

**Meena Kotecha**

## Addressing mathematics and statistics anxiety

**Article (Published version)  
(Refereed)**

**Original citation:**

Kotecha, Meena (2013) *Addressing mathematics and statistics anxiety*. [Mathematics today](#) , 49 (6). p. 259. ISSN 1361-2042

© 2013 [Institute of Mathematics and its Applications](#)

This version available at: <http://eprints.lse.ac.uk/54839/>

Available in LSE Research Online: December 2013

LSE has developed LSE Research Online so that users may access research output of the School. Copyright © and Moral Rights for the papers on this site are retained by the individual authors and/or other copyright owners. Users may download and/or print one copy of any article(s) in LSE Research Online to facilitate their private study or for non-commercial research. You may not engage in further distribution of the material or use it for any profit-making activities or any commercial gain. You may freely distribute the URL (<http://eprints.lse.ac.uk>) of the LSE Research Online website.

# Addressing Mathematics and Statistics Anxiety

**A**nxiety related to mathematics and statistics is a complex issue which requires extremely delicate handling. It is usually accompanied by test anxiety because of the negative emotions learners associate with these subjects. These emotions could either be triggered by prior unpleasant learning experiences or preconceived negative notions formed outside school. The fact still remains that this anxiety continues to challenge educators across the globe.



I would argue that this is also a challenge in higher education and can dampen undergraduate students' enthusiasm to engage with mathematics and statistics courses. This can have an adverse impact on students' academic performance as well as their future careers, if it is not addressed. Further, the increasing diversity in the British university student population as a result of the high proportion of international students, widening participation and access to higher education, adds new dimensions to this challenge. This diversity of cultural, socio-economic and academic backgrounds of students manifests itself through diverse expectations and individual learning requirements that need to be carefully considered.

Communicating mathematics and statistics, especially to non-specialists, is a challenge all academics involved with teaching courses related to these disciplines face to a certain degree. It may be due to a variety of reasons and can be successfully addressed by carefully designed course material and delivery. Student focused teaching approaches may be a way forward to successfully addressing this challenge and can positively contribute to student engagement in teaching rooms. I hope to be able to make some meaningful contribution to this field by bringing in new ideas from my multidisciplinary background that includes mathematics, philosophy, psychology, sociology and anthropology.

I have developed a teaching model [1–2] that endeavours to address this challenge by promoting interaction and am delighted to report that the outcomes are extremely encouraging. One of the multi-purpose tools in this model is the use of short formative assessment questions set on previously covered material and key concepts, which I ask students (see photo) to solve by discussing with their peers. My rationale behind using short questions is that it helps to capture interest, promote dialogue and create opportunities to provide instant feedback. It is, however, important to emphatically state that the purpose of these questions is to facilitate learning and not to assess students' knowledge. This puts students in a relaxed frame of mind which helps reduce their test anxiety and promotes active participation.

Further, I use short questions to lead discussions which promote student interaction and enhance the learning climate in teaching rooms. Students become more confident as they contribute to discussions, making them receptive to new material and better able to link new concepts to their prior knowledge. It is important to ensure that feedback is positive and constructive.

There is yet another effective use of short questions which is to break the monotonous nature of lectures [1–2]. I use these at the start and half way through my lectures to keep my students energised, finally ending with a short question which extends student interaction beyond teaching rooms.

I use a student-centred approach [3] to create interest in mathematics and statistics by setting formative problem-solving assessments on scenarios that are interesting for students. My focus is

on breaking the negative patterns in students' attitudes by addressing their unpleasant associations with learning mathematics and statistics. This positively contributes to reducing their anxiety and enhancing their academic self-efficacy by improving student engagement and interaction [1–2]. It has been well received by my students as well as colleagues.

Capturing and maintaining interest, promoting engagement and enhancing interaction are important points for consideration and are not limited to first year undergraduates. My experience confirms that conscious efforts aimed at addressing these points are also appreciated by final year students who are not immune to anxiety related academic issues. Further, carefully written course material and thorough preparation ensures effective course delivery, addressing the discussed challenge in any quantitative course.

I was recently invited by the Royal Statistical Society (RSS), as one of six subject advisors, to contribute to research on the role of statistics in the A-level economics curriculum. It commenced with a seminar scheduled at the RSS on 6 March 2013 which was chaired by the lead researcher Roger Porkess FIMA. We had a lively discussion which continued after the seminar as we worked on our individual contributions.

The resulting research report 'A World Full of Data Statistics Opportunities Across A-level Subjects' was launched on 11 September this year at the Institute and Faculty of Actuaries (IoFA). The event was commissioned by the RSS and funded by the IoFA. The presentations and panel discussions focused on opportunities for statistics teaching and learning across a wide range of A-level subjects. It concluded with delegates' questions to the panel and the last question was about seeking advice on addressing statistics anxiety. Having done some work on this I felt compelled to write this article and disseminate my practice in the area.

Some of the described techniques may, in my opinion, be successfully applied to A-level teaching. The report [4] will hopefully be used to enhance statistics teaching, which may better prepare students for university programmes.

Further, I think A-level courses have an enormous potential waiting to be explored and optimised to equip students with mathematical and statistical skills in order to facilitate a seamless transition to higher education.

**Meena Kotecha CMath MIMA  
LSE**

## REFERENCES:

- 1 Kotecha, M. (2011) Enhancing students' engagement through effective feedback, assessment and engaging activities, *MSOR connections*, vol. 11, no. 2, pp. 4–6, <http://eprints.lse.ac.uk/39868/>
- 2 Kotecha, M. (2012) Teaching mathematics and statistics: Promoting students' engagement and interaction, *Economics Network*, University of Bristol, Bristol, UK, <http://eprints.lse.ac.uk/42008/>
- 3 Kotecha, M. (2012) New patterns in learning and teaching Mathematics and Statistics, STEM Annual Conference 2012, The Higher Education Academy, 12–13 April 2012, Imperial College London, <http://eprints.lse.ac.uk/43387/>
- 4 Porkess, R. (2013) *A World Full of Data Statistics Opportunities Across A-level Subjects*, Royal Statistical Society and the Institute and Faculty of Actuaries, [www.rss.org.uk/uploadedfiles/userfiles/files/A-world-full-of-data.pdf](http://www.rss.org.uk/uploadedfiles/userfiles/files/A-world-full-of-data.pdf)