Pilot study: Maths Anxiety and Performance in the Animal Care Programme.

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Research team

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Rationale

Anecdotal evidence

- Personal experience

- Comments from people in industry

- Students perceptions and performance

- Numeracy in the polytechnic sector

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Initial questions

- What is maths anxiety?

- How does it relate to numeracy levels?

- How do we deal with it?

Research questions

- Basic numeracy levels

  What is the numeracy level of animal care students?

- Self-efficacy and maths anxiety

  What are the levels of self-efficacy and anxiety towards maths amongst animal care students?

- Relationship

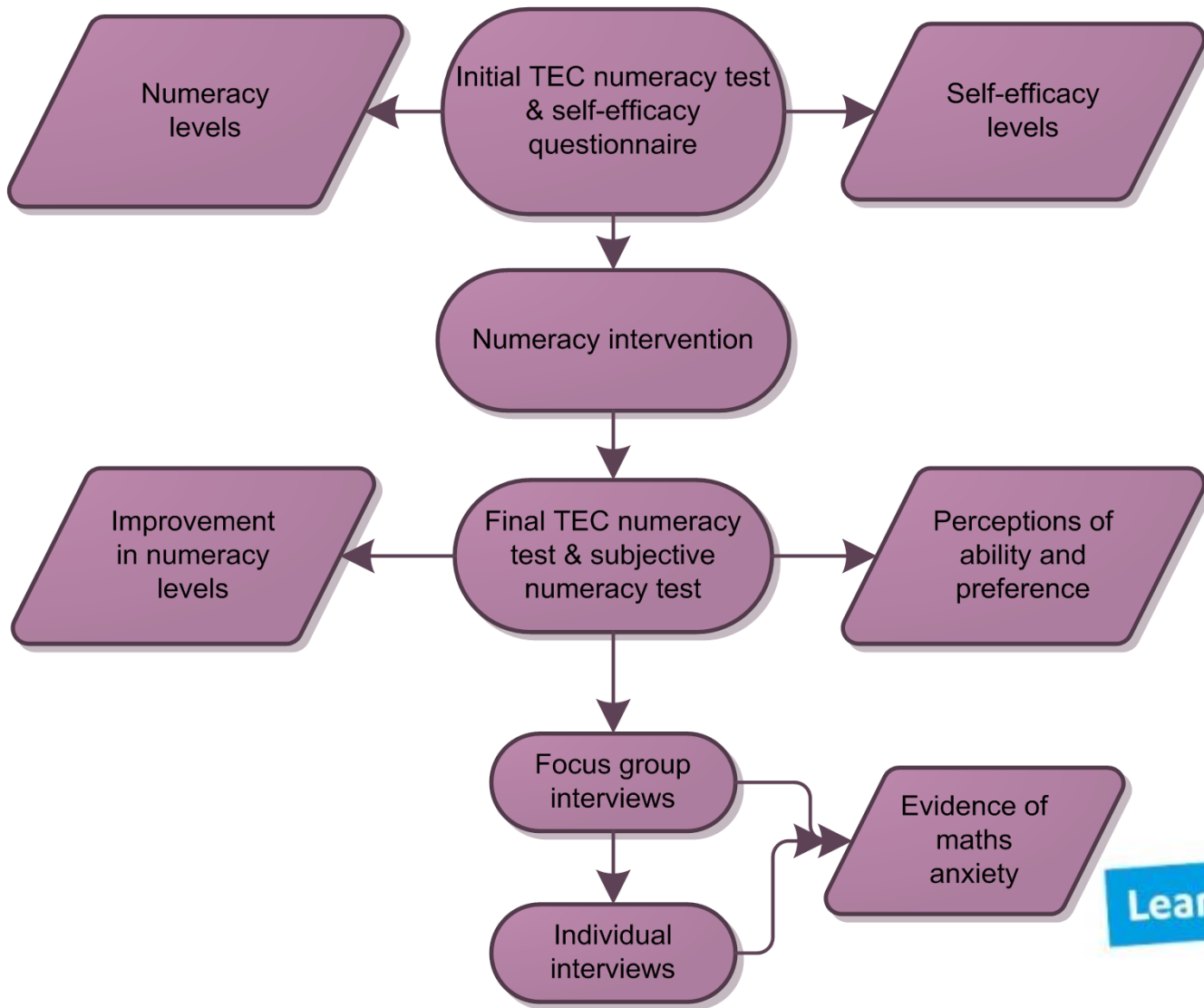 Is there a relationship between the levels of self-efficacy and numeracy?

A brief look at the literature…..

- Numeracy levels (both in New Zealand and abroad)

- Maths anxiety

- The nursing profession
  - and veterinary nurses

Research Design

Participants in the study

- New Zealand Certificate in Animal Care L3 – a feeder programme for L5 Certificate in Veterinary Nursing

- Ages range from 17 to 45; an average age of 24.4 years

- 24 female (86%); 4 male (14%)

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New Zealand Certificate in Animal Care L3

- Numeracy components:
  - Weights
  - Measurements
  - Calculations (division and multiplication)
  - Percentages
  - Place value

Data collected - Quantitative

TEC numeracy test

A national measure of **numeracy level** as well as **gains (step 1-6)**

Compulsory for all L1-3 programmes

Adaptive, computer-based

30Q's Initial, 15Q's Progression

Data collected - Quantitative

Self-efficacy tests

Provides a score which can be used to provide a high or low rating for each student (Bandura, 1993).
Adaption of MASEQ
Likert scale responses

Data collected - Quantitative

Subjective numeracy tests

> Tests a candidate's belief in their own ability to solve a particular type of mathematical problem (Fagerlin, 2007)

> 8 Questions – average score

Data collected - Qualitative

Focus group interviews

- Whole class divided into three groups according to test results

- Five general questions about experiences (positive & negative) in learning mathematics

Data collected - Qualitative

Individual interviews

- Selected from responses given in the focus groups as well as performance in the tests

- Specific, probing questions following on from the focus group interviews
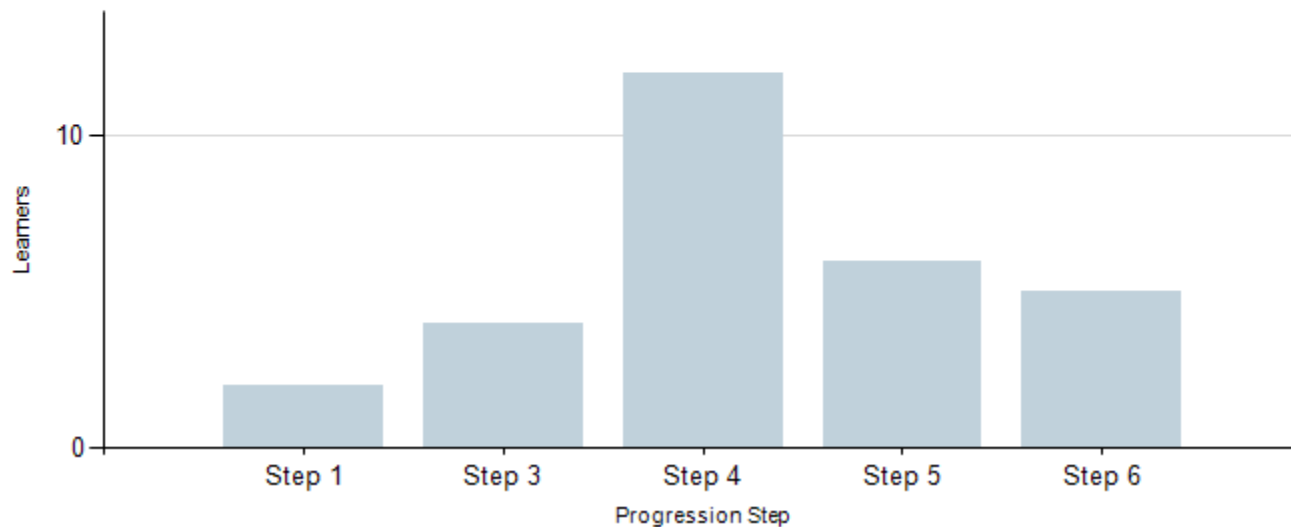
- Six areas of discussion

TEC Results

Assessment Summary Report, Numeracy

Assessment Type: Adaptive, Audience: Youth

Initial Numeracy Assessment - 2015 Tri2 Jul NC5444 National Certificate in Animal Care L2

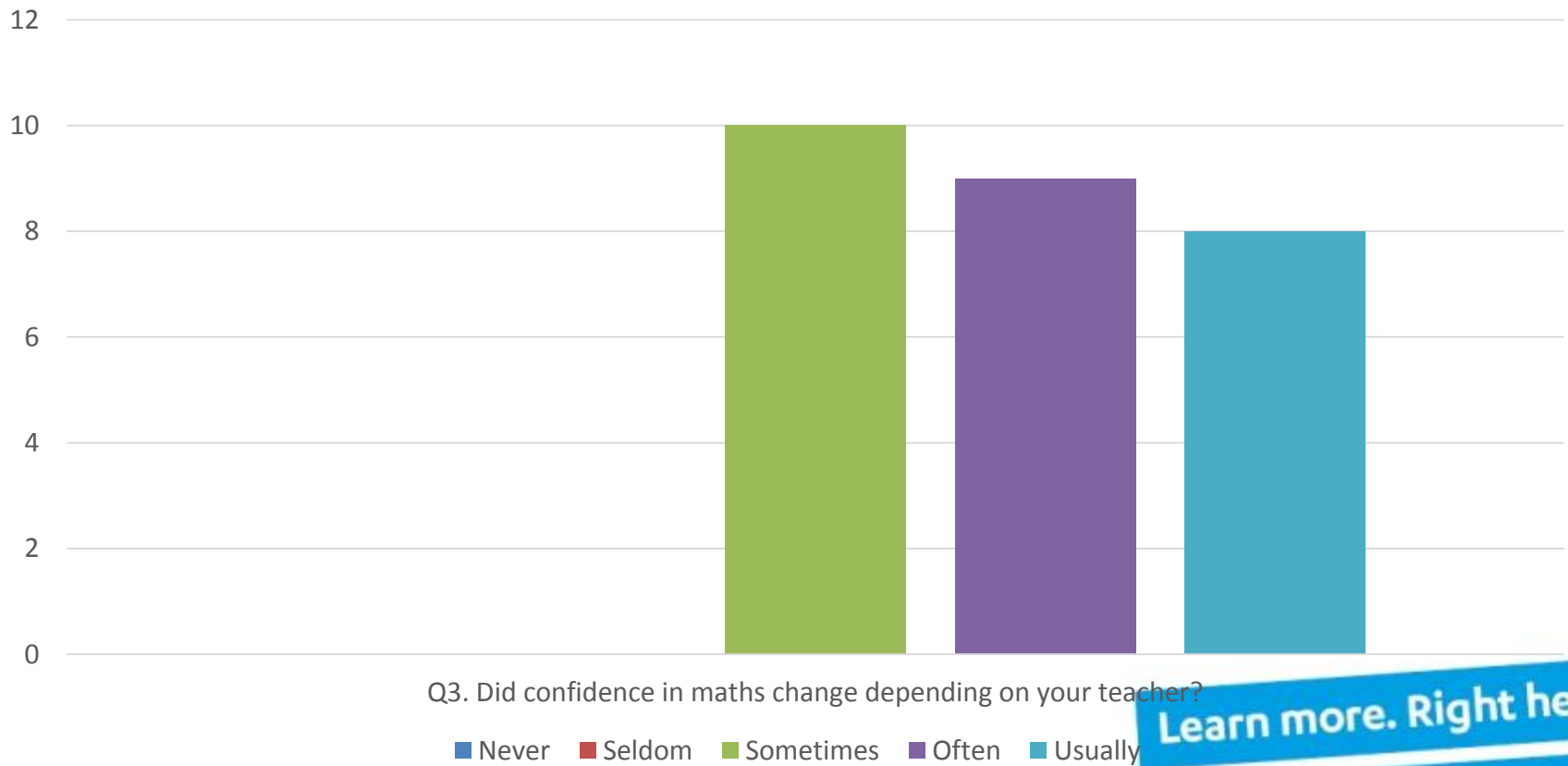| LEARNERS COMPLETED (SET)	AVERAGE SCALE SCORE	ASSESSMENT CREATED DATE
29 (32)	598	15 July 2015

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Self-Efficacy Results

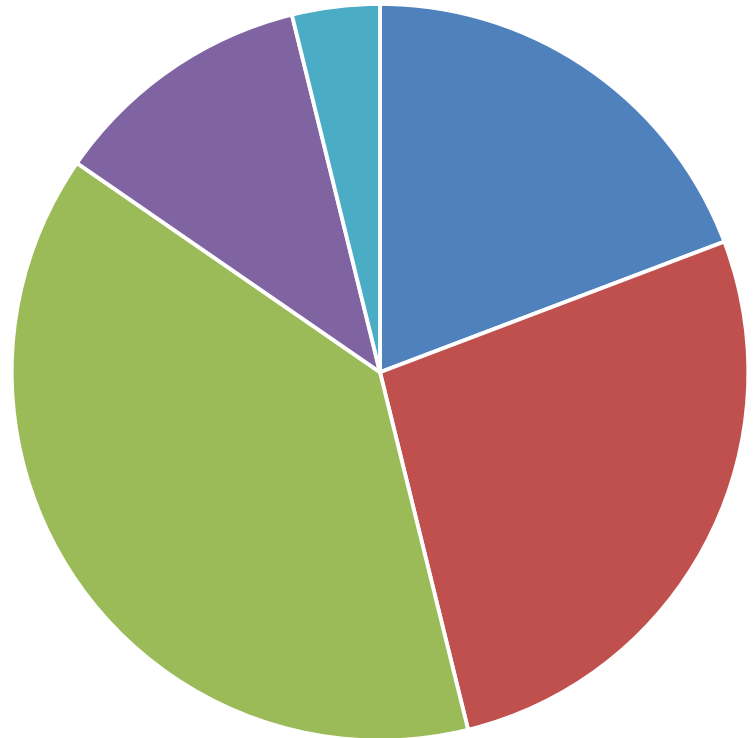Q3. Did confidence in maths change depending on your teacher?

Self-Efficacy Results

Q5. Do you enjoy solving maths problems?

Legend: Never · Seldom · Sometimes · Often · Usually

Self-Efficacy Results

Self Efficacy		Maths Anxiety	
Low	12	Low	11
Medium	10	Medium	13
High	4	High	3

17 participants produced the same result for both anxiety and efficacy, these results were spread against low, medium and high.
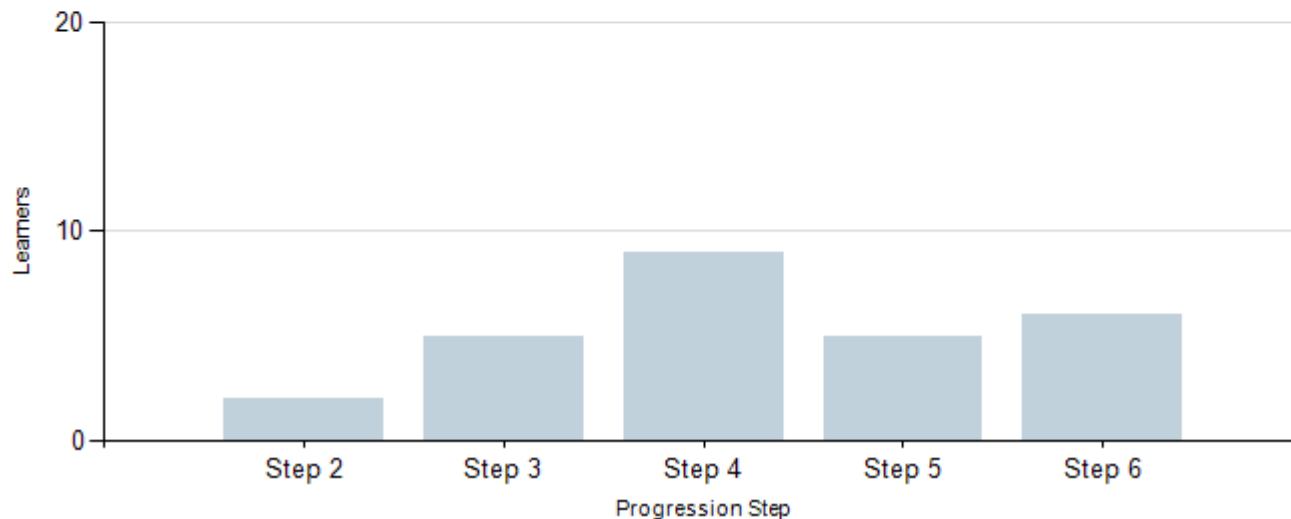
TEC Progression Results

Assessment Summary Report, Numeracy

Assessment Type: Snapshot, Audience: Youth, Threshold: No Threshold

Progress Numeracy Assessment - 2015 Tri2 Jul NC5444 National Certificate in Animal Care L2

LEARNERS COMPLETED (SET)	AVERAGE SCALE SCORE	ASSESSMENT CREATED DATE
27 (29)	615	5 October 2015

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Correlations were carried out between:

- Self-efficacy and performance on the TEC numeracy test
- Subjective numeracy test and performance on the TEC numeracy test
- Ability component of the SNS test & the TEC test
- Self-efficacy & the Subjective numeracy test

Quantitative Results

Correlations	Self-Efficacy Question-naire (SE Test)	Subjective numeracy test score (SNS)	Ability Component of the SNS test	Preference Component of the SNS Test
VS. Initial TEC score	0.567	0.689	0.590	0.437
Level of significance	0.01 level (2-tailed).	0.01 level (2-tailed).	0.01 level (2-tailed).	0.05 level (2-tailed).

NOTES
- There is a significant correlation, at the 0.01 level (2-tailed) between the SE questionnaire and the SNS test (r = 0.643).
- The anxiety component of the SE questionnaire had a very low negative correlation with the TEC test score (r = -0.125)
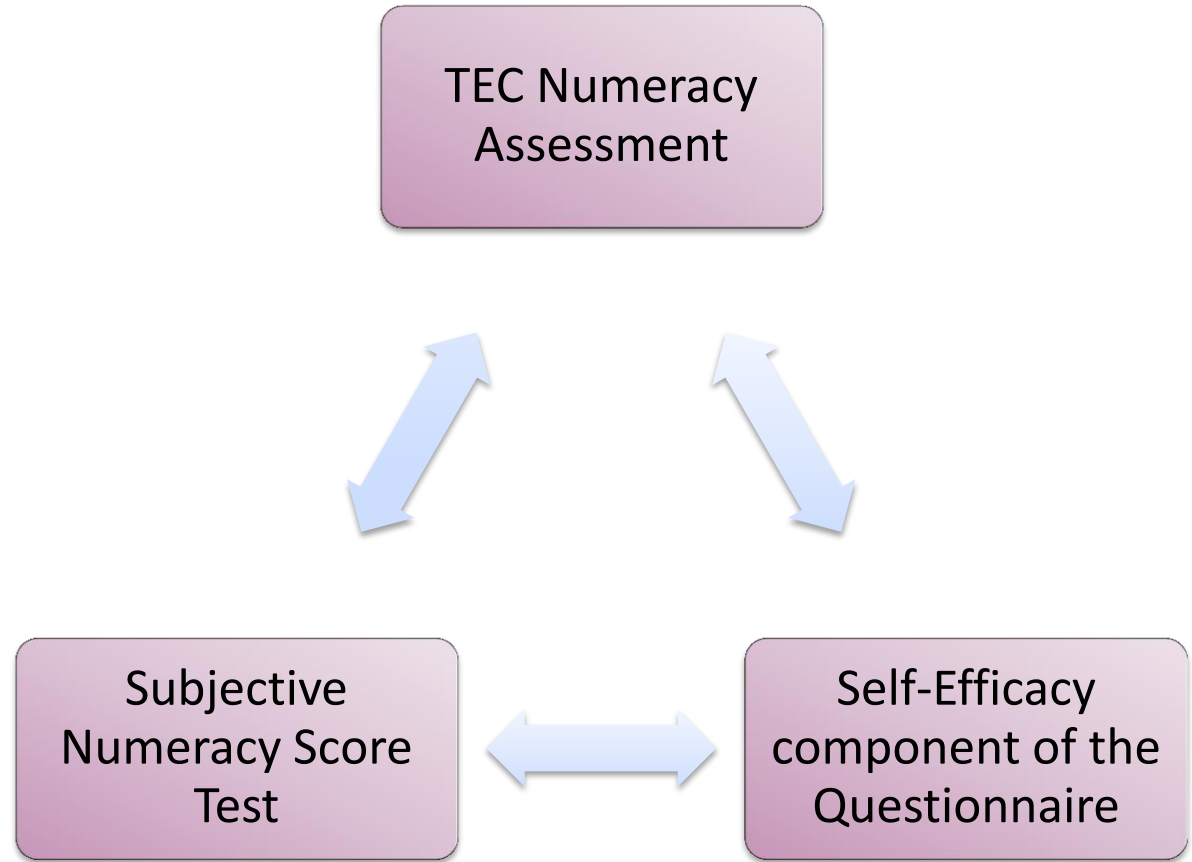
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Quantitative Results

Significant correlation at the 0.01

There was no correlation between maths anxiety component and the performance on the TEC test

TEC Numeracy Assessment

Subjective Numeracy Score Test

Self-Efficacy component of the Questionnaire

Findings – Qualitative data

How participants felt depended on the problem

Coping with everyday maths

- Technological support

- Self Efficacy

- Peer Support

Findings – Qualitative data

Best Experiences/enjoyed:

- Teacher

- Achievement

Worst experiences/disliked:

- Impact of failure

- Teacher
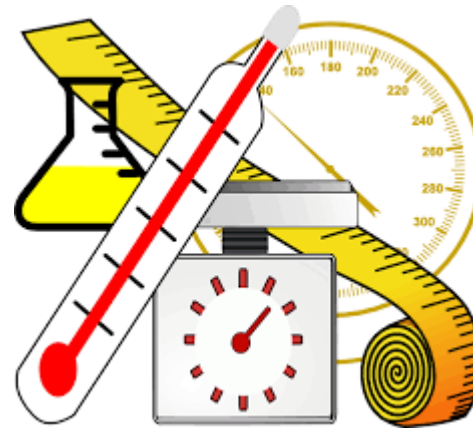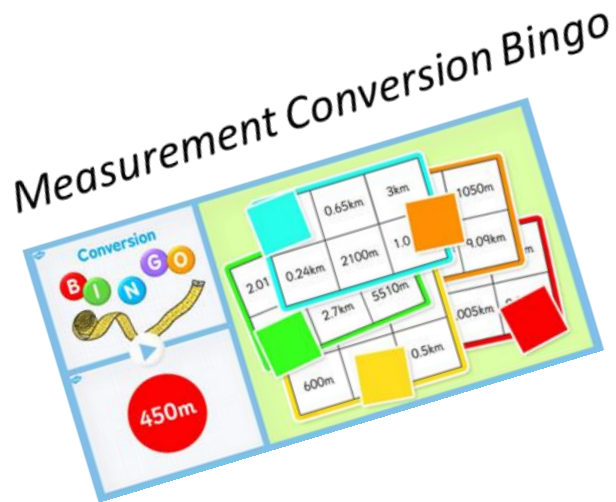
- Relevance, waste of time

- Pressure to succeed

Findings – Qualitative data

- Approaches to reduce maths anxiety
  - Teacher
  - Learning/Activities

Quotes

"I was made to feel stupid if I got the answer wrong"

"My teacher went too fast in class and I couldn't keep up, so I didn't bother"

"My teacher didn't like me!"

"Not real life math, can't use it in the real world"

Quotes

"Getting an Excellence"

"When I estimated and it was really close!"

"When I learnt maths with my Dad"

"I enjoyed year 11 because of the teacher, he was awesome!!!"

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Concluding Remarks

- Positive correlation between self-efficacy levels and performance on the TEC test, as expected

- Students who disclosed maths anxiety didn't feel anxious when it came to the maths in their programme

- Those that have low self efficacy have low maths anxiety

Take-away Statement

'If you contextualise maths and promote the relevance and hence the value then it is generally received better by students resulting in improved pass rates.'

References

Bandura, A. (1993). *Perceived self-efficacy in cognitive development and functioning*. Educational Psychologist, 28(2), 117-148.

Fagerlin, A., Zikmund-Fisher, B.J., Ubel, P.A., Jankovic, A., Derry, H.A., & Smith, D.M. *Measuring numeracy without a math test: Development of the Subjective Numeracy Scale (SNS).* Medical Decision Making, 2007: 27: 672-680.

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