



# Comments: Development of an early career academic supervisor in Statistics - a discussion on a guiding rubric

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*Received: 3 Jun 2022; Revised: 5 Jun 2022; Accepted: 5 Jun 2022*

## 1 Introduction

This discussant paper provides commentary on the “Development of an early career academic supervisor in Statistics - A discussion on a guiding rubric”. Later in this discussant paper, we refer to the original work as the “discussion paper”. Our perspective is that of academic actuaries involved in undergraduate and postgraduate professional training programmes. We commend the authors on a well researched and carefully argued paper, and fully support the renewed attention that has been drawn to the crisis in statistics in South Africa. Actuarial and financial risk management programmes rely heavily on strong teaching capabilities in mathematical statistics. The local crisis in statistics could therefore also be regarded as a crisis for actuarial science and other professional statistics-based programmes, such as the qualifications offered by the Centre for Business Mathematics and Informatics (BMI) at the North-West University (NWU).

It is true that in South Africa there is increasing pressure on mathematical sciences graduates to enter the workplace rather than pursue further postgraduate studies. However, it is this demand from industry that creates interest and impetus from prospective students. Very few first-year students that enrol for a degree in the mathematical sciences do so with the vision of pursuing a career in academia. On the other hand, the high entry requirements for professional programmes, such as engineering and actuarial science, ensure a steady intake of quality mathematical sciences students, which result in a stronger pool from which academics can develop. At the NWU, fifty

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per cent of the senior academics in the statistics department (either on associate or full professor level), completed their master's degrees in BMI. In line with the views of the authors of the discussion paper, we believe that professional statistics-based programmes should be seen as allies rather than foes.

## 2 Towards increasing the pool of doctorates in Mathematical Statistics

The authors of the discussion paper allude to three doctoral programmes available to Science, Engineering and Technology (SET) candidates in South Africa, namely the traditional doctorate for academia, the professional doctorate for industry, and the publication-based doctorate. According to them, only the traditional and publication-based programmes are currently actively utilised, with many universities and faculties still opting for the submission of a full traditional thesis. The question arises as to why the professional doctorate is not more actively pursued by faculties and candidates interested in applied statistics. Although the research component of a professional doctorate should comprise at least 60 per cent of the degree, it may also include appropriate forms of work-integrated learning [1]. Students are typically experienced professionals and the research undertaken is conducted in cooperation with enterprises.

Limited funding for full-time studies and higher salaries in industry are cited in the discussion paper as two of the main contributing factors for the declining number of academic statisticians. It is our view that the introduction of a professional doctorate at statistics departments could potentially attract candidates who would not otherwise have considered PhD studies. Collaboration with industry could not only ensure relevance of the research problem, but also potentially contribute towards the funding of the qualification.

It could be argued that the option of a professional doctorate might further exacerbate the demand from industry as these candidates will hone their skills in professional problem solving rather than preparing themselves for careers in academia. We would like to argue that because the professional doctorate could potentially attract candidates who would not otherwise have considered PhD studies, the offering is likely to increase the pool of doctorates in South Africa.

[5] confirms that the university retains authority and control in professional doctorate programmes, just as it is in traditional PhD programmes. By providing a wider choice in doctoral offerings, departments stand to gain from the interplay between the discipline of scientific enquiry and problem solving, a shift in the definition of statistics anticipated by [4] even before the term "fourth industrial revolution" was coined. A larger supply of doctorates will go some way towards stabilising the pull from industry, but more importantly it will increase the supervision capacity to graduate more PhD and professional doctorate students. It also has the potential to increase the pool of skilled examiners in South Africa. A shrinking pool of experienced examiners pose the risk of "intellectual inbreeding" and the erosion of academic exploration. As an interim solution, doctoral candidates should be encouraged to rather pursue a PhD by publication or the hybrid option, where the peer-review process inherent in publishing in quality journals is

invaluable in guarding against academic herd mentality.

### 3 Support for development of a guiding rubric

In terms of [2], the defining characteristic of the professional doctorate is that it requires the “ability to integrate theory with practice through the application of theoretical knowledge to highly complex problems in a wide range of professional contexts”. The Centre for BMI has since 1998 offered a highly successful MSc programme which has at its core a mini dissertation that culminates from an industry-directed research project [3]. The designers of this programme developed a detailed procedure for conducting and executing the student projects in industry and this could potentially be used as blueprint for a professional doctorate rooted in statistical science. Specifically, the formally organised meetings (initiation, business case, project proposal and close-out) provide a framework to ensure alignment in the understanding of the research problem by the doctoral candidate, academic supervisor and client organisation.

Core to the BMI masters programme is a success matrix that must be developed for approval by the client at the project proposal meeting. The success matrix details criteria for assessment of the quality of the project deliverables and therefore provides the student with a clearly defined set of objectives and how the attainment of these objectives would be measured. We strongly agree with the authors of the discussion paper about the need for transparent, consistent and monitorable assessment criteria, and we agree that the use of a guiding rubric can assist both the PhD candidate and supervisor to align expectations. We believe the competency-based assessment rubric framework proposed by [6] can serve as an effective tool for both traditional and professional doctorates, in that it can facilitate effective self-assessment as well as transparent and constructive feedback from supervisors. The same authors argue that, by setting explicit expectations for research training, the ability of institutions to attract exceptional PhD candidates may be enhanced. Given the common goal of academia, industry, and government to increase the quantity and quality of PhD graduates in South Africa, the plea by the authors of the discussion paper for collaboration by South African institutions to develop a guiding rubric is both apt and timely.

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