Connected Assessment: An alternative to a timed test for adult numeracy

Rebecca Woolley

Disconnects and tensions	
Teaching for deep understanding	Teaching to the test
Mathematics/numeracy	English/literacy
Mathematics/numeracy	Digital literacy/technology
Collaborative nature of problem solving	Individual testing
Teachers' values	Teachers' practice
'School maths'	How we use maths in life and work
Ratios	Fractions

Methodology

- Qualitative
- Action research
- Critical theory

Literature Review

- Little research found involving developing alternatives to a timed test for mathematics
- Many adults and young people would prefer alternatives to a timed test
- Mathematics anxiety inhibits performance on timed tests
- Using timed tests for high stakes assessment and accountability is damaging for education
- Numeracy as a social practice supports a more holistic assessment model
- Mathematical problem solving using simple maths in complex situations is needed for the 21st century and in workplaces rather than memorisation and speed of calculation

Teachers' Questionnaire

52 respondents from FE Colleges, Adult Education, prisons, work based training

- Nearly 2/3 of the teachers who responded would prefer to be able to offer an alternative to a timed test to their students.
- Over 70% of respondents do not think a timed exam gives everyone the same chance to show what maths they can do.
- Only 31% consider a timed test to be the best way to summatively assess mathematics

- However;
- 53% think timed tests are necessary for mathematics

Interviews With Adult Learners

13 interviews in phase one with adult maths learners

All interviews transcribed

Currently in the process of coding and analysis

Emerging themes;

- Time pressure during exams
- Wide variety of motivations for attending classes
- Wide variety of barriers to progress in adult numeracy

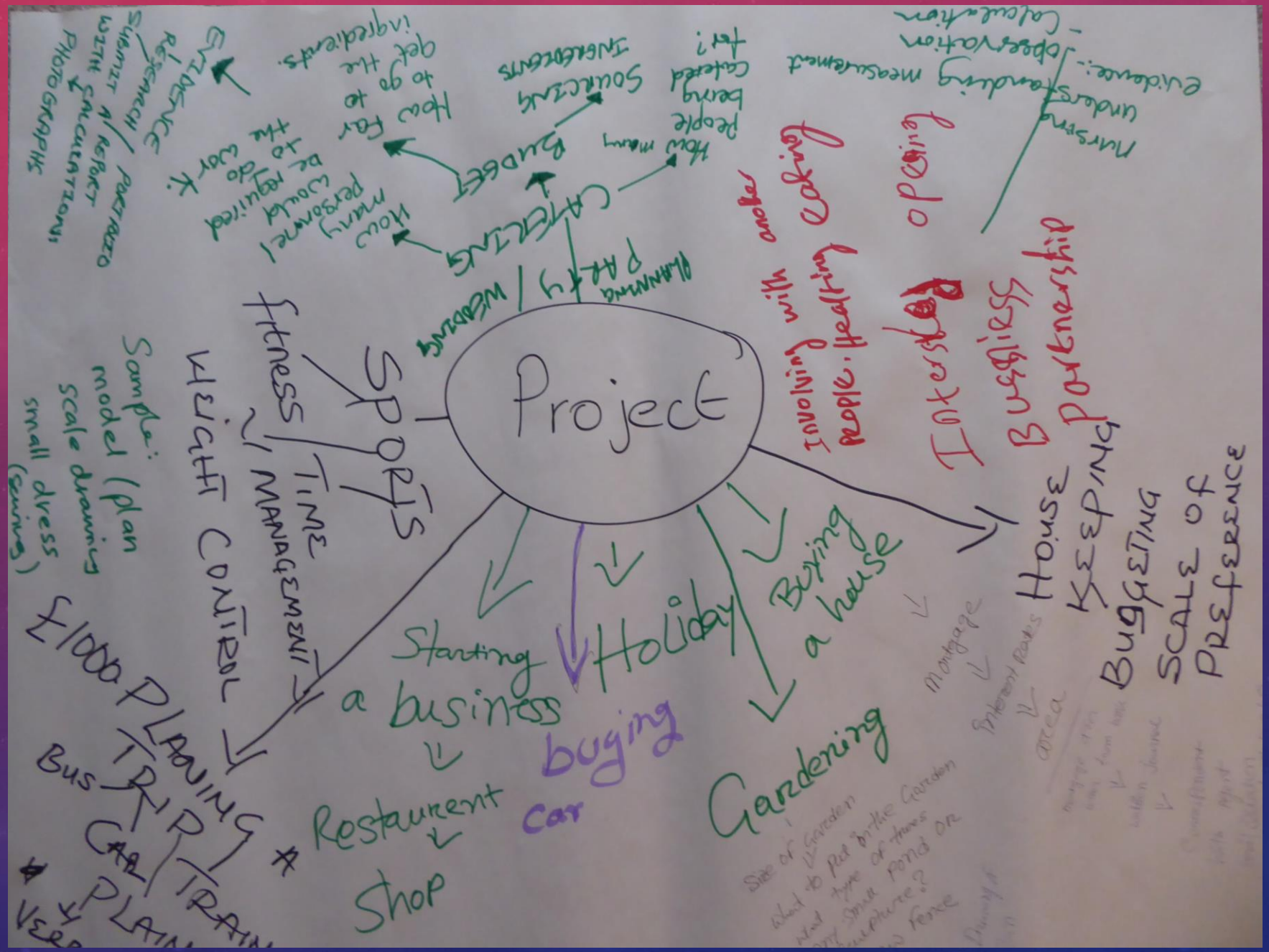
Emerging findings;

- Most adults had difficulty when asked to suggest alternatives to a timed test for mathematics.
- Most adults displayed characteristics of a growth mindset

Focus Group

5 adults attended a two hour focus group

- Group discussion with kids
- Maths quiz – Maths krypton factor
- Planning how to answer
- Break down question into small parts and think
- Projects- see poster



‘Connected Assessment’ Model

Features of Connected Assessment;

- a choice of assessment tasks
- learners developing their own assessment tasks to reflect their preferences and interests
- an extended period of time for assessment to take place over several sessions/weeks
- no arbitrary time limit for individual assessment tasks
- ‘open book’ assessment reducing the need for memorisation
- collaboration between learners on some tasks
- gathering a wide range of ‘evidence’ not just written work
- use of technology to support assessment.

‘Connected Assessment’ Model

Supports learners to make connections between;

- Different areas of mathematics
- Mathematics used inside and outside the classroom
- ‘Simple maths and complex situations’
- Mathematics and their own lives and purposes
- Mathematics, numeracy, literacy and use of technology
- People though collaboration and discussion

Suggested Assessment Tasks

Project – on anything you like that involves some maths

Puzzle – Tarsia puzzle using software on computers

Kahoot quiz; https://getkahoot.com/

Crossword; http://puzzlemaker.discoveryeducation.com/CrissCrossSetupForm.asp

Investigation – see prompt cards for ideas

Online quiz/challenge – Level 1 http://www.bbc.co.uk/skillswise

Level 2 https://www.mangahigh.com

Poster/Cartoon – choose some maths and create a poster or cartoon to explain it

Teach some maths to someone else – think about how you could demonstrate this.

How much does it cost to make a biscuit* at home?

How does this compare to the cost of a bought biscuit*?

How could **your** household save 10% of its water consumption?

17 x 48 = 34 x 24

is this true? Investigate further with other numbers.

30% of 70 = 70% of 30

Is this true? Investigate further with other numbers

If 15 = 10 + 5,

why doesn't $15^2 = 10^2 + 5^2$?

How far away from here could you travel today with £200 to spend?

Estimate how many babies will be born in the UK in 2017 without using the internet

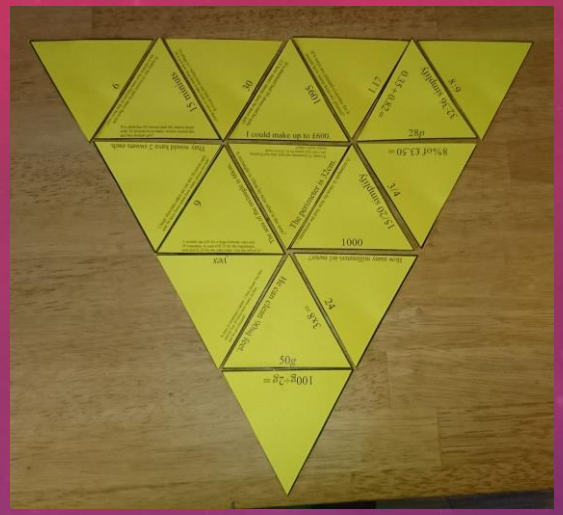
How far is it to the horizon?

Making Connections: Pilot

- Cohort recruited from existing ‘support’ sessions for adult numeracy at an Adult Education Service
- Making Connections course 2.5 hours per week over 5 consecutive weeks
- Eleven adults attended the sessions, with a core of six people who attended most of the sessions
- Sessions were double staffed by me and a mathematics teacher from the Adult Education Service

Making Connections Pilot; Data Collected

- Written evidence generated by learners while completing tasks
- Posters created by learners
- Digital evidence of tasks completed online
- Written comments in learners' journals
- Completed course evaluation forms
- Fieldnotes



plain flour 500g = £0.40
Orange jelly 135g = £0.54
Orange marmalade 454g = £0.27
Dark chocolate 100g = £1.50
(×1) (×2)

My total shopping will cost me £6.20.

Whereas if I buy Mcvities jaffa cakes from Tesco which has 12 cakes will cost me £1.19

£1.19 ÷ 12 cakes = 0.0991666

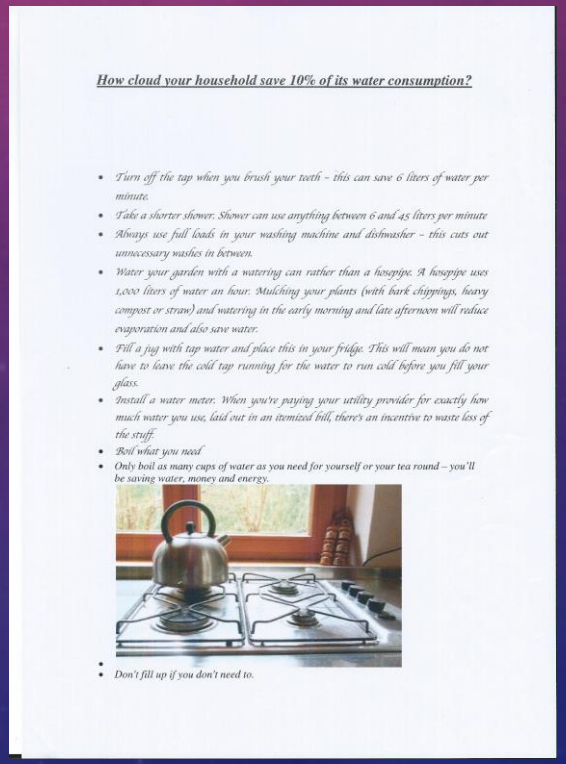
6 range eggs ÷ 3 = 2 eggs
£0.89 ÷ 3 = 0.2966666
so each egg will cost me £15p each. We will have 4 eggs leftover after making jaffa cakes. You can use it to make jaffa cakes 2 more times.

500g caster sugar ÷ 50g = 10
£1.10 ÷ 10 = £0.11
so each 50g caster sugar will cost me £0.11p. We will have 450g sugar leftover after making jaffa cakes. You can use it to make jaffa cakes 9 more times

500g plain flour ÷ 50g = 10
£0.40 ÷ 10 = £0.04
so each 50g plain flow will cost me £0.04. We will have 450g plain flour left. You can use it to make jaffa cakes 9 more times

135g orange jelly ÷ 135 = 1
£0.54 ÷ 1 = £0.54
1 orange jelly (135g) will cost me £0.54

Orange marmalade 454g ÷ 14.3g = 32 tbsp



How cloud your household save 10% of its water consumption?

- *Turn off the tap when you brush your teeth – this can save 6 liters of water per minute.*
- *Take a shorter shower. Shower can use anything between 6 and 45 liters per minute*
- *Always use full loads in your washing machine and dishwasher – this cuts out unnecessary washes in between.*
- *Water your garden with a watering can rather than a hosepipe. A hosepipe uses 1,000 liters of water an hour. Mulching your plants (with bark chippings, heavy compost or straw) and watering in the early morning and late afternoon will reduce evaporation and also save water.*
- *Fill a jug with tap water and place this in your fridge. This will mean you do not have to leave the cold tap running for the water to run cold before you fill your glass.*
- *Install a water meter. When you're paying your utility provider for exactly how much water you use, laid out in an itemized bill, there's an incentive to waste less of the stuff.*
- *Boil what you need*
- *Only boil as many cups of water as you need for yourself or your tea round – you'll be saving water, money and energy.*

- *Don't fill up if you don't need to.*

PANCAKE DAY

Our shop needs to make 420 Pancakes.

For 12 Pancakes you need:
100g Plain flour
2 Large eggs
300mL milk
1tbsp sunflower oil
1tsp of sugar

HOW MANY INGREDIENTS WILL YOU NEED TO MAKE 420 PANCAKES

100g flour × 35 = 3500g (3.5K)
2 Egg × 35 = 70 eggs
300mL milk × 35 = 10500 (10.5L)
1tbsp × 35 = 35 sunflower oil
1tbsp × 35 = 35 tbsp of sugar

12 × 35 = 420

Making Connections Pilot: Learners' Views

"I liked the sessions. It allowed me to look at everyday maths – making the calculations easier – knowing which calculations are needed for a particular type of question."

- Adults enjoyed these sessions and they were able to show their maths 'skills'
- Adults learned new maths during the sessions (not just an assessment opportunity)
- Some adults enjoyed being able to work together on maths tasks

Making Connections Pilot: How To Improve?

- More scaffolding needed for investigation tasks
- Very few adults chose tasks involving data
- A larger cohort would have been helpful for those who wanted to work as a pair
- Demonstration of Tarsia software by teachers at the beginning of the course
- Investigate possibility of incorporating ‘my maths’ digital platform
- Make video cameras more readily available
- Consider tracking curriculum areas for individuals

Making Connections Summer School

- Making Connections second cohort currently running in June/July 2017
- Target group; adults on Level 1, Level 2 and GCSE mathematics courses this year at the Adult Education Service