

Adults (19+) Studying GCSE Mathematics in Further  
Education (FE) Colleges in England:  
Perceptions, characteristics and examination grades  
Provisional Findings

By

Jenny Stacey

Sheffield Hallam University

[a0025098@my.shu.ac.uk](mailto:a0025098@my.shu.ac.uk)

[www.esolmaths.co.uk](http://www.esolmaths.co.uk)

Supervisors: Dr Iain Garner, Dr Peter Rowlett

# Setting the scene

- General Certificate in Secondary Education (GCSE) Mathematics: Level 2 qualification for 16-year-olds, marker exam for university entrance with Level 3 qualifications
- Non-traditional pathways into Higher Education
- 30 650 aged 19+ learners enrolled for exam in 2020 in England (Gov.UK, 2020)
- This is approx. 10% of total
- FE, 6<sup>th</sup> Form, Vocational/Specialist plus community and union provision
- Follow on from Functional Skills- funding implications for FS
- English and maths are fully funded by the government up to Level 2, FS and GCSE (but not ESOL)

## Literature review specific to the context of mathematics education

- Motivation of adults in FE contrasts with 16–18-year-olds: intrinsic vs extrinsic, mid-life changes, social and economic drivers (Tennant, 2006; Bélanger, 2015)
- Psychological aspects: self-efficacy, anxiety, links between success and confidence, low attainment and disaffection, anxiety and performance (Skemp, 1987; Evans, 2000; Dalby, 2012; Newmarch 2005; Ashcraft and Moore, 2009; Holloway, 2013)
- Older learners more anxious than younger ones (Betz, 1978; Jameson & Fusco, 2014; Watts 2011)
- Females more anxious than males (Hunt et al, 2011; Szucs et al 2017)
- Deficit view of EAL/ESOL learners (Kersaint et al,2013; Woolley, 2013)

# Data collection and analysis

- Mixed method research (Cresswell, 2014)
- Quantitative: questionnaire of 15 statements, based on AMAS (Hopko et al, 2003), with additions. Two scales, one for self-efficacy and one for anxiety
- Self-efficacy scale from 'Very confident' to 'I definitely can't do this'
- Anxiety scale from 'No anxiety' to 'Highly anxious'
- Qualitative: comments sections after each question, comments box at the end of questionnaire and interviews offered to all participants
- Analysis is thematic (Braun and Clarke, 2013), three main themes: classroom dynamics, course content and assessment, plus sub themes of statements and emergent from the comments

# Participants: numbers and characteristics

## Numbers:

- 21 participants in total, 31 questionnaire responses (10 x2), 1 interview
- Over 900 ranked responses; over 120 comments

## Characteristics:

- Split by age: 4/21 19 to 24 years, 17/21 25+
- Split by gender: 3/21 male, 18/21 female
- Split by L1 vs LX learners (Dewaele, 2018) to protect identity: 4/21 LX, 17/21 L1

## Limitations:

- Potential for volunteer bias (Spiegelhalter, 2019); small sample size; influence of the pandemic

## Self-efficacy vs Anxiety vs Grades

- Those with high self-efficacy and low anxiety tended to pass
- Those with low self-efficacy and high anxiety tended to fail
- BUT there were exceptions to both these statements!

# Self-efficacy vs Anxiety and Grades: based on median values

**High self-efficacy/Low anxiety:**

**Nine responses**

**Grades: 2 x grade 3; 3 x grade 4; 4 x grade 5+**

**High self-efficacy/High anxiety:**

**One response**

**Grades: 1 x grade 5+**

**Low self-efficacy/Low anxiety:**

**Two responses**

**Grades: 1 x grade 3; 1 x grade 4**

**Low self-efficacy/High anxiety:**

**Nine responses**

**Grades: 2 withdrawn; 4 x grade 3; 3 x grade 4**

# Findings by age, gender and first language:

N.B. Small sample size, provisional findings

- Age: 19–24-year-old learners (4/21) similar s-e, but higher anxiety, less likely to pass, one withdrew
- Gender: males (3/21) lower s-e, higher anxiety, similar pass rate, no withdrawals. Females (18/21) overall higher s-e, lower anxiety BUT the two withdrawals and the three who could not ask a question in class all female
- L1 vs LX learners: LX learners (4/21) higher self-efficacy, lower anxiety, higher pass rate, one withdrawal
- These findings contrast with some previous research



## Findings and recommendations

- Survey learners- use Abbreviated Maths Anxiety Scale or similar- little difference overall between self-efficacy and anxiety scales, but variations for individuals
- Stereotypical assumptions may be unhelpful for teachers, and learners if they encourage conformity to the stereotype (Holloway, 2013)
- Males may be just as anxious as females: they have 'failed' in the same way
- LX learners may outperform their L1 counterparts- English language vs mathematics levels
- Age is unlikely to be a marker for success or failure, but younger learners may be more at just as much or more risk- Covid pandemic: uncertainty about external examinations, reduced social contact...
- A larger research study needs doing- are these findings anomalies or not?

# Findings and recommendations

- Course content questions: fractions, percentages, algebra, charts and graphs, word problems
- Responses to course content questions very varied
- Spiky profiles, as used in ESOL/ELL/EAL teaching, are a useful way to look at these learners, all adults bring strengths and weaknesses with them, so exploit their strengths
- Word problems emerged as a significant issue: techniques used in ESOL for word problems may be helpful (Barwell, 2009)
- Peer support- helpful to know that everyone is struggling with something!
- Some learners have low self-efficacy and/or high anxiety but can still pass
- Build a community of learning for those who will benefit from it

# References

- Ashcraft, M. H., & Moore, A. M. (2009). Mathematics Anxiety and the Affective Drop in Performance. *Journal of Psychoeducational Assessment Vol 27 (3)*, 197-205.
- Barwell, R. (2009). Mathematical Word problems and Bilingual Learners in England. In R. Barwell, *Multilingualism in Mathematics Classrooms: Global perspectives* (pp. 63-77). Bristol: Multilingual Matters.
- Bélanger, P. (2015). *Self-Construction and Social Transformation: Lifelong, Lifewide and Life-Deep Learning*. Hamburg, Germany: UNESCO Institute for Lifelong Learning.
- Betz, N. E. (1978). Prevalence, Distribution, and Correlates of Math Anxiety in College Students. *Journal of Counseling Psychology Vol 25 (5)*, 441-448.
- Braun, V., & Clarke, V. (2013). *Successful Qualitative Research*. London: Sage Publications.
- Cresswell, J. W. (2014). *A concise Introduction to Mixed Methods Research*. London: Sage Publications Ltd.
- Dalby, D. (2012). From failure to functionality: a study of the experience of vocational students with functional mathematics in Further Education. *Informal proceedings: BSRLM*, 55-60.
- Dewaele, J.-M. (2018). Why the Dichotomy 'L1 Versus LX User' is better than 'Native Versus Non-native Speaker' . *Applied Linguistics*, 236-240.
- Evans, J. (2000). *Adults' Mathematical Thinking and Emotions*. London: Routledge Falmer.
- Gov.UK (1). (2020, June 22). *Education and training aim, participation and achievement demographics*. Retrieved from Statistical Data Set- Education and Training: <https://www.gov.uk/government/statistical-data-sets/fe-data-library-education-and-training>

# References

- Holloway, D. (2013). Mental health and the emotional aspects of learning mathematics. In G. Griffiths, & R. Stone, *Teaching Adult Numeracy* (pp. 257-268). Maidenhead: NRDC/Open University Press
- Hopko, D. R., Mahadevan, R., Bare, R. L., & Hunt, M. K. (2003). The Abbreviated Math Anxiety Scale (AMAS): Construction, Validity and Reliability. *Assessment: Volume 10 (2)*, 178-182.
- Hunt, T. E., Clark-Carter, D., & Sheffield, D. (2011). The Development and Part Validation of a U.K. Scale for Mathematics Anxiety. *Journal of Psychoeducational Assessment 29(5)*, 455-466.
- Jameson, M. M., & Fusco, B. R. (2014). Maths Anxiety, Math Self-Concept, and Math Self-Efficacy in Adult learners Compared to Traditional Undergraduate Students. *A.E.Q. Vol 64, 4*: 306-322.
- Kersaint, G., Thompson, D. R., & Petkova, M. (2013). *Teaching Mathematics to English Language Learners* (2nd ed.). Abingdon, Oxon: Routledge.
- Newmarch, B. (2005). *Developing Numeracy, Supporting Achievement*. Leicester: NIACE.
- Spiegelhalter, D. J. (2019). *The Art of Statistics- Learning from Data*. London: Pelican Books.
- Szucs, D., McLellan, R., & Dowker, A. (2017, September 18). *Understanding Mathematics Anxiety*. Retrieved from Nuffield Foundation: <http://www.nuffieldfoundation.org/>
- Tennant, M. (2006). *Psychology and Adult Learning*. Abingdon: Routledge.
- Watts, B. K. (2011). *Relationships of Mathematics Anxiety, Mathematics Self-efficacy and Mathematics Performance of Adult Basic Education Students*. Capella, USA: Capella University.
- Woolley, R. (2013). Language and mathematics. In G. Griffiths, & R. Stone, *Teaching Adult Numeracy* (pp. 76-90). Maidenhead, UK: Open University Press.