Grit² : Getting Gritty in Mathematics!

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The Research Question

How can participation in a self-differentiated Mathematics programme foster academic resilience strategies in Year 3 boys?

Introduction

One of the current problems children face today is that they often avoid or are protected from experiencing failure and therefore have fewer opportunities to develop academic resilience strategies. (Hoerr 2013, Tough 2012, Ginsburg 2011, King 2013). Engaging students in tasks that involve elements of risk, error, learner autonomy and tenacity are often promoted as powerful methods for facilitating learning. However, more guidance is needed for teachers on ways to support young learners who lack the resilience to persevere with such tasks, and who are often frightened to fail. This action research study investigated whether participation in self-differentiated mathematical investigations can foster academic resilience strategies for boys aged 7-8 years old.

'Success is not final, failure is not fatal: it is the courage to continue that counts.'

Winston Churchill

Research Context

Dulwich Prep London is an independent preparatory school located in South East London, England, in the United Kingdom. Predominantly a school for boys, (there are girls enrolled in the Early Years section only), the school has over 820 students ranging from ages 3-13.

Participants

The participants were 17 Year 3 boys aged between 7 and 8 years old.

'Believe you can do anything.'

'When you fall, always bounce back.'

'Don't give up, try your best.'

'Why stop?'

The Research Action

The word resilience was introduced and explored, and the boys created grit slogans to define what the word meant to them.
Mathematical investigation cards were presented to the boys in three colour levels of difficulty: green, yellow and orange (green being the easiest, then orange, then red being the most challenging.) The boys could choose their own investigation level to work on; recording their observations and workings on a rating sheet. They rate' the problem on its level of difficulty out of 1-10 (1 easiest-10 the hardest.) Growth mindset principles (Dweck, 2007) were implemented into teacher marking and feedback strategies.

Data Collection

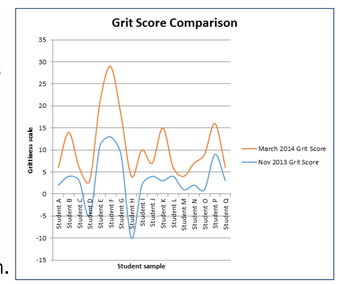
- Grit Survey (both pre and post intervention)
- Grit slogans created by students
- Teacher observations recording software
- Student interviews
- Student recording sheets

Data Analysis

Results of the pre and post grit surveys were compared to analyse changes in the students levels of resilience. Each of the 10 grit survey questions was compared from pre and post results, and data was displayed in the form of bar graphs. Grit slogans were grouped into themes regarding common perceptions of resilience. Observations and recorded interviews were transcribed into word documents. These data and the students comments from the mathematics investigation recording sheets were analysed and grouped into 'The Seven Traits of Productive Persistence' (Stano 2012) to identify common themes and examples of resilient language and behaviours.

Key Findings and Discussion

- Freedom of choice of task created opportunities for self-regulation (a key trait of resilience).
- Recording sheets encouraged reflection upon successes and mistakes.
- The majority of boys demonstrated an increase in grit scores after participation in the intervention.
- Many students demonstrated growth mindset and positive performance values towards learning.
- Every boy tried a challenging mathematical task at least once, regardless of whether they experienced success.
- Most boys accepted mistake making as a natural part of the learning process. This perception improved after participating in the intervention.
- Boys recognized that learning is often difficult and not always easy.
- Teacher feedback and marking practices changed as a result of the intervention.



Grittiness scale
18 and above = Extremely gritty
12-17 = Actively developing grit
Less than 12 = Early stages of developing grit

Conclusions

The outcomes of this project suggest that character skills such as grit, resilience and perseverance can be explicitly taught, influenced, adapted and improved. Fostering resilience begins with changing *how* we teach, rather than *what* we teach. We need to be living, breathing, acting examples of resilience. I encourage my peers, colleagues and the wider school community to share in this exciting learning journey and engage with and apply this insight to their own personal context. In doing so, we can help our boys to go forth in the world as the responsible, confident, caring, successful global citizens we wish them to be.

Implications for teaching practice/further research

Reflect upon teacher behaviours, feedback and marking procedures. Do they foster Growth Mindset values?
Create more opportunities for peer group tasks and reflection upon mistakes.
Give regular opportunities for students to rate the difficulty level of their work.
Provide opportunities for students to have more autonomy over their learning.
Consider rewards and sanction programmes and ask, 'Are we celebrating resilient behaviour in our schools or does everyone always get a trophy?'
Create a grit hall of fame with past pupils/ old boys/teachers names on an honour roll.
More research into student self-differentiation is needed.
What impact might ability setting have on resilience strategies?
Should school reporting systems also assess/report on character?

The greatest glory in living lies not in never falling, but in rising every time we fall

Nelson Mandela

Key Readings

Duckworth, A. L. (2013). True grit. *The Observer, 26*(4), 1-3.

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Further Information

The full report of this project and an online copy of this poster are available at http://www.theibsc.org/.