



**SHAPING SUCCESS ACTION
RESEARCH PROJECTS**

**FINAL REPORT ON THE SHAPING SUCCESS AR PROJECT –
EMBEDDING MATHS
TCHC Group/All Trades Training Ltd**

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For further information regarding the Shaping Success Action Research programme and this project go to <https://ccpathways.co.uk/practitioner-research/otla-7/>.

The programme was delivered on behalf of the Education and Training Foundation by -



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Final report - Embedding maths

TCHC Group/All Trades Training Ltd

The aim of this project was to help learners and learning coaches to identify where maths is naturally embedded within the workplace. This is one of the areas of development identified by Ofsted during our last inspection.

Summary

TCHC/ All Trades Training is an independent training company that run a variety of projects including apprenticeship which is the focus of this project.

The driving force behind this project stemmed from comments made by Ofsted (2019) which TCHC needed to address. This project was a creative response to our Ofsted feedback. We were looking for solutions and ways to more effectively support our learners.

Comments from the Ofsted report included:

- ...learning coaches do not give as much attention to the development of apprentices' mathematics skills. As a result, apprentices are less confident in undertaking advanced mathematical problems in higher-level apprenticeships.
- Leaders and managers need to ensure that apprentices develop good mathematical skills and use these skills effectively in their everyday work.

Rationale

The aim of the project was to help both the learning coach and learner gain skills to identify where maths is naturally embedded in the workplace and the surrounding environment.

The previous practice was for the learning coach to deliver a short 10-minute learning session around one area of maths e.g. area, ratio etc. This was the learning coach's idea of how to embed Functional Skills maths. Our goal was to change this mindset practice and help the learning coaches to understand how maths can be used in practical ways that relate to the learner and their working environment.

Instead of following our normal practice of giving resources to learners we decided to actively involve the learners in the production of video resources. Our rationale behind this was two-fold, we not only wanted the videos for the learners to identify where maths was being embedded, we also felt that they could be used to show evidence of the learners' occupational competency.

Maths embedding for apprenticeship work-based learning sessions is not explicit, often limited and sometimes entirely forgotten. This will often result in some learners missing out on developing their core skills which has a negative impact on our ability to meet the deadlines set for Functional Skills curriculum delivery. Learning coaches often struggle to identify where maths is being

embedded naturally within the learner's job role and miss key opportunities to challenge learners to become better.

Another challenge that we were facing is the recording of where the embedding of maths may have occurred naturally. Too much focus is given to gathering evidence for the standard and diploma, so Functional Skills tends to take a backseat. This is due mainly to the learning coaches' lack of confidence in delivering Functional Skills when it is not part of a planned session.

Our learning coaches are occupationally competent when it comes to delivering the standard qualification but they often lack the skills required when it comes to teaching maths and English. Our focus during this project was to equip our learning coaches with the observational skills required to support our learners in the area of embedded maths within the workplace.

We also wanted to involve the managers in this project, as it is important to their business that employees have good maths and problem-solving skills. We also wanted their input to see whether there were any internal training requirements that we could potentially support.

Approach

Initially our approach to this project was to:

- work with our Health and Social Care learners to support them in identifying where maths naturally occurred within their workplace.
- support the managers within the workplace to understand what maths embedding was and how they could support the learner by setting them tasks where maths naturally occurred.
- undertake a series of training sessions with our learning coaches so that they could confidently support the learners in not only the production of the videos but also how to identify the different types of maths being used within tasks.
- learner led video production to give them more ownership of their learning.

However, we did not bank on the effect that COVID-19 would have on the Health and Social Care sector so was unable to continue with this approach.

This setback meant that we then had to look at other areas of business that we worked in to see if any were suitable. We found that the Warehousing sector, where we have an apprentice, could be another area to work in. Looking further into this we found that this sector was suitable so decided to move forward with our project in this area.

We decided to take a two-pronged approach:

- the learner to create some videos of themselves at work. By doing this it would stretch and challenge the learner as they would have to use their observational skills when finding where the maths was being embedded within our videos.
- we would also create our own videos from another Warehouse environment.

To support our learning coaches, we organised a training session for them and looked at the learning criteria and where maths naturally occurred within this. We also used the guidance document 'Maths and English in Apprenticeships' (ETF, 2018) found on the excellence Gateway website to help with the planning of our training. After establishing where maths could be embedded the learning coaches then took this back to sessions with their learners. Learning coaches used their sessions with learners to go through daily activities and identified maths within their learning.

This then led to videos being produced showing daily maths activities that occurred in the workplace. The aim of the videos was to help both the learner and learning coach identify embedded maths, improve both learner and learning coach practice and develop training resources for learners and tutors. The videos produced were between 2- 3 minutes in length. The reasoning for this was to make the videos accessible to learners and the learning coaches. These videos could also link with the company's Class2Cloud online learning platform and act as a practical resource for the learners.

Professional learning: Evidence of changes in teaching, learning and assessment practices

We have noticed a change in the approach to teaching maths since the start of this project. By involving the quality team, we have delivered CPD sessions for the learning coaches around how to identify maths embedded during everyday tasks that the apprentice completes.

This has prompted a shift from tutor-led sessions to a more co-operative session where the learners have given input into the type of resources that they feel would make maths more explicit to their everyday work tasks.

This has led to the learning coaches devising their own Functional Skills type problem scenarios that mirror the type of question that could come up in an exam. The scenarios are all relevant to the learner and their workplace.

An example question is as follows:

- A Warehouse employee is given a customer order to pack onto pallets which then need to be loaded onto a lorry. The volume of goods that the lorry can carry is 120m^3 . Once the goods have been packed the pallet size measures $150\text{cm} \times 100\text{cm} \times 200\text{cm}$ and there are 45 pallets in total. Is there enough space on the lorry to load all of the pallets? Please give a justification for your answer. (This would be a 4-mark question)

During this project we have found that the learner retains knowledge, e.g. how to work out a formula, ratio, area etc. as they can see the impact it could have on the business if they were to get these calculations wrong.

Evidence of improved collaboration and changes in organisational practices

Six videos have currently been produced which are being used to support the learners with their apprenticeship and our learning coaches with their CPD. This is also helping the managers within the learner's workplace as we are teaching the employees not only maths but how to problem solve. Managers have responded by saying that their employees are now more able to spot potential issues during a task rather than waiting until everything is completed before a problem is found.

When building our project team, we wanted to bring together people with a diverse range of skills. We wanted people who were occupationally competent within the apprenticeship sector but also people who had a Functional Skills background. Once the initial team was put together, I felt as the project manager that there was something missing. After discussion with my deputy project manager, it was decided to bring in a member of the quality team to assist and our Head of Technology.

By doing this we felt that all bases were covered as we had a learning coach who understood the sector working alongside a teacher who could support the learning coach with the maths delivery. We also had a member of the quality team who could advise us of any quality issues when gathering the required evidence and the Head of Technology to advise us around best formats for video production and to deal with any playback issues.

This collaboration of professionals throughout the company will ensure that all Teaching and Learning is of a high standard and meets the requirements of both TCHC and the Awarding Bodies.

During the initial project meeting each person within the team was invited to come up with ideas around the best way to implement the tasks required. As project manager, I took on board all suggestions and worked with my team to develop a blueprint which we could all agree on. This gave each person a sense of ownership as no suggestion was left on the table unused.

Working on this project has brought the different teams closer together. A good example of this has been when a member of the quality team worked with the learning coach to identify how to embed maths. The learning coach has then worked with a Functional Skills Tutor to devise scenario-based questions to test the learner's maths skills (an example can be seen in the Professional Learning section of this report). Our apprenticeship team is now working much closer with our Functional Skills Tutors which has enabled them to tap into many more resources to support both themselves and their learners. There is a much better support network between the quality team and the apprenticeship learning coaches with much better lines of communication.

The learning coaches will now ask for support rather than just trying to muddle through on their own. This has not only given them confidence in their own ability to deliver but has given the learner a much better teaching and learning experience.

Evidence of improvement in learners' achievements, retention and progression

Functional Skills has never been a popular part of any apprenticeship and we wanted to ensure that not only was the learner engaged during their meetings with the learning coach but they also met the required objectives. By combining the teaching of Functional Skills within the learning that is being undertaken for the qualification standard we felt that we could meet both objectives.

Instead of teaching standalone maths sessions, the learning was incorporated within the teaching for the qualification standard. The videos had a two-fold purpose with one being to identify where maths was naturally occurring and the other purpose was that the learner and learning coach would have a professional discussion around the content of the video, so gathering evidence for the qualification standard. By working this way, the learner progressed much quicker through their qualification and they could see how important maths was within their job role.

Quote from Ami Nurjandoa, TCHC Learning Coach:

'Having these videos will also help visual learners understand maths by relating it to their job role.'

Quote from Sue Crowley, TCHC Quality Team IQA:

'The combination of videos and scenario-based questions will aid the learners to identify relevant maths-based problems and work to use their wider skills to solve problems and develop critical thinking skills.'

Learning from this project

What we have learnt from this project is that unless you have a genuine interest in maths then it is difficult to get motivated.

We found that by interlinking maths with the everyday tasks completed within the Warehouse, both the learner and manager have started to see the relevance of teaching maths and problem-solving skills.

This led us to completely change our lesson plans for the learner. Instead of having two lesson plans, one for the apprenticeship and one for maths, we have combined them. This has meant that our learning coaches are producing more meaningful lesson plans and cutting down on the amount of maths standalone teaching. Through these types of lesson plans, managers can now see the relevance of why we teach the learner maths and problem-solving skills.

Learners and learning coaches have used the videos produced to reflect on their learning and where maths is embedded. The impact of this has meant that learners can clearly identify where maths embedding has taken place.

The positive impact of this project has led us to look at other sectors we work in and we have already identified where we can use this within Health and Social Care and Business Administration.

References

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Appendix 1 – The project team

Project Role	Name	Job Role
Project Lead	Kim Kitchener	Teacher
Project Lead	Nicole Farnham	Teacher
Project team	Claire Jeens	Manager
	Lee Moorton	Manager
	Michael Brosnan	Teacher
	Nicole Vargeson	Teacher
Project Mentor	Paul Stych (ccConsultancy)	
Research Group Lead	Gail Lydon (ccConsultancy)	

OUR PARTNERS



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