



Reducing Mathematics and Examination Anxiety using the Five Question Approach.

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Mathematics anxiety is a significant issue for many students and varies from other anxieties as it is specific to mathematics. Much research has been conducted on mathematics anxiety in both teachers and students with some research providing suggestions to assist in the alleviation of mathematics anxiety including reinforcement activities, time for students to develop understanding, class discussions, formative assessment, timely feedback, and linking the level of difficulty of the questions to the students' level of understanding. Mathematics anxiety reduces working memory by diverting cognitive resources away from procedural execution thus reducing the students' ability to solve mathematical problems and an increase in performance through greater confidence could result in a reduction in mathematics anxiety.

Many current NSW mathematics classes use a traditional teaching approach with a prevalence of teaching mathematics with repetitive procedural questions, little opportunity for problem solving, a restrictive linear delivery of curriculum and not revisiting any student problem areas. The FQA was designed by the author to allow teachers to take small steps towards a change in practice without completely changing their entire approach to teaching.

The FQA consists of four procedural questions and one conceptual question. The questions are presented at the commencement of the lesson and a new set of five questions are provided every lesson. The basis for the first four questions being of a procedural nature is threefold:

- develop procedural fluency, to decrease the load on working memory
- purposely selected as direct revision and consolidation of problem areas
- prepare students for future content areas ensuring any prerequisites are covered

The first four questions are usually based on one question from the previous lesson, two questions from previous content areas, and one question preparing for upcoming topics. The procedural questions are not decontextualised right / wrong questions but the questions are carefully chosen based on student areas of difficulty as perceived by the teacher which is different to traditional teaching. The fifth question is an open ended conceptual problem solving question, on any topic, that provides the opportunity for a deeper understanding of that concept allowing students to discuss their solutions, with multiple strategies for solutions.

The restricted time frame of the linear scope and sequence fixes the time students have to develop an understanding of each topic. This may exasperate the anxiety level of many students. The FQA could change how traditional teachers teach by revising completed topic areas allowing additional time for students to develop their understanding and introducing problem solving style questions into the classroom. This change in teaching approach may then result in a decrease in mathematics and examination anxiety for some students. Many students in a classroom using the FQA have shown improvement in perceived academic performance, engagement, enjoyment, and an increase in academic performance.