A Guiding Rubric for The Early-Career Doctoral Supervisor in Statistics

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Abstract

Industry attracts statistical science graduates away from academia, and from the pursuit of further postgraduate studies. In South Africa, the industry draw has resulted in an academic capacity-building crisis within statistical sciences, with two primary factors exacerbating the move away from academia. First, academic salaries in statistical sciences are not comparable to that of industry at the same level of qualification (especially with the growth of 'Data Science'). Second, the lack of sufficient supervisory skills and capacity, especially at doctoral level, is evident across South African Statistics departments. The discussions previously documented by the authors show that there is an urgent need for guidelines to support active early-career doctoral supervisors in South Africa. In this paper, we present a guiding rubric that has evolved from numerous discussions within a focus group of novice supervisors from South Africa. While this guiding rubric is by no means presented as a prescriptive set of rules, it aims to be a dynamic document that can be referred to by both the novice supervisor and the doctoral candidate to ameliorate potential stresses during the doctoral journey.

Keywords: Doctoral supervision; postgraduate research; statistical sciences; South Africa; data science

1. Introduction

In academic Statistics in South Africa, we are currently experiencing a relative decrease in the number of postgraduates continuing with their doctoral studies, as industry lures graduates away with more enticing salaries than academic funding can sustain. This, along with the constant stream of retirements of senior research supervisors in Statistics, has led to decreases in the demand, and in the capacity for doctoral supervision in the field. Fabris-Rotelli et al. (2022), with discussions and rejoinders, have identified areas for urgent attention to support the development of early-career doctoral supervisors for Statistics in South Africa. These areas include the identity of Statistics, funding, the thesis document, student-supervisor relationships, assessment, and supervisor growth. Fabris-Rotelli et al. (2022) proposed that guidelines be set for each of these focus areas, to be incorporated into a rubric of sorts, even though rubrics are primarily used as assessment tools. This paper introduces the guideline rubric for Statistics PhD supervision and assessment in South Africa, and as such, is a natural successor to the paper by Fabris-Rotelli et al. (2022).

Rubrics are cross-tabulations of assessment criteria against assessment standards (Sadler, 2009), and the application of a rubric construction for the entire doctoral study process is a novelty. There is extensive research on the use of rubrics in higher education for both formative and summative purposes. Rubrics assist in maintaining validity, reliability, transparency, and facilitates feedback and self-assessment (for example the meta-analyses by Jonsson and Svingby (2007), and Gallardo (2020)). Rubrics for postgraduate research have also been discussed (Prins et al., 2017; Trosset & Weisler, 2014, 2018). In our case, we are particularly interested in the ways in which student self-assessment, self-regulation, and understanding of assessment criteria are all enhanced by the use of rubrics (Cockett & Jackson, 2018). It is these qualities of rubrics that we seek to activate in our work. The publication of a transparent set of guidelines (and their varied levels of achievement) for both doctoral supervisors and students within Statistics will ease the entire PhD process. We are also interested in the conclusions of Venning and Buisman-Pijlman (2013), who note that rubrics are used for more than just standardising assessment within postgraduate research. Extending these notions, this paper is interested in the application of a rubric in a scenario that may not primarily be for assessment, one of the avenues for future research proposed by Gallardo (2020). Instead, we focus on the idea that a rubric will provide a formative list of the guidelines supporting student learning; guiding feedback provision and the demands of expected performance (amongst others), as suggested by Postmes et al. (2023).

The criteria in the guiding rubric were compiled through extensive discussions between the authors of the Fabris-Rotelli et al. (2022) discussion paper, select senior supervisors, department representatives across multiple universities, and a cohort of early-career supervisors in Statistics in South Africa. While Polkinghorne et al. (2023) comprehensively investigate ‘best practice’ for doctoral supervision in the UK in a detailed meta-analysis, the approach in this paper has been somewhat different. Focus groups and interviews were

conducted with departments in South Africa to generate the guiding rubric presented in this paper. However, it is noteworthy that both Polkinghorne et al. (2023) and our research agree on many items, and Polkinghorne et al. (2023) is recommended for wider referencing. Similarly, Chugh et al. (2022) provide an extensive literature review focusing on supervisory feedback and identify four challenges in postgraduate supervision: content, process, people, and expectations. These are indeed similar to those found by Fabris-Rotelli et al. (2022), which form the skeleton of this paper's guiding rubric. Thus, this paper includes the identity of subject field, funding, the thesis, student-supervisor relationships, assessment, and supervisor growth. However, for Statistics supervision in the South African context, the focus is on items that enable postgraduates to physically study further (like funding), and items related to student and supervisor growth, both of which are vital at this time.

It should also be noted that the proposed guiding rubric is intended for supervisors and students within statistical sciences, but can be applied to a wide range of fields including, but not limited to, applied and mathematical statistics, data science, machine learning, operations research, biostatistics or biometry, business statistics, econometrics, and psychometrics, as long as the foundation of the research is statistical in nature.

2. A Guiding Rubric

2.1 Identity crisis opportunities

The identity crises of academic Statistics should be viewed as an opportunity to build something innovative (Fabris-Rotelli et al., 2022). Thus, when a PhD candidate considers starting their studies there are a number of things to take into consideration, most likely via conversations with potential supervisors. Before registering or being admitted, a pre-registration research proposal should be designed by the candidate, which will ensure a fully committed student, an appropriate supervision team, and an earlier gained momentum for the research. This document is usually compiled independently since its primary purpose is to attract an appropriate supervisor and to display a commitment to the PhD. However, involving a supervisor or mentor in its creation could result in a better research plan. This proposal process is not enforced in South Africa due to difficulty in finding funding before being registered, and often unrealistic timelines for funding applications. In addition, to ensure success, it is important to make sure that PhD candidates have the required level of statistical and mathematical knowledge before starting the degree. Further, discussing the placement of the research within a subfield in Statistics ensures that the necessary background knowledge is met, the appropriate team of supervisors is chosen, and the topic is feasible. As part of supervisor development, early-career supervisors should engage with the South African Statistics community network to, amongst others, check feasibility if there is any uncertainty.

These pre-registration steps cannot not be discounted. The discussions convey to the student the nature and general purpose of a PhD, including a very honest discussion that just because a student is *admitted* to a PhD does not mean that they have the *ability* to complete a PhD. A decision should be made concerning part-time and full-time studies. The institution's rules regarding residency periods under each option must be consulted. It must be acknowledged that sometimes funding cannot be obtained for part-time students (or conversely, for full-time students) and that the minimum time commitment required for a PhD in South Africa is 3600 hours. This equates to 450 full days or 900 half-days.

Supervisors should not take on students with topics that are completely outside of their fields of expertise, simply for the sake of adding supervision numbers for career advancement. In Statistics, this is not always possible due to the multidisciplinary nature of the field, as well as the need for novice supervisors to build their research portfolio. In these instances, there should be adequate understanding of the risk that at some point, the supervisor's input may be limited. Such cases must be openly discussed by all parties, and help could be sought, for example, from line managers. It is imperative that experts in the proposed field of research be identified by the supervisor when needed. Within South Africa, methodological experts should be made aware of the proposed study, and they could indicate their willingness to provide quality control advice, co-supervision, or assessment.

If no pre-registration proposal is provided, it is important for students to acknowledge their interest in the topic provided by the supervisor or by the department. Since the PhD study will be the student's focus for an average of five years, their interest in the topic is important. However, students should not be pressured into working on a topic they are not interested in, and they should be willing to change topics and/or supervisors on the first annual review. Changes should be finalised no later than one year after first registration. Students with no interest in a topic run the risk of lacking motivation to complete; prolonging residency; personal priorities and circumstances may change; and mental and financial stress if the study takes longer to complete.

As part of open conversations, the expected publications from the PhD must be decided on. Some institutions have explicit rulings in terms of the number of published or 'publishable' papers produced during the degree. Even if this is not the case, there may be expectations from the involved parties. Since this is a Statistics PhD, there should be an agreement that publications be geared towards Statistics journals. However, parties must discuss that Non-Disclosure Agreements and Intellectual Property Agreements reduce the potential to publish work. Further in these conversations, as part of the required growth of an academic through the PhD (both the candidate and the supervisor), networks of experts should be developed to raise the quality (and visibility) of the degree outputs, with the burden on the supervisor to form these networks. At a minimum, the South African Statistics community should be involved in certain aspects of the study, namely in co-supervision (if necessary), quality control (ensuring that relevant experts are involved), and assessment. Of course, international academic involvement is recommended, and may even be mandated by

the institution for the panel of assessors. The supervisor should be aware of this from the outset. Students should also be encouraged to join peer networks while keeping their supervisor in the loop. Levels of achievement for items in this section of the rubric will vary from binary categorisations (decisions on part-time *versus* full-time, for example) to multiple levels (the extent of network engagement for quality control, co-supervision and/or assessment, for example).

2.2 Funding

Another important factor for a successful PhD is the availability of funding. Often graduation within a reasonable time is unlikely without the necessary financial backing. In South Africa, full-time students have access to more opportunities for financial support from funding agencies. However, in the South African context, annual funding is not sufficient to cover living expenses, and is generally only provided for three years. There are limited opportunities for part-time academic positions teaching undergraduate courses, or tutoring, to supplement funding. With part-time PhD students (if the institution allows), funding is usually less of an issue as they are often professionally employed. However, the downside of this scenario is that the candidate has less time for research, often leading to an increase in the residency period. Sometimes, a student is full-time in the first year, but later seeks and finds employment, which might necessitate part-time studies. Thus, student and supervisors must discuss the amount, type, and term of funding required for the PhD (in relation to the full-time/part-time status of the student). The risk of primary funding not meeting all the requirements of the student should be assessed. The risk of not having enough funding for a PhD can be reduced by ensuring that both the student and supervisor agree on the financial needs for degree completion. It is important to appropriately consider the student's financial management plan in a transparent manner, as a student-supervisor team. In more detail, fees and subsistence funding should be discussed, as well as other items like academic funding for conferences, *etc*. Secondary sources of funding should be considered if primary sources are time-limited. Institutional regulations concerning “over-funding” or “double-dipping” are important to consider and adhered to in South Africa. The need for funding publication costs should be considered. There may be institutional funding (possibly institutions’ libraries) for open-access or high-quantile journals, or from the supervisor’s research account, but this should be planned for. A discussion of how funding is paid out may be required; for example, as a monthly amount or one large amount. Financial management is an integral part of learning to become a successful academic, and these skills should be considered as part of graduate attributes that the PhD candidate is developing.

Writing (successful) grants is an art. By the end of a doctoral study, a graduate is expected to be comfortable writing high-quality grant proposals for their research. The first exposure to this will be the application for initial funding (grant/bursary) for PhD studies. Subsequent proposals should be improved continually as the research progresses. Then, in the event a call opens, fine-tuning of a proposal to the call's specifics can easily be made. The growth and development of this process is important for a future academic. Completed PhD

graduates must not be shy to embark on new areas of research, and grant-writing skills should be in place at this stage. Note that one way to enrich one's proposal is to link the study to a Sustainable Development Goal. It is worthwhile to find out if a candidate's institution has a scientific writer, organisation, or workshops, which can assist in preparing grant proposals.

In South Africa, the National Research Foundation (NRF) is often the first port of call for academic funding. The general NRF rubric comprises the following sections: 1) Scientific merit (rationale, approach, methodology, scientific and ethical logistics, and technical feasibility); 2) Track record (contributions to knowledge production) and the ability of the applicant to do the proposed research; 3) Equity of applicant (Race/gender) and equity of students supervised (in master's and doctoral degrees); 4) Collaboration with international and national institutional entities (appropriateness and roles clearly indicated); 5) Impact of the proposed research on the field and its wider impact in society. These items are taken from national calls for funding and are generally used for application assessment in South Africa, with slight modifications and, of course, alignment with the purpose of the call. Also available from the NRF are *Thuthuka* grants for PhD candidates who are employed as academic staff permanently or on a three-year fixed-term contract. The supervisor should mentor on how to complete such an application successfully. It is beneficial to the outcome of a proposal if the draft grant proposal is reviewed by a senior academic, particularly with regard to outcomes and budget parity. Peer-reviewed work of the team that aligns with the call proposal is also beneficial. Funders are positively influenced if there is evidence of co-funding. Once the funding award letter arrives, one needs to be vigilant about administrative details with regards to release and receiving of funds. There will be differences concerning the type of funding (for example, bursary released to the student, versus a grant ring-fenced to an entity). It may be necessary to indicate to finance that funding be ring-fenced for a purpose. Annual reporting of funding will have to completed, so flows of money (as well as research outcomes) should be well documented.

If funding cannot be obtained through sponsorships or grants, academic positions within the department should be investigated. These will expose the candidate to academia during their PhD journey. The department benefits when a process is in place whereby a contract employee pursuing a PhD can apply for a permanent position on completion. While none of the funding opportunities are guaranteed, they should be discussed. Once the PhD is completed, the department has immediate access to qualified staff, and the student is better equipped to start their academic career. While some institutions globally may not encourage hiring their own PhD graduates, this route will at least initially alleviate the supervisor scarcity experienced in Statistics in South Africa. In this section of the guiding rubric, levels of achievement are multi-category, ranging from 'not applicable', through 'partially sponsored' to 'fully funded' for specific sources of funding, or 'not applicable' through 'partially managed' to 'fully managed' for financial management discussions and administrative considerations.

2.3 The thesis document

The topic of the thesis can come from the supervisor or from the student, however, it should be developed together for the title registration document/post-registration proposal document. During the discussions of the topic, ethical clearance processes must also be discussed, paying special attention to the institution's rules. The supervisor should help the student navigate the relevant ethics approval process at their institution and/or other institutions. The supervisor should also ensure that the topic overlaps sufficiently with their expertise and whether it is necessary to include a co-supervisor, or rather not take the topic on at all. The institution's research mandate should be acknowledged, along with the Singapore Statement on Research Integrity (Resnik & Shamoo, 2011), which is a global movement toward promoting ethical conduct among scientists around the world. These four guiding principles should be acknowledged by both the student and supervisor.

The supervisor and student must have an initial discussion about research and scientific misconduct in terms of fabrication, falsification and plagiarism in all aspects of the PhD process. The student must be made aware of the serious consequences of misconduct and supervisors have the responsibility to guide students throughout the whole process. We recommend the following guideline for the electronic Turnitin report on plagiarism: have no more than 2% from one source, and less than 20% overall, with no blatantly plagiarised sections.

The format of title registration document and the format and length of the post-registration proposal therein will depend on the requirements set out by the university. We recommend that title registration be done early on in the PhD degree (*i.e.*, within the first year). Assessors can be added and titles can be amended at a later stage. Titles are stored on a database for years in the South African higher education system, and so ownership of the topic in the research field is established.

Discussions on the format of the thesis should be done at the start of the research process. This decision will form part of the expected deliverables and outcomes of the student. The supervisor can discuss the difference between a traditional dissertation as a monograph compared to a publication-based thesis (PBT) with the student (Frick 2016, Nygaard & Solli 2020). The PBT usually consists of 3 or more papers, written during the postgraduate studies. The final decision will be driven by factors such as full-time *versus* part-time, contact *versus* distance-learning, the type of supervisory model, the curriculum, structure of the programme, funding requirements, the candidate's abilities, partnership opportunities and the expected outcomes. However, the final product must still adhere to the requirements of the institution and the core nature and purpose of the PhD.

For the PBT, publications will have to be accompanied by an introduction to and a summary of the papers included. It can be in a "sandwich" format where the papers are bounded by the introduction and conclusion, or in the Scandinavian format consisting of a

summary thesis and the publications in the appendix. The PBT can result in shorter completion times, lower drop-out rates, and higher levels of productivity throughout the degree. It addresses the institution's publication subsidy requirements, and has the immediate benefit of accountability and quality assurance by external reviewers before the examination process, even though the thesis will still be examined as a single product. It remains the supervisor's responsibility to guide the student towards ensuring that the PhD's purpose is addressed in one or more of these publications and that the overarching research contribution is appropriate and highlighted in the final submission for examination. There should be understanding that the supervisory team will advise on the journals that will be targeted for PhD publication outputs. The authorship of each publication in a PBT or those originating from the monograph thesis must be discussed and agreed upon by the supervisory team and the student. There may be institutional regulations that should be considered for authorship of student work.

The supervisors must declare appropriate external examiners for each thesis to the relevant institutional committee or department. Examiners should be selected with the same care and consideration with which co-supervisors were selected. The number of external examiners and their distribution nationally and internationally will typically be determined by the institution. However, even if the institution does not mandate it, we recommend at least one international external examiner. It is the responsibility of the student to make corrections to the final submission as recommended by the assessors. The student must commit to make these changes, otherwise the line manager cannot support the awarding of the degree. In this section of the rubric, levels of achievement indicate 'not considered', 'partially managed' and 'fully acknowledged, discussed, and managed'.

2.4 Student-supervisor relationship

A harmonious relationship between the student and supervisor is important for the success of the PhD. The expectations of each party should be clearly stated up front. The supervisor should be clear about any limitations in their workload capacity or field of expertise. The possibility of a co-supervisor should also be discussed. However, the supervisor and student must acknowledge that the co-supervisor is not brought in to take on a major portion of the workload, but rather to raise the quality of the research output. Both the student and supervisor must acknowledge the benefit of bringing in a co-supervisor to enrich the PhD study.

Although the roles and contributions of each supervisory member of the team may evolve, at the onset most of the contributions of each member should be clearly defined. The supervisory team should assist the student in developing a practical and feasible timeline, which is also a requirement of the PhD proposal. The student should be aware of the minimum term of registration as well as the time it may require to become an independent

researcher. All parties must acknowledge the institutional memorandum of understanding (MOU) between student and supervisor if there is such a document.

Right from the start of the PhD, the supervisor and student should agree on how much typesetting and non-scientific editing will be done by the supervisory team. The student's needs should be considered, acknowledging that students may require different levels of editing assistance. We recommend at least some guiding support is provided by the supervisor. Take note, if a very high level of support is provided by the supervisor, the goal is that the student eventually grows to be capable of proper academic writing by the end of their degree.

The supervisor should inform the students on what they can expect from them in terms of meetings and feedback. We recommend a two-week turnaround of feedback on moderately-sized pieces of work. The supervisors should take into consideration full-time versus part-time and distance-learning students, the power relations between student and supervisors, culture and other matters of diversity, and their roles as a knowledge creator/facilitator. Differences between the supervisors and the student in terms of culture, language, gender and age, for example, need to be acknowledged so that potential barriers are overcome for mutual understanding or even just to communicate well. The risk that such barriers may lead to miscommunications must be acknowledged. Institutional grievance procedures should be reviewed and acknowledged by the student and the supervisory team. The details of foreseeable grievances should be added to the MOU to reduce risk (for example, for submission readiness disagreements, an external reviewer could be consulted), or at least the institutional grievance procedures should be mentioned in the MOU.

The supervisory team must acknowledge that a PhD in Statistics will require statistical contributions to the relevant research fields. Publications will therefore first and foremost be of a statistical nature. Papers in other fields will be relegated in priority. Of course, it may be better (impact-wise) to publish in non-statistically-oriented science journals. However, the statistical methodological contribution needs to be acknowledged in the paper and the thesis. Levels of achievement in this section are almost all strictly binary, simply establishing or acknowledging protocols as far as each criterion is concerned.

2.5 Standardised assessment

The assessment rubric items are sourced from Trosset and Weisler (2014) and have been adapted for research in statistical fields. This section is not concerned with prescribing an assessment rubric, but is rather only meant to *identify* the commonly prescribed assessment criteria for theses, noting that each institution may have their own criteria. Thus, the criteria identified here are only meant to guide a supervisor and student towards a high-quality statistical research output, whether the degree is a PBT or full thesis. All of these items are important, and failure to address each of these outcomes will lead to a lower quality output and more negative marking from most examiners. Additionally, grading is often holistic (pass

versus fail) for a doctoral thesis, and not addressing each of the following items may result in a lower holistic grade of output. The levels of achievement in the rubric are more comprehensive than for most other sections, since achieving at higher levels will inevitably result in a more favourable assessment of the thesis. The levels of achievement include 'less than proficient / unsatisfactory', 'proficient / satisfactory', and 'outstanding', with descriptors for each.

Assessment of the research output begins with a **focal question or hypothesis,** in which the title/subject, scope, and objectives of the research thesis are clearly defined, contextualised, and scientifically founded. This is usually followed by the **rationale/motivation**, in which the gap in the research field is properly identified. Moreover, the original contribution of the research must be specified, with an explanation of how the research findings contribute to the knowledge base of the discipline. It is important to clarify whether the work or parts thereof are suitable for publication. **Scholarly context** follows, where extensive proof of sufficient knowledge, correct interpretation, and application of the relevant literature is elucidated. It is vital that current research is well placed within the current scholarship in the appropriate field(s). Very important for Statistics PhDs, the **approach/methodology** must then be appraised. For Statistics, appropriate novel research methodology needs to be applied or introduced; this should be a focal point for assessment of Statistics PhDs. Next to be assessed is the **application and/or simulation**. The proposed research methodology must be sufficiently applied; proposed techniques and analyses should be fully demonstrated. Take note that even in applied studies there may be simulation requirements for the research output as a whole, or for publications. Once the application or simulation study is assessed, assessors must consider the **interpretation/discussion of results**, ensuring that there is a display of critical thinking (evidence-based personal insight) in terms of interpretation of methodology and results. The interpretations presented and evaluated should be defended as novel in the context of authoritative published literature. Finally, **research insight/foresight** needs to be assessed. The candidate must show understanding of possible further research as well as the limitations of the doctoral study; both strengths and weaknesses of the research should be identified in an objective manner. This concludes the assessment of the theoretical content of the thesis.

As far as technical aspects are concerned, there are numerous items to consider for assessment. Attention should be paid to the **abstract, introduction, and conclusion**, ensuring that the abstract, as well as the introduction-conclusion pair, fully encapsulating the contribution of the thesis. As far as **writing mechanics and organisation** are concerned, the subject of the study should form a logical progression from the research objectives, with the chapters standing as coherent units. **Grammar and spelling,** and **language usage** should also be assessed carefully, ensuring that the thesis is free of linguistic, typographical, and stylistic (consistency) errors. **Clarity, style, and readability** are then assessed. The argument in the research thesis must be presented systematically, logically, in a well-structured and coherent

manner. Moreover, for Statistics research outputs, the style and quality of tables, illustrations and/or graphic representations should be satisfactory and in accordance with formal conventions of statistical scholarship, along with appropriate lists of figures and tables, (and potentially, algorithms), and useful and coherent appendices. We suggest that for Statistical theses, programming code is no longer included in appendices, but rather through links to code repositories or through contact with the researcher. Finally, and most importantly, **referencing** needs to be assessed carefully. References must made in a proper and consistent manner, and the format and layout of the bibliography or reference list must be correct. On a more theoretical level, assessors should ensure referencing includes the most important and recent sources, and that all needed references are provided. It is also the supervisor's responsibility that an electronic plagiarism report is conducted and attached to the thesis submission.

2.6 Supervisor growth

Supervisor growth for early-career researchers can be fast-tracked by joining research groups and building a team of local and international collaborators. These networks help in sharing new ideas about supervision, typical problems encountered, ethical considerations, and the sharing of diverse research expertise. In South Africa, the number of mid-career researchers are small compared to the incoming group of early-career academics. There is also a large contingent of experienced supervisors in the field of Statistics who are either retired or past retirement age. This creates a gap in mentoring opportunities for early-career supervisors. An alternative manner in which growth can be facilitated is to expose the young supervisor to local country-wide peer-networks and research groups, which will allow for sharing of supervision styles, skills and additional networking opportunities. These networks can also serve as one of the networks where supervisors can introduce their prospective doctoral graduates who have shown an interest to continue with academia.

Several steps can be taken by both the early career supervisor and student to encourage continuous development of an academic's curriculum vitae for future employment and promotion purposes. The maintenance and expansion of the networks they have built during their studies plays an important role in these steps, which must align with a good understanding of the relevant institutions' requirements of postgraduate students as well as an agreement between the supervisor and student of the expected outcomes. These include joining the Statistical Society's local organisation, moderating modules and lecture plans, being available for editorial purposes, and to serve as co-researcher, co-supervisor or examiner on different degree levels. Through exhibiting a willingness to assist other supervisors, an early-career academic and student can build a panel of diverse, knowledgeable and trusted external examiners that are experts in various topics. Conferences present great opportunities for both early-career supervisors and students. This networking and collaboration platform allows for sharing knowledge, new ideas, different viewpoints and the latest trends and techniques on an international scale. Conference attendance can be used to impart conference etiquette in terms of attendance of sessions and engagement with

presenters. Additionally, conferences present a good opportunity to learn proposal writing and budgeting skills when making use of travel grants. Although many opportunities may exist for doctoral students and early-career supervisors to join and use networks and build their capacity, it remains important to carefully consider the balance between academic duties and research time.

3. Conclusion

This paper has presented the content of a guiding rubric for Statistics PhD supervision, designed to assist in both supervisor and doctoral student development. This is placed in the context of academic capacity issues currently experienced in South African Statistics departments, where student and supervisor developments often occur without mentorship from senior academics. This research proposes to holistically view the entire PhD process from before registration until graduation, allowing growth for the student-supervisor team via the guiding rubric, and a horizontal network of novice supervisors maintained by the authors of Fabris-Rotelli et al. (2022) and Statistics Association of South Africa.

The guiding rubric is meant to be a dynamic document and is by no means prescriptive. A current version can be accessed here. To date, information from the authors and discussants of Fabris-Rotelli et al. (2022), numerous departmental interviews, select senior supervisors, and a cohort of early-career supervisors have been incorporated, to create guidelines similar to those proposed by Polkinghorne et al. (2023). These guidelines will be further updated in 2023 when a cohort of senior academics are formally consulted. Use and adaptations of the guiding rubric are highly encouraged.

While this guiding rubric was developed for the South African context, however, the identity of academic Statistics is under much discussion internationally due to the rise of Data Science, which is the combination of the application of statistical and mathematical models already developed, but more easily made use of due to computer access and excellent statistical software. This has resulted in the increase of departments and degrees that are labelled as Data Science, a formalisation of collaborations amongst statisticians, mathematicians, and programmers that were perhaps limited in the past. The identity of Statistics must, however, be held aloft, since the development of core Statistical methodologies are fundamental to Data Science. Thus, this guiding rubric provides a reference building block for novice Statistics supervisors to keep the identity of their field as they grow their careers. Outside of South Africa or the field of Statistics, the rubric can be easily adapted to be equally useful in other areas where academic sustainability may be an issue.

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