



Roger Stern and David Stern

A story of a British mathematician in Africa

At first glance, as a British pure mathematician, David Stern may seem to be an unlikely champion for improved statistics education in Africa but first impressions can be misleading. He is unconventional in many ways and his varied background has enabled him to respond to local needs more than his own agenda.

His passion for Africa stems from his childhood, where he spent all of his secondary schooling in a French school in Niger. He is a digital native growing up in a household with computers around from age five, even working as a professional programmer before starting university. His University education was in mathematics, mainly in the UK but with an additional degree in Germany. His love was for the pure and abstract, though he had a broad interest in all of the mathematical sciences.

After his PhD in algebraic geometry, David then accepted a 6 month contract, in 2008, as a local lecturer, in Maseno University, one of Kenya's younger universities at the time, chosen partly because of its existing strength in Mathematics and partly because it was open to change in the way teaching was undertaken. It had recently taken the bold and novel step of insisting that all its undergraduate students (whatever their subject) were taught IT. And the time devoted to this strand was substantial.

Just after he joined he had a lunch with the Head of the Maths and Stats Department, who announced: 'It is a shame but we will have to send our applied statistics MSc students home because we don't have enough lecturers to teach them'. David responded: 'Would it help if I taught them a course?'. This was how he got involved in statistics education and it played a big role in his six months in Kenya becoming six years."

In the following years, innovation in the teaching of statistics was much of his work, starting with the MSc programme. This was a degree in Applied Statistics, but the students had no prior knowledge of any statistics package and none of the existing courses changed that. Hence the introduction of statistics software seemed an essential addition which started David on the path of innovation. The next steps followed simply from discussions with contacts about some of the more applied teaching that was happening elsewhere. This led to a number of other simple 'innovations', including introducing a series of statistical games and hosting a visiting lecturer.

David's innovation was really how these changes were integrated into the local institution. Wherever possible he involved junior lecturers with the changes he was bringing into the teaching, James Kaleli Musyoka was the keenest to embrace these innovations. This led to broader opportunities to become involved in curriculum development and while David's changes were at postgraduate level, he also supervised James and others to implement parallel changes in teaching statistics at the undergraduate level.

The most significant achievement at the undergraduate level, was the changes to the curriculum for the IT courses for all the Mathematical Science students in the University. The new courses in computing provided a range of opportunities for students to learn to work with data. This included using a spreadsheet for simple data analysis, using statistics packages, encouraging good statistical practices and elements of programming. Some of the most useful skills for graduates can be as simple as using pivot tables in Excel. These are often not taught but many potential employers across the continent expect statistics graduates to have them.

Through this process of curriculum change intertwined with improvements in the delivery David coined the phrase “Incremental Modernisation” to describe the approach taken in Maseno University.

Many of these initiatives are straightforward but this is an area where there remains so much to be done. In a recent informal survey of around 50 AIMS MSc students, top mathematical science students from 16 different African countries, few graduates, even with a statistics degree, have any real experience of dealing with data. There is a lot of talk about Africa entering into digital economies, but a substantive issue is the lack of Data skills even amongst statistics graduates.

The access to relevant data and textbooks for the African context is a problem, one which David is working to address. However there have been good free resources available for years. In particular many of David’s students and colleagues have been introduced to CAST, which had added many examples of data from Africa in 2005. This interactive textbook includes good exercises and even Moodle compatible tests. CAST is free to use, distribute and even to edit. Even so the uptake remains low.

The low uptake is easily understood in these environments because staff have very heavy loads and hence don’t have time to adapt teaching resources or even to adapt teaching to existing resources. “Making it easy” has become a catch phrase amongst David and his colleagues to remember that good ideas are not enough.

Across Africa many postgraduate degrees are taken part-time, with most students employed and many are school teachers. Most teachers take the degree to help them escape, but some are dedicated to teaching and would like to use their new skills to teach better. Zach Mbasu was one such dedicated teacher who took the initiative to engage David in initiatives with Schools. This was also a key driver in the initiative to establish a Kenyan NGO called AMI (African Maths Initiative). This developed out of a yearly “Maths Camp” given in Kenya since 2010 for school children and their teachers. It has expanded, to include maths clubs, and maths camps are now also given in Ethiopia (Bahir Dar), Ghana (near Cape Coast), Tanzania (Bagamoyo) and in the UK (London). This initiative has led to the establishment of a UK-based charity called SAMI (Supporting African Maths Initiatives), which has been supporting the expansion.

The way James and Zach used the postgraduate initiatives to impact undergraduate and school students led to a realisation that there are opportunities in Africa for research on improving teaching of statistics to be undertaken across “all academic levels”.

In 2013, Francis Torgbor, a Ghanaian student from AIMS contacted David, asking if he could supervise his MSc project He was looking for a more applied project than those that had been offered and had come across some of the

David’s previous work. Accepting indirectly led David to finally leave Kenya. This was impeccable timing as Giovanna, his wife to be, had just managed to secure a post teaching development economics there. He joined AIMS (African Institute for Mathematical Sciences), an initiative that has spearheaded an innovative MSc programme in Mathematical Sciences across Africa, and was then based in Ghana for a year. With students and centres across the continent AIMS provided a Pan-African perspective to David’s experiences. Perhaps most importantly this experience challenged him to think beyond a single institution or even country to the bigger problem.

Given the differences between African countries, reflecting on the bigger problem led David to a new conceptual approach, namely “Viral Scaling”. This brought together a lot of his previous learnings into a natural framework through which future efforts could evolve.

In 2014 he joined the Statistical Services Centre (SSC) at Reading University where he remains until December 2017. A large piece of work for SSC is offering Research Methods support for agricultural researchers in a wide range of African countries; in particular this has involved a number of trips back to Niger where he grew up. It also involved him in more conceptual discussions about development and development evaluation.

In particular the concept of principles in development resonated extremely well. The phrases, “Incremental Modernisation”, “Making it Easy”, “Across Academic Levels” and “Viral Scaling” were now more than just phrases; they were principles which can be discussed, communicated and critiqued.

His SSC work has also given him further insights into interactions between development and research and the substantive need for statistical literacy at many different levels. He now believes that research and development are being held back by statistical misunderstandings.

The realisation that African statistical literacy is a substantive development problem is part of the motivation behind the African Data Initiative (ADI), a principled collaboration which aims to make a contribution to statistics in Africa and beyond. This is a first attempt to use the principles David has been developing to guide African statistical education. Supporting ADI to take shape and get started is eating up any available time at the moment. This is much to the disapproval of his one year old daughter Anna, but it is starting to take shape—watch this space! ■

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