**ACTION ENQUIRY** **9th June 2017**

## Title of action enquiry

**Aberdeenshire Educational Psychology Service**

Evidencing the impact of growth mindset teaching and learning approaches on children's engagement, enjoyment and attitude towards mathematics at secondary education level.

## What did we ask? (Research questions)

Will an increase in teachers' knowledge and understanding of growth mindset influence their teaching and learning approaches in secondary schools? Specifically, will it impact on reported levels of engagement, enjoyment and attitude towards mathematics as perceived by learners?

## What is the Evidence Base?

Over the past few decades there has been a gradual increase in the perceived value of practitioner research within an educational context. Donaldson (2011) highlighted practitioner enquiry as a way to support career long professional learning that engages teachers with research that will, ultimately, have a significant impact on children's learning.

There is an increased motivation for better self-evaluation, driven by How Good Is Our School 4 (HGIOS4) (Education Scotland, 2015). Teachers are expected to be evaluating the impact of their teaching and using evidenced based approaches in their classrooms. Some of the benefits of practitioner enquiry have been highlighted as the opportunity to strengthen the profession's evidence base and develop research that is more relevant to educational practitioners. It encourages practitioners to challenge previously held assumptions about what works in education, it supports practitioners to develop new knowledge and skills, and it can encourage collaboration between schools and school leaders that supports systemic change (Hitchcock and Hughes, 1995), (Murray and Lawrence, 2000), (Coleman, 2007).

The Scottish Government acknowledged the importance of raising attainment for all children and young people in their report Delivering Excellence and Equity in Scottish Education (Scottish Government, 2016). However, local and national data shows a noticeable decrease in children's attainment in mathematics as they progress through school, especially from P7 to S2. In addition, children at this stage show decreased enjoyment and engagement with mathematics.

Children's mindset, in relation to intelligence and learning has been shown to have a significant impact on how they view effort, how they respond to challenge, mistakes and feedback, which in turn impacts on what they achieve in school (Dweck, 2017).

Boaler (2013) argues that students often have more of a fixed mindset towards mathematics than other subject areas. It is suggested this may be due to mathematics tasks frequently involving closed short questions which have a right or wrong answer, with little scope for exploring different ways to use number. She argues that fixed ability approaches to teaching mathematics limits pupils' attainment and increases levels of inequality.

Dweck proposes a more positive viewpoint and has shown that mindsets can be changed. By teaching children and adults about the brain and its huge potential, by teaching them about how we learn and the different mindsets, people can become more aware of when they have a fixed mindset and be taught strategies to overcome this (Dweck, 2017).

There is an increasing amount of evidence showing that mindsets play a key role in numeracy achievement (Good, Aronson & Inzlicht, 2003; Hart, 2016). In one study, Blackwell, Trzesniewski and Dweck (2007) found holding a growth mindset belief predicted an upward trajectory in grades in individuals over two years and led to them employing more positive, effort-based strategies in response to setbacks. Moreover, data collected by PISA show that students with growth mindsets are the highest achieving in numeracy in the world (PISA, 2012 cited in Boaler, 2016).

## What did we do?

1. As a working group of educational psychologists we gathered the principal teachers of mathematics from all secondary schools in Aberdeenshire together and shared the concept of the mathematics and mindset project with them.
2. Mindset input was delivered by the mathematics and mindset working group psychologists to all mathematics departments with varying numbers of staff per department attending.
3. Any mathematics department showing an interest had an individual meeting with their school educational psychologist and one of the psychologists from the Mathematics and Mindset working group to consider what research questions they might ask in their school and consequently what research projects might come from this.
4. We have now supported several projects which are in their infancy in different mathematics departments.
5. We developed research leaflets and shared these with all interested schools.
6. We have developed a resource list and again, this has been shared with all interested schools.
7. We have shared what has been done so far and the inputs given to the mathematics staff with the rest of educational psychology service team.

## What did we do?

8. Copies of the following materials can be found at
   PDF file: Research in schools leaflet (606 KB)
   PDF file: How to carry out research in schools (772 KB)

## What have we found so far?

- Initially, there was a very low level of mindset awareness within the mathematics staff and we found they gave very honest responses when asked about this.
- We have found a mixed level of engagement in the project between different schools.
- We have found that some schools have shown a great deal of willingness to try new ideas and new projects.
- We have found that staff like a pre-prepared package on which to hang their research, such as the 'Brilliant Brain' material or Jo Boaler's 'Week of Inspirational Maths' week resource.
- We have found that mathematics staff would appear to need more input from Educational Psychology Services or other sources about growth mindset and practitioner enquiry before they feel confident to take forward any work independently.
- We have found that there is a lack of use of any poverty data and a need to support staff with the use of other kinds of data to inform practice.

## What do we plan to do next?

- We will continue to update our audit of which schools are doing which projects and which stage they are at with their research.
- We will continue to support schools in going forward with any projects by providing information and resources, helping them to think about data gathering, supporting analysis of data and write up work. We will support them with wider dissemination of their projects.
- We have arranged to hold a focus group with senior secondary students at one academy to gather more data in relation to our research questions and to support them with wider dissemination of their project.
- We will continue to work with the whole EPS to look at data gathering, analysis and how to support the use of this in our schools.

## References

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## For further information and materials

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