Adults (19+) Studying GCSE Mathematics in Further Education (FE) Colleges in England: Confidence, anxiety and performance

By

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Setting the scene

- General Certificate in Secondary Education (GCSE) Mathematics: Level 2 qualification for 16 year olds, marker exam for university entrance in tandem with Level 3 qualifications
- Traditional vs non- traditional pathways into Higher Education
- Expanding opportunities, higher earnings, secure employment in nursing, teaching, policing, social work, software development…
- Reduction in economic vulnerability
- Over 30 000 learners enrolled for exam in 2020 (Gov.UK, 2020)
- Approx. 10% of total, in colleges: FE, 6th Form, Vocational/Specialist plus community and union provision
- Follow on from Functional Skills

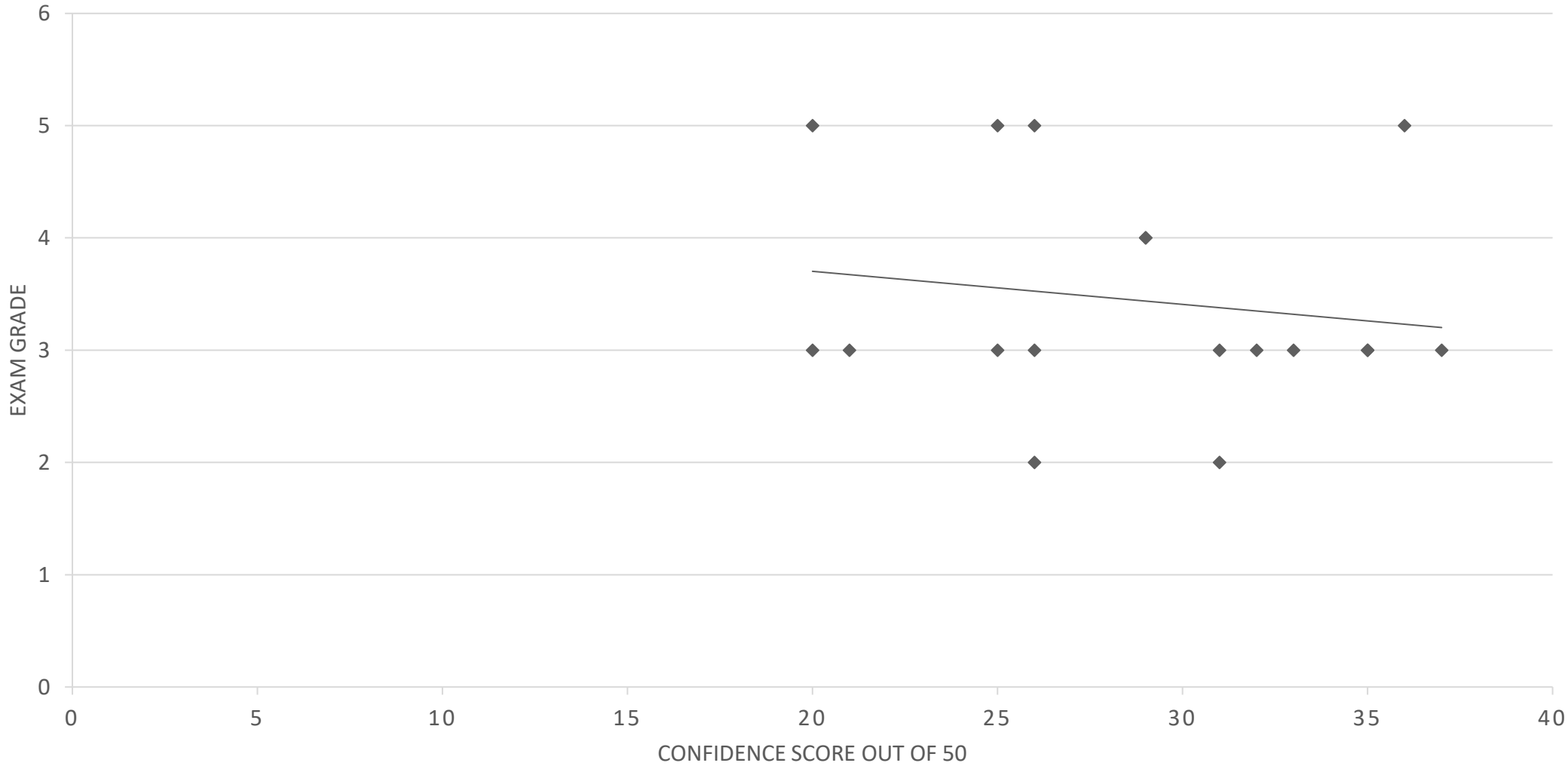
Purposes of Investigation

- To add to our understanding of the diversity of both the students and their perceptions of mathematics and examinations: are confidence or anxiety levels related to performance?
- To fill a gap in our knowledge: there is much existing work on maths anxiety for school aged children, adults in HE provision (Evans, 2000), adults on numeracy courses (Griffiths and Stone, 2013) and 16-18 year olds in FE (Dalby, 2012), but less on adults (19+) in FE provision on GCSE courses

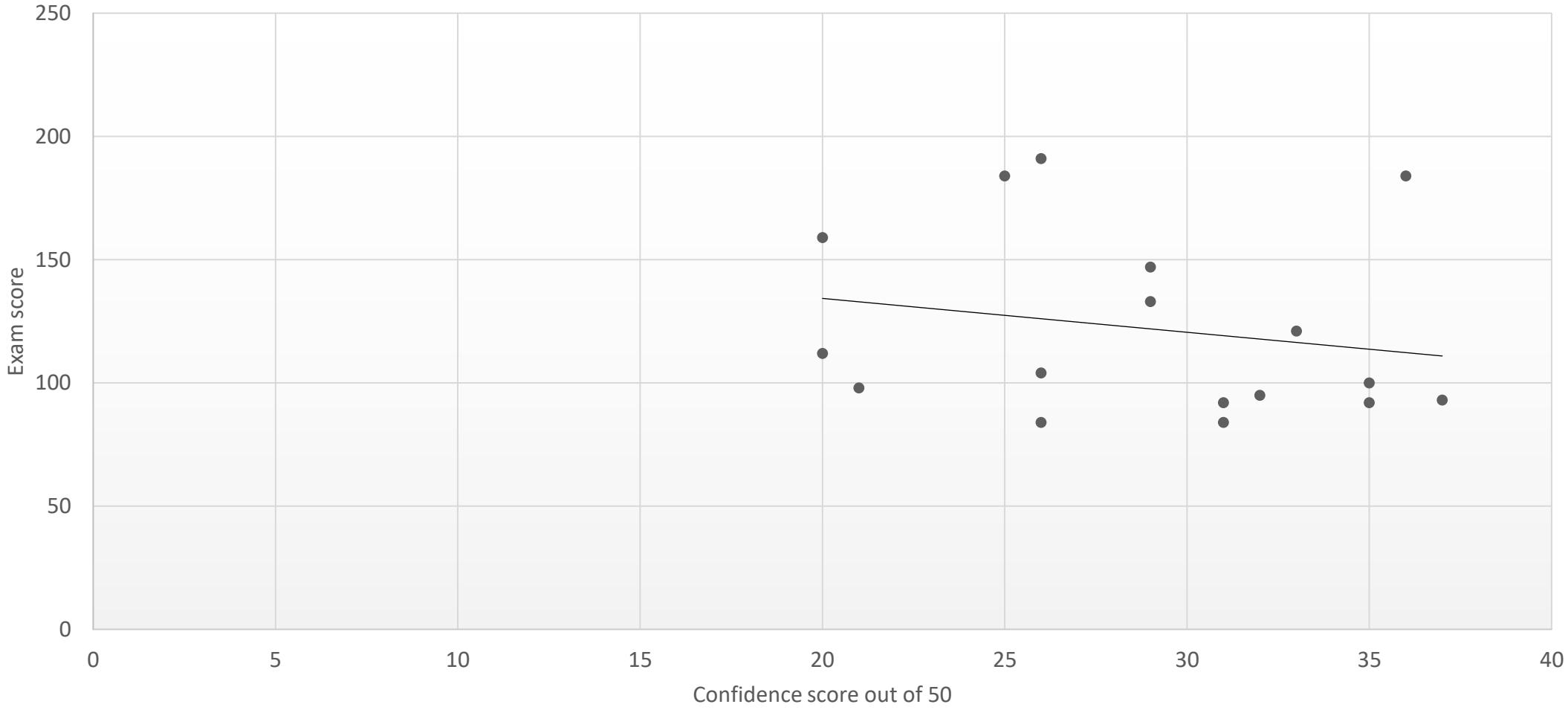
Action research project using mixed methods (Biesta, 2017)
Materials tested in pilot study

- Information letter
- Consent form
- Mathematics and Examinations Confidence Scale (MECS) questionnaire: Single Likert scale 1-5 from ‘very confident’ to ‘very anxious’ plus comments space
- Feedback form: MECS vs Abbreviated Mathematics Anxiety Scale (AMAS) questionnaires
- Feedback form: staff presentation

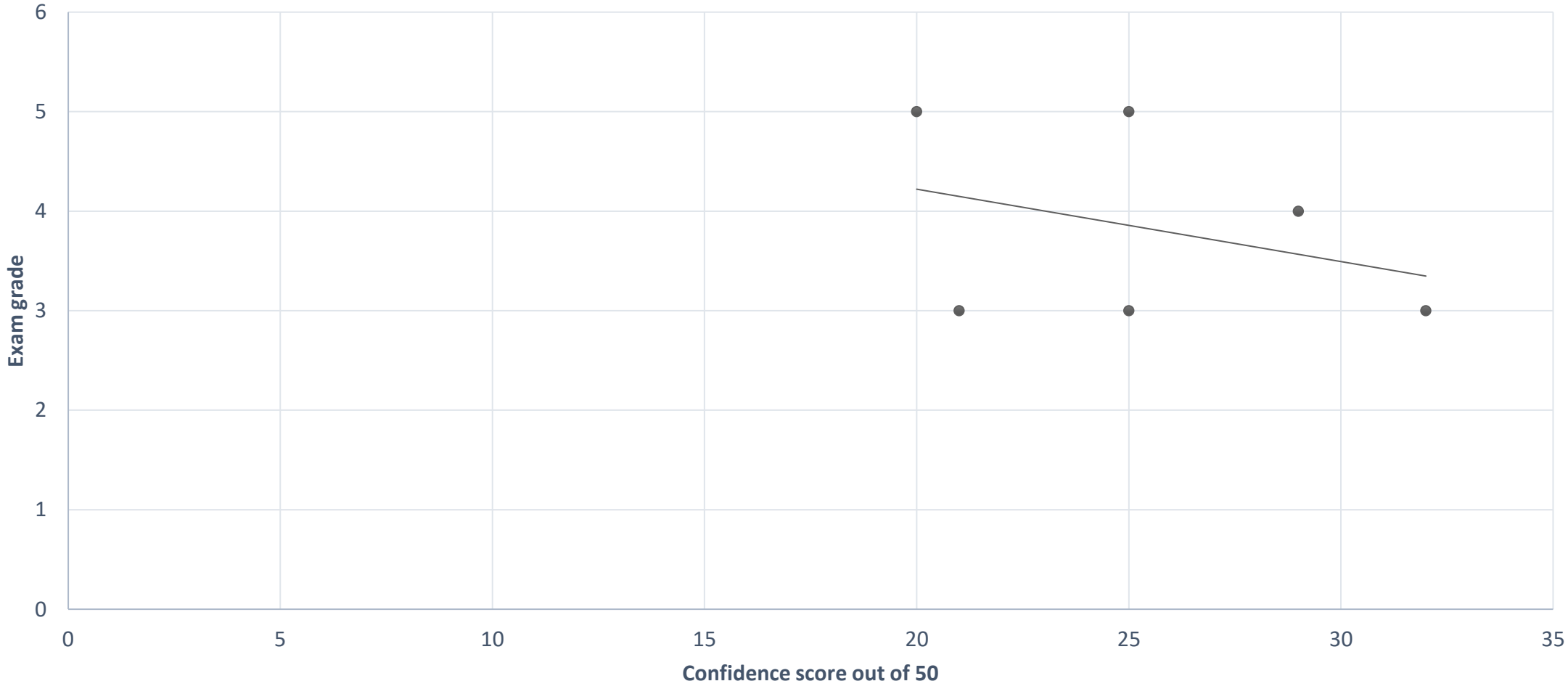
COMPARISON BETWEEN CONFIDENCE LEVEL AND EXAM GRADE FOR 18 ADULT LEARNERS



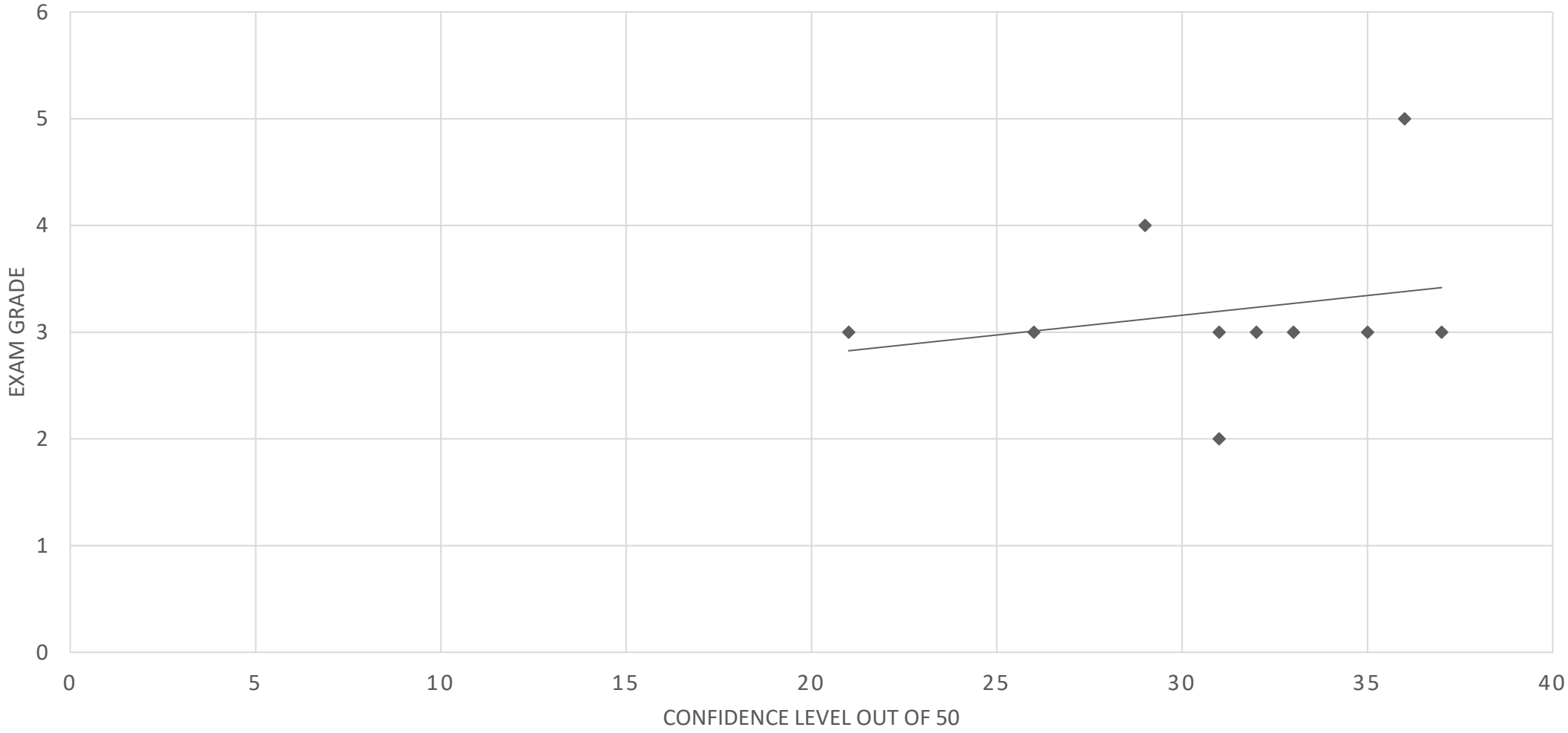
Comparison between confidence level and exam score for 18 adult learners



Comparison between confidence level and exam score for 6 male adult learners



COMPARISON BETWEEN CONFIDENCE LEVEL AND EXAM GRADE FOR LEARNERS UNDER THE MPV FOR AGE: 38.5 YEARS



Question number and main topic	Mean average response per question (3 is neutral)	Range on Likert Scale	Number of comments per question	Positive comments	Negative comments
Q1 x table grid	2.05	1 to 4	8	6	2
Q2 maths test next day	3.7	2 to 5	11	5	6
Q3 algebra question	2.65	1 to 5	12	7	5
Q4 maths GCSE exam	3.6	2 to 5	12	2	10
Q5 other GCSE exam	3.45	1 to 5	8	3	5
Q6 tricky homework	3.05	2 to 4	8	4	4
Q7 listen to teacher	1.55	1 to 2	9	9	0
Q8 listen to a student	2.7	1 to 4	8	2	6
Q9 maths quiz	2.9	1 to 5	11	5	6
Q10 new topic	2.7	1 to 5	8	3	5
Other			10	6	4 exam time

Examples of comments on exams, maths exams and maths tests

- I am always anxious on the day; I am worried that I won't be able to think straight; I am scared of failure and remembering facts
- The feeling of failure is always there
- I am not feeling confident; I get nervous before hand; Thinking about it is worse than taking it
- The desire to pass and the anxiety causes a mental block; It's the exam situation that causes me to freeze
- Extremely nervous; in a class a test is far different from an exam

Comments on MECS questionnaire, and comparison of MECS vs AMAS

- Verbal comments: The AMAS form predisposes for anxiety; I did feel my anxiety was justified and listened to, and that made a difference; It was a validation- it's okay to feel this way about an exam
- Written comments: Prefer not having anxiety written as that can stir up anxiety; Starting a scale with the word would make me more anxious; Prefer having a comments section as you are able to make sure you are fully understood; Sometimes it is not a simple as 'yes' or 'no', and need more of a description for explanation, comments are good; It gives the student more opportunity to express themselves; I like the re-wording from American to English for better understanding

Staff feedback post pilot study

- Include a question on the exam environment? As a college we need to investigate if there is an impact when we remove students from the Sports Hall- No
- Remove ‘anxiety’ from the questionnaire? Change anxiety to low and/or no confidence- Sort of! Two scales separated.
- Obtain approval for students’ scores, rather than grades- No
- Extreme bias of the sample so issues of validity: optional and my students- Yes
- Issue of significance due to small sample size- Yes

Conclusions drawn from the pilot study

- The MECS form needed more work: include geometry, word problems; cluster questions on testing- exams, maths exams, test, quiz etc
- Males may have a clearer correlation between confidence and results, so the more anxious are less likely to pass
- Females may be anxious even when they get a grade 5, so there is less correlation between confidence/anxiety and results
- Small sample sizes: stronger patterns may emerge in the main study
- There is no evidence that learners will not use all 5 points on the Likert scale
- Participation should/must be optional to ‘do no harm’; inherent bias. Also volunteer bias.
- There is evidence that learners liked to be asked about their confidence levels, which may have an impact on their results

Impact of the pilot study, pandemic and feedback from Confirmation of Doctorate

- Questionnaire revised to two scales: one on confidence in their ability (self-efficacy)(Bandura, 1997) and one on anxiety (Hopko et al, 2003) to show those who are both anxious and confident, and those who are neither
- No face to face presentations to recruit participants. Fall in participation rates.
- Online format using email and 'Qualtrics' for information letter, consent form and questionnaire- participants can use word documents or phones to complete. Online interviews to supplement data collection
- Development of themes for analysis (Braun & Clarke, 2013)
- Extended deadline for data collection due to teacher assessed GCSE results for May/June exams
- Completion date now 2023

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