was the viva/oral thesis defence undertaken since the start of the pandemic?

4. Literature review

While there is some fairly recent literature on doctoral supervision in sub-Saharan Africa (Manderson *et al.,* 2017; Jili & Masuku, 2017; Ndayambaje, 2018; Isike, 2018; Assimwe, 2019; Cekiso *et al.,* 2019; Mothiba *et al*., 2019; Ngulube & Ukwoma, 2019; Nsereko, 2019; Gohar & Qouta, 2021), there is little research currently available on the impact of the COVID-19 pandemic on doctoral supervision methods and practices in the same region of the world.

Even though published before the pandemic, Gray and Crosta (2019) did a systematic literature review to ascertain the best practices of high-quality online support to students during the thesis stage of an Online Doctorate in Higher Education programme. They provide useful information and make recommendations that apply during the pandemic too. In their section on frequency of meetings between doctoral students and supervisors, they note the following: timing and frequency of meetings is important to scaffold student progress, to build persistence and completion (Pyhältö, Vekkaila & Keskinen, 2015, cited by Gray & Crosta, 2019). Frequency goes hand in hand with communication (Erichsen, Bolliger & Halupa, 2014).

Spanning three continents, including Africa, Stevens *et al.*'s 2021 study entitled "Doctoral supervision and COVID-19: Autoethnographies from four faculty across three continents" gave four faculty members the opportunity to write an auto-ethnography of their experience as doctoral student supervisors. Even though their basic advising philosophies and contexts were quite different, their findings regarding the possibility and power of resilience, empathy and mentoring online, indicate that monitoring of new online practices is essential because some of these should be kept after the pandemic to expand the reach, depth and impact of doctoral education.

Authors such as Phillips, Logan and Mather (2021) as well as Suparman (2021) looked at the COVID-19-induced need for online doctoral supervision and specialised training for doctoral supervisors. Paula (2020) investigated how lockdowns due to COVID-19 affected doctoral studies, while Mullen's 2020 research focused on online doctoral mentoring. Tatnell (2020) is one of the few researchers noting the use of videoconferencing as part of good online research supervision relationships. Earlier on, Lim *et al.* (2019) highlighted videoconferencing as one of the possible strategies to assist distance doctoral students in completing their dissertations.

Research on Swedish graduate students by Börgeson *et al.* (2021) noted particular challenges in PhD education due to COVID-19-disrupted supervision. The few studies highlighted above are an indication of the need for additional studies on different aspects of doctoral study supervision before, during and beyond the COVID-19 pandemic.

5. Research design, methodology and sampling

This study used a descriptive research design in view of generating useful data to answer the main research question. A qualitative case study design was selected because it allowed for the generation of in-depth data that emerged from the participants' opinions, thoughts and feelings (Creswell & Poth, 2016). This design was chosen to explore the respondents' real-world experiences of Master and doctoral study supervision before and during the COVID-19 lockdown/pandemic. The survey tool I implemented was an online Google Form self-designed questionnaire that provided data about participants' demographics (such as age) and their opinions regarding the main points discussed below. The questionnaire consisted of 11 multiple choice and 2 open-ended questions.

There was no ethical clearance sought. Informed consent was obtained by explaining that the generated data would be used for a study that was part of the requirements for the completion of an online course and would possibly be used additionally in a published article. Respondents participated on a voluntary basis and could opt out at any time. Their responses were anonymised at data analysis stage.

Sampling was purposive in nature. The purposive sampling technique (Klar & Leeper, 2019), also known as non-random sampling, relies mainly on the researcher's ability to select elements for a sample. On the negative side of this choice is that the outcome of the sampling might be biased and make it difficult for all the elements of the population to be part of the sample equally. I selected possible participants based on the aim of the study, namely, to get the opinion of a particular group of higher education stakeholders, MA and PhD supervisors. It can also be described as convenience sampling. As I did not receive sufficient quality responses the first time I sent out the questionnaire (Cohort 1), I sent it again, but for Cohort 2, I specifically targeted my fellow DIES/CREST Online Course participants.

6. Participants and their profile

Yin (2015) explained that purposive sampling involves the selection of participants based on their identified relevance and rich experience that can contribute towards answering a study's research questions. In the current study, the respondents were chosen because of the rich information they could provide related to their experience as supervisors. The first cohort (survey undertaken in July 2020) consisted of 168 of the researcher's colleagues worldwide, known to me for being/having been doctoral supervisors. Of these, 27 responded to the questionnaire; this gives a response rate of 16,1%. As I was not satisfied with the number of responses, I then requested fellow participants in the DIES/CREST Online Course for Doctoral Supervisors at African Universities to also fill in the online survey. The second cohort (survey sent out at the end of July 2020) then consisted of 143 colleagues, all working at African universities. From this group, 37 responses were obtained, which corresponds to a response rate of 25,9%. In total, 64 responses were collected out of 311 possible respondents. This brings the overall response rate to 20.6%.

In a large-scale Danish study on response rate differences between paper-based and online surveys, Ebert *et al.* (2018) found that the overall response rate in the digital group was 36.31% (1303/3588), almost 10 percentage points lower than in the paper group (45.99%, 1653/3594). We can thus suppose that a better response rate might have been achieved if we had been able to use paper-based instruments (which was not possible due to the COVID-19 pandemic in our particular case). In addition, we know that study participants are increasingly resistant to responding to surveys (Kohut *et al.,* 2012). General stress and anxiety related to the pandemic might also have been a factor for the relatively low response rate in this study.

The following demographic information relating to age, qualification and country of residence was gathered. Table 1 indicates that most supervisors were between the ages of 41 and 50 (Cohort 2; supervisors solely from Africa) and 51 and 60 (Cohort 1; supervisors from all over the world, including Africa: 9 respondents from this Cohort were based outside Africa). In Cohort 2 all study participants were PhD holders (in Cohort 1 a few respondents were MA holders, but they only supervised MA students).

Table 1: Age of respondents

Age	Cohort 1 (n=27)	Cohort 2 (n=37)
30–40	3	11
41–50	8	16
51–60	15	8
61 and above	1	2
Total	27	37

Interestingly, the participating supervisors in the second cohort were generally younger than those in the first one. Does this mean supervisors in Africa start to supervise at a younger age? Or is it related to the fact that there is a limited pool of supervisors? Further research is needed to answer these questions.

7. Findings and discussion

In this section, I note the main study findings and discuss them in relation to international research. I start with the number of doctoral students per supervisor and then go into the

themes identified at the start of the study, namely frequency of interaction, use of digital tools for online interaction between supervisor and supervisee and student progress during the pandemic. A few selected responses then guide a discussion leading to the recommendations and conclusion.

This section is organised according to the research sub-questions: frequency and change of frequency in supervisor-supervisee interactions, digital tools and means of supervisor-supervisee interactions, variety of videoconferencing tools and oral thesis defence.

In addition to information directly answering these questions, I also obtained information regarding the number of doctoral students currently under a participant's supervision. This can be seen in Table 2.

Table 2: Number of doctoral students currently under the participants' supervision

Number of students supervised	Cohort 1 (n=27)	Cohort 2 (n=37)
0	8	6
1-3	10	26
4-6	9	2
7-10	0	3

In Cohort 1, 38,5% of the respondents supervised between 1 and 3 doctoral candidates, and 34,6% between 4 and 6. In Cohort 2, the vast majority (70,3%) supervised between 1 and 3 doctoral students. The remaining respondents in both cohorts (8 in Cohort 1 and 6 in Cohort 2; some of the Cohort 1 participants were supervising MA students) were not currently supervising doctoral students.

In Cohort 2, a significant number of participants supervised between 7 and 10 doctoral candidates. This is an indication of possible work overload. Research undertaken in east and southeast Asia on the number of doctoral students per supervisor in the field of nursing education shows that 45% of the participating institutions had between 1 and 5 students, while one third had between 6 and 10 supervisors and a quarter had no upper limit of students/supervisor (Molassiotis *et al.,* 2020).

8. Frequency and change of frequency of supervisor-supervisee interactions

In general, supervisors interact with their own students as they were supervised, and/or they learn by doing (Halse, 2011, cited in Manderson *et al.,* 2017). Because there is no prescribed frequency of interaction and the frequency means of interaction varies from country to country, from university to university, from department to department even, I have not included any benchmark questions for frequency or means of interaction. However, what could be measured was the change of frequency starting from what happened before the pandemic and what occurred during the pandemic.

In response to the questions – How often did supervisors see their students face-to-face before COVID-19? – and – Has there been a change in frequency of supervisor-supervisee interaction between "before" and "during" COVID-19? – the following was noted: before the pandemic, 95,2% (Cohort 1) and 67,7% (Cohort 2) of the supervisors only interacted face-to-face with their students once a month. Since the start of the pandemic, the frequency of interactions has changed as can be seen in Table 3 below.

Table 3: Change in frequency of interaction between supervisor and student

Frequency of interaction	Cohort 1 (n=22)	Cohort 2 (n=34)
Less frequent	8	13
More frequent	4	9
Equally frequent	10	12

Cohort 1 respondents noted slightly more instances where the frequency of interaction with the supervised students did not change. As countries outside Africa were included here, it could be possible that the dependency on online interactions were already higher there before the pandemic. Nevertheless, it is important to note that for 26,5% of Cohort 2 respondents, the interactions became more frequent during the pandemic. This might be an indication of a heightened need for communication and interaction, even if occurring online only (face-to-face was impossible during the lockdown periods), in "difficult" periods such as the COVID-19 pandemic.

In many Master's and doctoral programmes, two phases can be distinguished: the taught course phase and the research phase. In the research phase, supervision of doctoral research has four dimensions: "the advisory role, the quality control role, the supporting relationship nurtured by the supervisor and the guidance of the student by the supervisor" (Mouton, 2001: 17, cited by Beer and Mason, 2009). None of these roles or dimensions can be undertaken without regular interaction.

Even before the COVID-19 pandemic, supervisors and researchers were debating the differences and possible advantages of on- or offline supervision practices (e.g. Gumbo, 2019) for all postgraduate research students but also more particularly for international students (e.g. Herman & Meki Kombe, 2019). In a study undertaken in Portuguese universities, "almost all supervisors (90,2%) agree that regular contact (by email, Skype, in-person) with doctoral students, is the key to monitoring and guiding student research work. Regular meetings in person with students has an agreement of 76,8%. Almost sixty-one per cent (60,7%) of supervisors agree with joint monitoring (PhD student-supervisor) of the proposal development while more than half (56,3%) of supervisors agree with the statement "Supervisor's failure to monitor student work may lead to non-completion of the doctorate" and that 31.3% partially agree with this statement (Ribau, 2020: 1585).

The frequency of supervisory meetings may also affect doctoral candidates' emotional exhaustion and intentions to dropout. Supervisory interaction and meetings are also a critical consideration in the advisory relationship. The frequency and quality of meetings are important (Li & Seale, 2007). Although the quality and frequency of meetings likely varies with the individual advisor, it may also depend on the academic discipline. Gardner (2007) reported that doctoral students emphasised the importance of their supervisory interaction, but she noted that expectations regarding contact time with their supervisor varied by academic department. Regardless, the frequency of interaction seems to affect doctoral students' wellbeing and progress. For example, Stubb, Pyhältö and Lonka (2011) found that weak and infrequent advising hindered the emotional wellbeing of doctoral students. Furthermore, students who have access to regular meetings with advisors, where they can receive guidance and discuss expectations, are more likely to complete their degrees (Bair & Haworth, 2005).

9. Digital tools and means of supervisor-supervisee interaction

The second theme of this study relates to the use of digital tools for online supervision of doctoral students and the main means of interaction between both stakeholders. This theme provides answers to the following questions: What was the main means of communication between supervisor and supervisee before COVID-19? What are the main means of communication between supervisor and supervisee during COVID-19? And which videoconferencing tools were used to interact during COVID-19?

Both cohorts used face-to-face interaction as the main means of communication before the pandemic started. Noteworthy is the much higher percentage (70,6%) of Cohort 2 participants compared to that of Cohort 1 respondents (54,5%). This could confirm what was noted above, namely that the use of technology-mediated communication was already more significant outside Africa than it was on the continent.

During the pandemic, there was a definite shift from face-to-face to email and Skype or similar platforms, as Figures 1 and 2 below indicate.

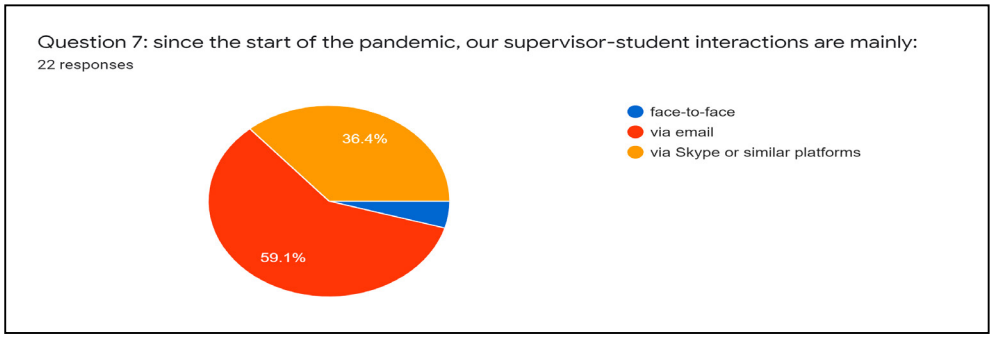

Figure 1: Cohort 1 interaction types

For Cohort 1, 59,1% of the interactions between the supervisor and the doctoral student happened via email during this period of the COVID-19 pandemic (March 2020–August 2020), 36,4% of the interactions via Skype or other videoconferencing tools and only 4,5% took place in a face-to-face setting.

For Cohort 2, as indicated in Figure 2 below, the numbers indicate that more interactions took place via videoconferencing (45,7%) compared to what occurred in Cohort 1. A little more than half (51,4%) of the interactions were undertaken via email, while only 2,9% of the supervisor-supervisee interactions happened face-to-face.

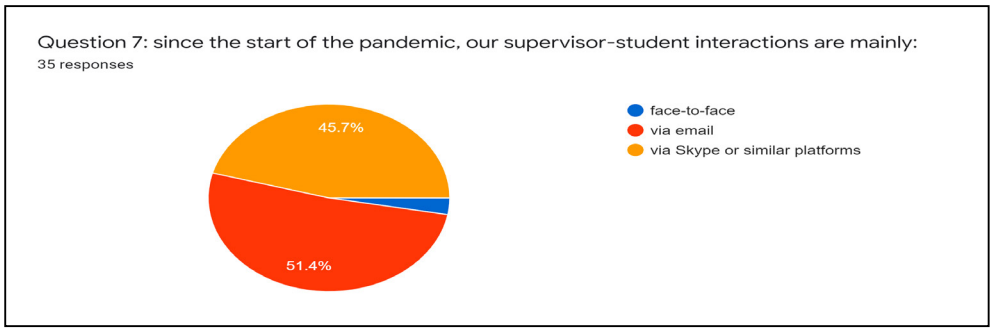

Figure 2: Cohort 2 interaction types

Supervision using videoconferencing tools, also called remote supervision, tele-supervision or even e-supervision (Ghani, 2020: 38) is slowly appearing as a research topic under the broad category of doctoral study supervision. While no significant research has been done in Africa in this regard, a few pre-COVID-19 studies outside the continent called for the intensified use in the near future (Frederick, 2020; Flaherty, 2020, both cited in Ghani, 2020).

Cuban (1986) indicated that new technologies have succeeded each other since the 19th century, in particular in the education sector. Thus, students and educators have had to adapt themselves to new technologies, and today this includes digital ones (Khoza, 2017) as well as social media usage for teaching and learning (Annamalai, 2019; Mpungose, 2020; Deng & Tavares, 2013; Henry *et al.,* 2016; Madge *et al.,* 2009), which means we need to ensure that users are informed about these rapidly changing digital technologies (Dlamini, 2015). While lecturers and students have used Skype's videoconferencing functionality professionally and socially in the past, during the COVID-19 lockdown they seem to have switched to the more flexible Zoom, which is easy to install and use, and allows more participants in the same "call".

A variety of tools were used by the supervisors in this study: Zoom, Google Meet/Hangout, Microsoft Teams, Adobe Connect, Skype, WebEx and WhatsApp. Zoom is by far the preferred videoconferencing/virtual meeting tool (45,5% of the participants of Cohort 1 and 36,2% for Cohort 2). This is followed by Google Meet/Hangout for Cohort 1 (31,8%) and Microsoft Teams (23,5%). Researchers like Mullen (2020) discuss the importance of videoconferencing tools to ensure continued interactions, in particular during extreme events such as pandemics.

Crawford *et al.*'s (2020) study explored universities' responses, in the form of migration to online environments, to the COVID-19 pandemic in relation to teaching, learning and research, in Germany, Hong Kong, Malaysia, Jordan and South Africa. Universities started hosting lectures and meetings through videoconferencing software such as Zoom, and file-sharing applications such as Google Classroom. In addition, universities have expanded their use of learning management or content management systems such as Moodle (Putri *et al.,* 2020).

In the narrative, open-ended part of the questionnaire, one participant had this to say:

> Another positive is that I find that staff and students have been kind of forced to rely more on technology and eventually find it useful for virtual meetings/interactions, etc, whereas before many relied more on print and email. Some students have access challenges with

> regard to WiFi and this interferes with the new arrangement of holding virtual meetings and slows down work and student/supervisor interactions (P5, Cohort 2).

This confirms the shift towards more use of digital interactions during the pandemic but also points to multiple challenges regarding infrastructure and connectivity which, in turn, point to access and inclusivity challenges.

Ribau's study participants noted that "almost all supervisors (90,2%) agree that regular contact (by email, Skype, in-person) with doctoral students, is the key to monitoring and guiding student research work. Regular meetings in person with students has an agreement of 76,8% (Ribau, 2020: 1585). The current study confirms this, except that because of the pandemic much less face-to-face, in-person interaction is happening.

The pandemic has brought about a more diversified offering when it comes to videoconferencing. While many of these products were available before March 2020, the fact that supervisors and supervisees started using videoconferencing more as an alternative to the now prohibited face-to-face interactions, also meant that stakeholders would start looking for videoconferencing products that were better suited to their specific needs. In their research on group research supervision, Kumar *et al.* note the following regarding the effectiveness of videoconferencing tools during a pandemic: "Having a flexible structure for Zoom meetings, a scheduled time to work with their mentor, a lengthy block of time to interact one-to-one, and the mentor's prepared responses to their files and questions, with attention on anything arising while in session, proved motivating" (2021: 148).

10. Oral thesis defence/viva

The videoconferencing tools mentioned in the previous section were mainly used for regular supervisor-supervisee meetings, but also at the level of oral thesis defence or viva. This is normally something that happens in a face-to-face setting, even though before the onset of the pandemic it was possible to hold a viva at a distance. This occurred in particular with international students.

This shift is also visible when it comes to thesis defence. More than half (56,5%) of the respondents of Cohort 1 indicated that there have been thesis defences since the start of the pandemic. This number is significantly lower for Cohort 2. While I have not been able to ascertain why this is the case, one of the reasons might be that in Cohort 1 there are participants based outside Africa who might have been better prepared to deal with online thesis defences (they might have dealt with international students on a larger scale and therefore might have had thesis defences "at a distance" even before the pandemic started).

Cohort 1 respondents noted that thesis defences were undertaken "virtual[ly] using Zoom", "via Google meeting", "on Blackboard Collaborate" and "different[ly] from before because of time management" ("the defence should not last more than 3 hours"). One of the respondents noted that besides the "initial technical glitches", doing the defence online was "in fact, (...) an easier means to get all examiners to attend orals once we can all agree on dates. Previously orals had to be waived because of the unavailability of examiners who were usually out of the country. With online oral defence, attendance can be from any part of the world".

Of the 13 responses received from Cohort 1, 6 indicated that the doctoral students' thesis defence or viva was held online, while 7 said it took place face-to-face. In one case the chancellor of the university had given special authorisation to do so. In all cases precautionary measures (presence of sanitiser or request to wash hands at the entrance of the venue,

temperature checking prior to entering the venue, less than 20 people attending, social distance of at least one metre, obligatory wearing of a facemask) were in place. Other changes took place in how the defence was conducted. One of the study participants indicated that students had to prepare a presentation with a voice-over and send it in. This allowed the panel to go through it in their own time. Then there was a shorter synchronous presentation and discussion on Blackboard Collaborate where people could, for instance, pose questions.

Nineteen Cohort 2 respondents shared their thoughts about online defences. Notably, similar to Cohort 1, these were done over Zoom or other online platforms. For most respondents this was new and brought with it challenges of connectivity, for example, or that the students were not used to this (one respondent noted that a dry or trial run was undertaken before the actual defence) or that the examination committee was not used to this (in one case, the committee members received training on how to use Zoom before the actual defence date). Such challenges were already noted in other parts of the world (see, for example, Salihbegovic & Ribic, 2008). For some institutions this was already the case pre-pandemic as using virtual platforms ensured the participation of international supervisors and/or examiners in the examination process or even during the proposal presentations or progress reporting (so, earlier in the doctoral students' journey). One participant noted that "Zoom and other virtual means are more effective than face-to-face" (unfortunately, the respondent did not qualify that statement).

As Morley *et al.* (2002; cited in Watts, 2012: 376) noted, oral examinations are variable in form and conduct, so there is nothing peculiar about a shift in mode of delivery (online versus face-to-face). However, this should have an impact on the way supervisors prepare their doctoral candidates for this part of the journey.

11. Student progress during the pandemic

Linked to the questions regarding frequency of interaction and tools used to supervise students, an additional question sought to find out how supervisors viewed their students' progress. Overall, respondents had this to say about their students' progress during the pandemic: for Cohort 1, a large portion of the students, 40,9%, as reported by the study participants, progressed at a slower pace during the pandemic, while for Cohort 2, interestingly, they seemed to be more performant (their progress was more intense). For Cohort 2 almost one third indicated that progress was faster, one third that progress was similar to what occurred before the pandemic, and one third that progress was slower. Several Cohort 1 participants indicated that the intensity of the progression varied from student to student.

It is thus difficult to generalise the data from this theme on student progress. The responses to the open-ended questions (qualitative) are helpful when it comes to interpreting the indecisive nature of the quantitative data. This is what one respondent had to say: "My students had very different experiences and their progress showed it. Students with additional work (for example moving from face-to-face to online teaching very quickly and without sufficient support) or child care responsibilities had less time while others working from home progressed quickly" (Cohort 2). The comment is noteworthy as it points to individual differences, personal challenges and the need for individual and flexible learning paths in postgraduate supervision. Thus, caution should be exercised in not approaching supervision in a rigid manner. Many doctoral study programmes are already quite flexible in nature, but probably more should be done to ensure that differing approaches and circumstances allow more people to proceed with this type of studies.

12. Recommendations

Infrastructure, connectivity and access are all elements that need to be improved for staff and students for postgraduate supervision to continue online during (and beyond) the pandemic. Additional research is needed in the area of how supervisors can prepare their students for online interactions and defences. Frequency and means of interaction have an impact on doctoral student commitment and persistence (Jones, 2011; Lovitts, 2001; Kurtz-Costes *et al.,* 2006). Frequent interaction between supervisor and supervisee is important. Quality assurance aspects need to be revised and/or implemented to address frequency and quality of supervision. Creating a structured model to assist advisors in providing feedback, both in terms of academic research and relationship management, may be helpful.

Research on how the quality of the supervisory relationship affects students' anxiety, stress and wellbeing (such as that undertaken by Stubb *et al.,* 2011) should be envisaged, especially during a pandemic such as the one brought about by COVID-19. According to Pyhältö *et al.* (2012), doctoral students who experienced supervisory problems reported higher anxiety and emotional exhaustion, while Rigg *et al.* (2013) found that advisor support significantly reduced emotional exhaustion among American graduate students. Supervisors need to be trained and supported to provide holistic support that goes beyond academic support and supports student wellbeing. It has to be noted that with doctoral students experiencing psychological distress six times higher than the general population (Barry *et al.,* 2018) and one in three being at risk for a common psychiatric disorder (Levecque *et al.,* 2017) before the pandemic, it is important to explore the impact of COVID-19 on their wellbeing and mental health, as well as on that of their supervisors.

13. Study limitations

This small-scale study focused on the point of view of the supervisors. This meant that no input was received from the supervised students. Further research, such as Sokhulu's 2020 study entitled "Students' experiences of using digital technologies to address their personal research needs during the COVID-19 lockdown", is necessary to complement the current study. Additional follow-up studies looking at how students perceived the impact of the pandemic on the way/frequency they were supervised during their doctoral studies would be useful to provide a more balanced picture of the phenomenon and impact research output (Halbert, 2015).

In addition, the study was undertaken soon after the start of the first lockdown (March 2020). Supervisors and supervisees had to improvise and rapidly implement ways and means to deal with the changed environment for their interactions. It remains to be seen whether, close to two years after the onset of the pandemic, the situation has further transformed, whether other tools are now used and whether the frequency of interactions between supervisor and supervisee has undergone additional shifts. In this area too, further research is required.

It would further be useful to study completion rates to compare what supervisors thought their students' progress was to what really occurred. It would be vital too to look at how pre-COVID-19 distance education and online doctoral studies programmes assure their quality when it comes to frequency of interaction between supervisor and supervisee. Heeralal's (2016) case study on improving postgraduate supervision in an Open and Distance Learning (ODL) environment would be a good starting point.

14. Conclusion

The current study's major research questions were whether the pandemic brought about a transformation in the way Master and doctoral students are supervised. The data collected from the online survey administered to doctoral studies' supervisors suggests that there has been a change in frequency and means of supervision, that there is more reliance on videoconferencing tools and interaction "at a distance". However, the impact on student progression is less clear and the data cannot conclusively confirm that there has been a significant transformation in the way students are supervised because many participants seem to indicate their wish to return to the way things were done pre-pandemic. Nevertheless, there will probably be more reliance on social media, email and other online tools such as Zoom and Skype post-pandemic. In the words of the study participants, "online supervision is developing" and "the pandemic has also given us more tools of engagement, which is good". In addition to what Wu *et al.* (2020) describe as "organizational agility" which is the basis for the success of the transition to online teaching and learning, supervisors and supervisees require "personal agility" as COVID-19 is a global pandemic that might be with us for a long time to come (and even if it ends, there will always be other pandemics as history has shown us).

References

Annamalai, N. 2019. Using WhatsApp to extend learning in a blended classroom environment. *Teaching English with Technology*, 19(1): 3-20.

Asiimwe, J.A. 2019. Understanding doctoral supervision: Concepts and experiences of selected supervisors and PhD graduates in Uganda. *MIER Journal of Educational Studies Trends & Practices*. 9(2): 134-146.

Bair, C.R. & Haworth, J.G. 2005. Doctoral student attrition and persistence: A meta-synthesis of research. In J.C. Smart (Ed.). *Higher education: Handbook of theory and research* (pp. 481-534). The Netherlands: Springer. https://doi.org/10.1007/1-4020-2456-8_11

Barry, K.M., Woods, M., Warnecke, E., Stirling, C. & Martin, A. 2018. Psychological health of doctoral candidates, study-related challenges and perceived performance. *Higher Education Research & Development*, 37(3): 468-483. https://doi.org/10.1080/07294360.2018.1425979

Bastola, M.N. & Hu, G. 2021. Supervisory feedback across disciplines: does it meet students' expectations? *Assessment & Evaluation in Higher Education*, 46(3): 407-423. https://doi.org/10.1080/02602938.2020.1780562

Börgeson, E., Sotak, M., Kraft, J., Bagunu, G., Biörserud, C. & Lange, S. 2021. Challenges in PhD education due to COVID-19-disrupted supervision or business as usual: A cross-sectional survey of Swedish biomedical sciences graduate students. *BMC Medical Education*, 21(1): 1-11. https://doi.org/10.1186/s12909-021-02727-3

Carpenter, S., Makhadmeh, N. & Thornton, L.J. 2015. Mentorship on the doctoral level: An examination of communication faculty mentors' traits and functions. *Communication Education*, 64(3): 366-384. https://doi.org/10.1080/03634523.2015.1041997

Cekiso, M., Tshotsho, B., Masha, R. & Saziwa, T. 2019. Supervision experiences of postgraduate research students at one South African higher education institution. *South African Journal of Higher Education*, 33(3): 8-25. https://doi.org/10.20853/33-3-2913

Crawford, J., Butler-Henderson, K., Rudolph, J., & Glowatz, M. 2020. COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Teaching and Learning*, 3(1): 1-20. https://doi.org/10.37074/jalt.2020.3.1.7

Creswell, J.W. & Poth, C.N. 2016. *Qualitative inquiry and research design: Choosing among five approaches*. Thousand Oaks: Sage Publications.

Cuban, L. 1986. *Teachers and machines: The classroom use of technology since 1920*. New York: Teachers College Press.

Deng, L. & Tavares, N.J. 2013. From Moodle to Facebook: Exploring students' motivation and experiences in online communities. *Computers & Education*, 68: 167-176. https://doi.org/10.1016/j.compedu.2013.04.028

Dietz, A.J., Jansen, J. D. & Wadee, A.A. 2006, *Effective PhD supervision and mentorship: A workshop based on experiences from South Africa and the Netherlands*. Amsterdam/Pretoria: Rozenberg Publishers and UNISA Press.

Dlamini, R. 2015. The role of the strategic and adaptive Chief Information Officer in higher education. *Education and Information Technologies*, 20(1): 113-140. https://doi.org/10.1007/s10639-013-9269-5

Ebert J.F., Huibers L., Christensen B. & Christensen M.B. 2018. Paper- or web-based questionnaire invitations as a method for data collection: Cross-sectional comparative study of differences in response rate, completeness of data, and financial cost. *Journal of Medical Internet Research,* 20(1): e24. https://doi.org/10.2196/jmir.8353

Erichsen, E.A., Bolliger, D.U. & Halupa, C. 2014. Student satisfaction with graduate supervision in doctoral programs primarily delivered in distance education settings. *Studies in Higher Education*, 39(2): 321-338. https://doi.org/10.1080/03075079.2012.709496

Flaherty C. 2020. *Virtual thesis defense*. Available at https://www.insidehighered.com/news/2020/03/27/rise-remote-phd-defense. [Accessed 17 April 2020].

Frederick A. 2020. *How to defend a PhD remotely*. Available at https://www.nature.com/articles/d41586-020-00971-z. [Accessed 15 October 2020].

Gardner, S.K. 2007. "I heard it through the grapevine": Doctoral student socialization in chemistry and history. *Higher Education*, 54: 723-740. https://doi.org/10.1007/s10734-006-9020-x

Ghani, F. 2020. Remote teaching and supervision of graduate scholars in the unprecedented and testing times. *Journal of the Pakistan Dental Association*, 29(S): 36-42. https://doi.org/10.25301/JPDA.29S.S36

Gohar, A.S. & Qouta, M.M. 2021. Challenges of Improving the quality of academic supervision of postgraduate studies at the Faculty of Education, Damietta University. *Journal of Educational Issues*, 7(1): 113-137. https://doi.org/10.5296/jei.v7i1.18292

Gray, M.A. & Crosta, L. 2019. New perspectives in online doctoral supervision: a systematic literature review. *Studies in Continuing Education*, 41(2): 173-190. https://doi.org/10.1080/0158037X.2018.1532405

Gumbo, M.T. 2019. Online or offline supervision? Postgraduate supervisors state their position at university of South Africa. *South African Journal of Higher Education*, 33(1): 92-110. https://doi.org/10.20853/33-1-2673

Halbert, K. 2015. Students' perceptions of a "quality" advisory relationship. *Quality in Higher Education*, 21(1): 26-37. https://doi.org/10.1080/13538322.2015.1049439

Halse, C. 2011. Becoming a supervisor: the impact of doctoral supervision on supervisors' learning. *Studies in Higher Education*, 36: 557-570. https://doi.org/10.1080/03075079.2011.594593

Heeralal, P.J. 2016. Improving postgraduate supervision in an Open and Distance Learning (ODL) environment. A case study at the College of Education – University of South Africa (Unisa). *South African Journal of Higher Education*, 29(3): 87-100. https://doi.org/10.20853/29-3-490

Henry, J.V., Winters, N., Lakati, A., Oliver, M., Geniets, A., Mbae, S.M. & Wanjiru, H. 2016. Enhancing the supervision of community health workers with WhatsApp mobile messaging: Qualitative findings from 2 low-resource settings in Kenya. *Global Health: Science and Practice*, 4(2): 311-325. https://doi.org/10.9745/GHSP-D-15-00386

Herman, C. & Meki Kombe, C.L. 2019. The role of social networks in the transitional experiences of international African doctoral students at one university in South Africa. *Higher Education Research & Development*, 38(3): 508-521. https://doi.org/10.1080/07294360.2018.1556618

Isike, C. 2018. The impact of University of Zululand structural and cultural contexts on postgraduate supervision practice (2011–2016). *Africa Education Review*, 15(2): 112-130. https://doi.org/10.1080/18146627.2017.1341292

Ives, G. & Rowley, G. 2005. Supervisor selection or allocation and continuity of supervision: Ph.D. students' progress and outcomes. *Studies in Higher Education*, 30: 535-555. https://doi.org/10.1080/03075070500249161

Jili, N.N. & Masuku, M.M. 2017. Supervision as a tool of producing independent researchers: Reflecting on supervision processes. *International Journal of Sciences and Research*, 75(8): 339-350.

Jowi, J.O. 2021. Doctoral training in African universities: recent trends, developments and issues. *Journal of the British Academy*, 9(s1): 159-181. https://doi.org/10.5871/jba/009s1.159

Khoza, S.B. 2017. Master of Education students' reflections: Which curriculum reasons are promoted or limited by Skype Resources? *Progressio*, 39(2): 1-19. https://doi.org/10.25159/0256-8853/2405

Klar, S. & Leeper, T.J. 2019. Identities and intersectionality: a case for purposive sampling in survey-experimental research. In P.J. Lavrakas, M.W. Traugott, C. Kennedy, A.L. Holbrook, E.D. de Leeuw & B.T. West (Eds.). *Experimental methods in survey research: techniques that combine random sampling with random assignment* (pp.419-433). Hoboken, NJ: John Wiley & Sons Inc. https://doi.org/10.1002/9781119083771.ch21

Koen, C. 2007. *Postgraduate student retention and success: A South African case study.* Cape Town: HSRC Press.

Kohut, A., Keeter, S., Doherty, C., Dimock, M. & Christian, L. 2012. *Assessing the representativeness of public opinion surveys*. Washington, DC: Pew Research Center.

Kumar, S., Pollard, R., Johnson, M. & Ağaçlı-Doğan, N., 2021. Online research group supervision: Structure, support and community. *Innovations in Education and Teaching International*, 58(6): 647-658. https://doi.org/10.1080/14703297.2021.1991430

Lee, A. 2008. How are doctoral students supervised? Concepts of doctoral research supervision. *Studies in Higher Education*, 33: 267-281. https://doi.org/10.1080/03075070802049202

Levecque, K., Anseel, F., De Beuckelaer, A., Van der Heyden, J., & Gisle, L. 2017. Work organization and mental health problems in PhD students. *Research Policy*, 46(4): 868-879. https://doi.org/10.1016/j.respol.2017.02.008

Li, S. & Seale, C. 2007. Managing criticism in PhD supervision: A qualitative case study. *Studies in Higher Education*, 32(4): 511-526. https://doi.org/10.1080/03075070701476225

Lim, J., Covrig, D., Freed, S., De Oliveira, B., Ongo, M. & Newman, I. 2019. Strategies to assist distance doctoral students in completing their dissertations. *International Review of Research in Open and Distributed Learning*, 20(5): 192-210. https://doi.org/10.19173/irrodl.v20i5.4532

Madge, C., Meek, J., Wellens, J. & Hooley, T. 2009. Facebook, social integration and informal learning at university: It is more for socialising and talking to friends about work than for actually doing work. *Learning, Media and Technology*, 34(2): 141-155. https://doi.org/10.1080/17439880902923606

Manderson, L., Bondjers, G., Izugbara, C., Cole, D.C., Egesah, O., Ezeh, A. & Fonn, S. 2017. Enhancing doctoral supervision practices in Africa. *Journal of Higher Education in Africa/Revue de l'enseignement supérieur en Afrique*, 15(2): 23-40.

Mason, M.M. 2012. Motivation, satisfaction, and innate psychological needs. *International Journal of Doctoral Studies*, 7: 259-277. https://doi.org/10.28945/1596

Molassiotis, A., Wang, T., Hoang, H.T.X., Tan, J.Y., Yamamoto-Mitani, N., Cheng, K.F., Tuazon, J.A., Kunaviktikul, W. & Suen, L.K. 2020. Doctoral nursing education in east and Southeast Asia: characteristics of the programs and students' experiences of and satisfaction with their studies. *BMC Medical Education*, 20: 1-12. https://doi.org/10.1186/s12909-020-02060-1

Motala, S. & Menon, K. 2020. In search of the "new normal": Reflections on teaching and learning during Covid-19 in a South African university. *Southern African Review of Education*, 26(1): 80-99.

Mpungose, C.B. 2020. Beyond limits: Lecturers' reflections on Moodle uptake in South African universities. *Education and Information Technologies*. 4: 1-20.

Mullen, C.A. 2020. Online doctoral mentoring in a pandemic: help or hindrance to academic progress on dissertations? *International Journal of Mentoring and Coaching in Education,* 10(2): 139-157. https://doi.org/10.1108/IJMCE-06-2020-0029

Ndayambaje, J.B. 2018. PhD supervision challenges in developing countries: Case study in East Central Africa. *International Journal of Research in Economics and Social Sciences*, 8(5): 1-6.

Ngulube, P. & Ukwoma, S.C. 2019. Mapping supervision trends in doctoral research in library and information science in Nigeria and South Africa: Implications for collective learning. *African Journal of Library, Archives & Information Science*, 29(1): 1-16.

Nsereko, A.K.N. 2019. Doctoral supervision a challenge in universities: The Context of the sub-Saharan African universities. *Islamic University Multidisciplinary Journal*, 6(3): 58-63.

Nurie, Y. 2018. Higher education supervision practices on student thesis writing: Language function and focus of written feedback. *International Journal of Teaching and Learning in Higher Education*, 30(3): 522-553.

Paula, J.R. 2020. Lockdowns due to COVID-19 threaten PhD students' and early-career researchers' careers. *Nature Ecology & Evolution,* 4(8): 999. https://doi.org/10.1038/s41559-020-1231-5

Phillips, L.A., Logan, J.N. & Mather, D.B. 2021. COVID-19 and beyond: Telesupervision training within the supervision competency. *Training and Education in Professional Psychology,* 15(4): 284-289. https://doi.org/10.1037/tep0000362

Prinsloo, P. 2016. A socio-critical model for understanding and predicting postgraduate student success. In M. Fourie-Malherbe, R. Albertyn, C. Aitchison & E. Bitzer (Eds.). *Postgraduate supervision: Future foci for the knowledge society* (pp. 85-98). Stellenbosch: Sun Media. https://doi.org/10.18820/9781928357223/05

Putri, S.E., Hamuddin, B., Nursafira, M.S. & Derin, T. 2020. Discourse analysis in e-learning-based course using Moodle platform: An experimental design. *REiLA: Journal of Research and Innovation in Language*, 2(1): 19-26. https://doi.org/10.31849/reila.v2i1.3960

Pyhältö, K., Vekkaila, J. & Keskinen, J. 2015. Fit matters in the supervisory relationship: Doctoral students and supervisors' perceptions about the supervisory activities. *Innovations in Education and Teaching International*, 52(1): 4-16. https://doi.org/10.1080/14703297.2014.981836

Ribau, I. 2020. The drop effect at the doctoral supervision sea surface: Observing the waves with the supervisor lens. *Universal Journal of Educational Research*, 8(4): 1579-1595. https://doi.org/10.13189/ujer.2020.080452

Salihbegovic, A. & Ribic, S. 2008. Defending a PhD thesis over the Internet: Challenges and obstacles. *Proceedings of the ITI 2008-30th International Conference on Information Technology Interfaces*, Cavtat, Croatia. https://doi.org/10.1109/ITI.2008.4588471

Sokhulu, L.H. 2020. Students' experiences of using digital technologies to address their personal research needs during the COVID-19 lockdown. *African Identities*, 1-17. https://doi.org/10.1080/14725843.2020.1801384

Stevens, D.D., Chetty, R., Bertrand Jones, T., Yallew, A. & Butler-Henderson, K. 2021. Doctoral supervision and COVID-19: Autoethnographies from four faculty across three continents. *Journal of University Teaching & Learning Practice*, 18(5): article 6. https://doi.org/10.53761/1.18.5.6

Stubb, J., Pyhältö, K. & Lonka K. 2011. Balancing between inspiration and exhaustion: PhD students' experienced socio-psychological well-being. *Studies in Continuing Education*, 33(1): 33-50. https://doi.org/10.1080/0158037X.2010.515572

Suparman, U. 2021. The implementation of the online thesis supervision during pandemic covid-19 at one of graduate and postgraduate programs in Indonesia. *AKSARA: Jurnal Bahasa dan Sastra,* 22(1): 43-53. https://doi.org/10.23960/aksara/v22i1.pp43-53

Tatnell, R. 2020. Research supervision for online students – What makes a good online research relationship? In S. McKenzie, F. Garivaldis & K.R. Dyer (Eds.). *Tertiary online teaching and learning* (pp. 277-284). Singapore: Springer. https://doi.org/10.1007/978-981-15-8928-7_27

Watts, J.H. 2012. Preparing doctoral candidates for the viva: issues for students and supervisors. *Journal of Further and Higher Education*, 36(3): 371-381. https://doi.org/10.1080/0309877X.2011.632819

World Health Organization (WHO). 2020a. *Novel coronavirus (2019-nCoV) Situation Report 1.* Available at https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200121-sitrep-1-2019-ncov.pdf?sfvrsn=20a99c10_4. [Accessed 21 January 2021].

World Health Organization (WHO). 2020b. *Coronavirus disease 2019 (COVID-19) Situation Report 51.* Available at https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200311-sitrep-51-covid-19.pdf?sfvrsn=1ba62e57_10. [Accessed 11 March 2021].

World Health Organization (WHO). 2020c. *Coronavirus disease 2019 (COVID-19) Situation Report 81.* Available at https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200410-sitrep-81-covid-19.pdf?sfvrsn=ca96eb84_2. [Accessed 10 April 2021].

World Health Organization (WHO). 2020d. *Coronavirus disease 2019 (COVID-19) Situation Report 151.* Available at https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200619-covid-19-sitrep-151.pdf?sfvrsn=8b23b56e_2. [Accessed 19 June 2021].

World Health Organization (WHO). 2020e. *Modes of transmission of virus causing COVID-19: Implications for IPC precaution recommendations. Scientific brief*. Available at https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implicationsfor-ipc-precaution-recommendations. [Accessed 29 March 2021].

Wu, F., Zhao, S., Yu, B., Chen, Y.M., Wang, W., Song, Z.G., Hu, Y., Tao, Z.W., Tian, JH, Pei, Y.Y. & Yuan, M.L. 2020. A new coronavirus associated with human respiratory disease in China. *Nature*, 579(7798): 265-269. https://doi.org/10.1038/s41586-020-2008-3

Yin, R.K. 2015. *Qualitative research from start to finish*. New York: Guilford Press.