Integrating Numeracy across the Curriculum

Kathleen Crammer

Youth Training & Development Centre

Newbridge, Co. Kildare

Whole Centre Approach to Integrating Numeracy in Youth Training Settings- Experiences from Youth Training and Development Centre, Newbridge

Who are the learners?

The profile of the learner in our youth training centre: has left school without achieving any formal second level qualification or has achieved the minimum qualification. Level 3 on the framework of awards. Usually aged between 15 and 17 years with low self-esteem, low self-confidence and possibly disengaged from society. They have also disengaged from the educational system.

Why integrate numeracy?

Why not? Numeracy is everywhere, it is not confined to mathematics classes, but numeracy has mathematics at its core. We introduce the learner to maths in their world. Clocking in is an introduction to calculating the hours the learner will be paid a training allowance for. We encourage the learner to calculate their own training allowance.

Calculating the training allowance

Trainee allowances and travel

18 Years	€185.80
17 Years	€ 94.60
15-16 Years	€75.70

Travel allowances

0- 3 miles	nil
3 – 5 miles	€4.60
5 – 10 miles	€11.90
10 – 20 miles	€17.60
20 – 30 miles	€21.60
30 – 40 miles	€27.70
40 – 50 miles	€32.50

Meal allowance of €4.00 per week, or .80c per day

Find out your own allowance:

1. **What age are you?**

2. **Fill in your allowance**

3. **Fill in your travel if any**

4. **Fill in your meal allowance**

5. **Add up the figures**

This is your weekly allowance if you attend every day.

Numeracy in real life situations

When a learner follows a timetable in the centre they are using mathematical skills.

Numeracy should be taught in context for the learner. Practical activities and hands on materials that are real, such as the timetable or the training allowance calculation are real and have meaning for the learner.

Everyday numeracy in the centre activities

- Quantity and number
- Space and shape
- Data handling and chance
- Problem solving
- Patterns and relationships

It is the role of the tutor in the centre to assist the learner to 'see' the numeracy in their subject areas.

Quantity and number

Estimation is an important skill in numeracy. Estimate the weight of an everyday item, an egg, one tomato etc. Allow the learner to check the actual weight. Move onto larger items and the learners will have a mental picture of the weight of items. It is also a good idea to get learners to measure themselves, this is a useful 'rule of thumb' to estimate size. Measure from the top of your thumb to the knuckle – approx 3 cm 30 mm.

Quantity and number

How thick is a match?

How high is the ceiling?

How many glasses of milk from one litre carton.

What is the length of the room?

What are the size of a goals on a soccer pitch?

Quantity and number

In catering measuring the ingredients for cooking are obvious uses of numeracy.

Ratios can also be used in baking, for instance a recipe for pastry is 2:1 flour to butter.

In hairdressing the chemicals must be measured accurately for hair colouring and perming. 60 ml of peroxide to 60 ml of permanent tint. For perming a learner must measure 100ml of perming lotion from a 5 litre bottle. Perms and colours must be timed accurately, some need to be checked after ten minutes and 5 minutes thereafter. They can also calculate the cost of the lotion for one application.

Quantity and number

Engineering offers endless use of measurement and calculations.

Allowing a learner to make a metric rule of one metre, and mark in given measurements enables them to 'see' the measurement. Guess which spanner will open a specific nut. Check the size of the spanner.

Quantity and number

Learners are encouraged to count numbers of trainees for different reasons. How many are going swimming?, how many are going to gym? How many are there altogether for lunch? How many sandwiches do we need for the lunch? How many slices in a sliced loaf? Work out how many loaves we need.

Quantity and number

Give learners a number line to assist in rounding numbers.

0   10   20   30   40   50   60   70

Mark the following numbers on the line

    17   21   58   39

Round each number to the nearest 10, use the line to help you.

Space and shape

This can be integrated into daily life through distance, area, speed, angles and relationships between stationary and moving objects.

When calculating the training allowance learners must know how far they live from the centre, this determines their travelling allowance if any.

Space and shape

Ask learners to give directions to the bank, doctors surgery etc.

Our induction book has a map of the town and directions to the centre, we ask them to give these directions to each other starting from different locations in the town. We also get them to read warning symbols and road signs. Learners study for the driver theory test and must know the road signs in order to pass this test.

Space and shape

Give the learners a drawing of a football pitch. Ask them to identify the following:

- Circle
- Quadrant
- Segment
- Right angles
- Rectangles

Space and shape- Circles

The dartboard

If the diameter of a dartboard is 42cm. Calculate the length of a piece of metal needed to go round the side of the board.

$$= \quad 42 \text{ cm}$$

Circumference $\quad = \quad 2\pi r$

$$= \pi 2 r$$

$$= \pi . D = \frac{22}{7} \text{X } 42 = 22 \text{ X } 6 = 132 \text{ cms.}$$

Space and shape in ceramics

Learners make ceramic clocks.

They must divide the clock face accurately.

They also make vessels, jugs, cups etc. They calculate the volume of these vessels. They also make trinket boxes which are cubes.

Data handling and chance

Data handling can be integrated into following the news. The recent election results were depicted by bar charts etc. on the news and in newspapers. Learners can carry out surveys to find out what lunches the majority prefer and the menus for the centre based on the findings. This allows learners see the usefulness of statistics.

Data handling and chance

Chance can be discussed in the context of racing, football, tennis and card games. Rolling dice versus tossing a coin demonstrates chance very clearly. When choosing a venue for an outing. Learners carry out surveys to determine the favourite activity and we choose accordingly.

Problem solving

Problem solving is logical thinking. Using sudoku or similar puzzles uses logical thinking. Teenagers love puzzles. We make sure there are plenty in the canteen for them to use at will. Make up number patterns and leave those in the canteen to tempt them. Fill in the missing number for instance: 20,18,16,14,__10

Problem solving

Ask a learner to plan out the following:

You have to be in the centre at 9.00 am

It takes you 15 minutes to walk to the centre.

You go to the shop on the way to buy cigarettes (an extra 5 minutes)

You call to your friends house to meet them (10 minutes)

What time should you leave home at to be in on time?

Patterns and relationships

Patterns are everywhere around us. We use patterns to organize what we see and hear and to make sense of data whether we are driving in a car, listening to music, or solving mathematical problems.

Finding, describing, explaining, and using patterns to make predictions are among the most important skills in mathematics. These skills allow users of mathematics to impose order, meaning, and understanding on situations that at first seem like collections of random facts.

Finding patterns is a subjective activity. Different people notice different things, so what one person sees is often different from what another perceives. That's why it's so important to describe patterns in language that everyone understands -- so others can see what you see. Algebra is a tool for describing patterns, and there are many others.

It's important to keep in mind, however, that algebra is much more than a language. Algebra may be introduced as a way to reason about things. In fact, "making sense" is what doing mathematics is all about.

Patterns and relationships

The mention of the word algebra causes the learners in our centre panic, "I hate algebra, it's one of the reasons I left school, don't make me do algebra." By explaining that finding the pattern and grouping items by relationship is algebra, it becomes less daunting. Help the learners to see that the most important aspect of algebra is the seeing, interpreting and expressing patterns. Recognising the relationships in the information given.

Space and shape

Discuss the fact that Manchester United's pitch is the largest in the premiership.

Reading has the smallest pitch.

Discuss the variables, how much more space a player must cover on the larger pitch.

Draw out a metre squared, multiply by 480 to get the difference in space between the two pitches. This gives a visual image of the space involved.

Early school leavers and numeracy

Numeracy is part of everyone's life, in the case of early school leavers it is imperative to help them 'see' why numeracy is important for them. The job prospects for early school leavers are not good, but if they can achieve national qualifications in mathematics and also understand where numeracy and mathematics exist in their everyday lives their chances of progression improve. The application of numeracy is vital.