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## DEVELOPING COACHES FOR MATHEMATICAL RESILIENCE: LEVEL 2

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### Abstract

The construct 'Mathematical Resilience' [1] has been developed to describe a positive stance towards mathematics that enables learners to develop approaches to mathematical learning which allow them to overcome the barriers and setbacks that are frequently part of learning mathematics for many people. A resilient stance towards mathematics can be engineered by a strategic and explicit focus on the culture of learning mathematics within both formal and informal learning environments. As part of that cultural engineering, we have developed the notion of coaches specifically to support emergent resilience. The work described here is focused on developing coaches who can work beside learners, helping them to conjecture and use resilient learning ideas when facing difficulties in mathematics. Coaches develop a culture of 'can do' mathematics which works to counter the prevalent culture of mathematics helplessness and mathematics anxiety in the general population when faced with mathematical ideas. The coaches are not required to *know the answer* but rather to know ways that might yield an understanding of the mathematical ideas involved and thus lead to an answer.

Our previous paper described the outcomes of the level 1 course, in which participants became skilled at peer-coaching. This paper discusses the outcomes of a second pilot course (Sept to Nov 2013) designed to develop 'coaches for mathematical resilience' at level 2, equipped to work with learners under the direction of a mathematics tutor outside the course.

The 10 participants at Level 2, who regularly work with apprentices, both young and more mature, in a work-based environment continued with part 2 of the programme because of the positive outcomes from level 1. In the Level 1 course, they had worked to develop their knowledge of how to overcome deep seated antipathy to mathematics in themselves and in those with whom they work.

The data confirms that once an individual has begun to develop their own personal mathematical resilience, worked through their own anxieties and negative stance towards mathematics in a safe and collaborative environment, they can then successfully coach learners to develop as resilient learners of mathematics. They become able to help those learners to find or develop the resources and skills to overcome their own barriers to learning mathematics and to manage any anxiety that may be engendered. Importantly, when the coach learns not to take any responsibility for the mathematics, but rather to focus on the learning skills and well-being of the learner, learner outcomes are improved.

Keywords: mathematics anxiety, learned helplessness, mathematical resilience, coaching