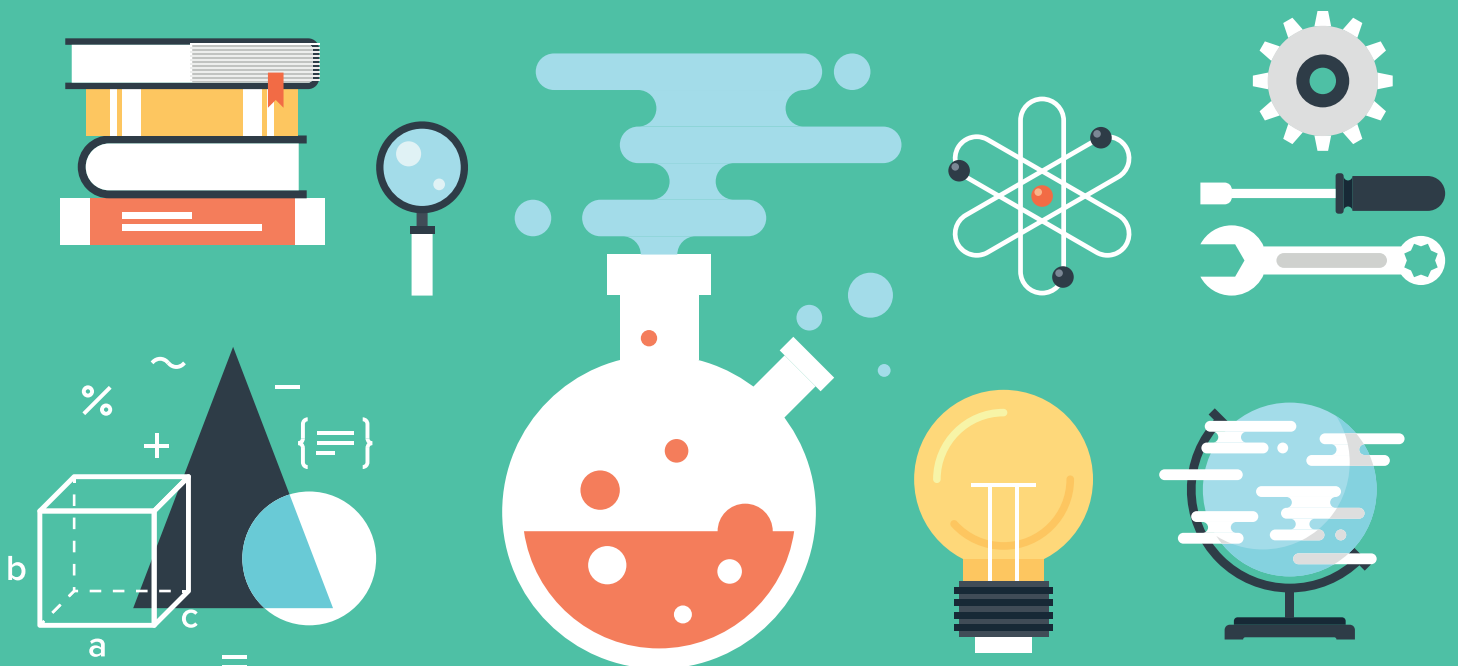


STEM Grant Programme

Case Studies



1

Scottish Borders Council CLD

Digitally Active, connected and collaborative
CLD practitioners

14

Total number
of sessions

151

Total number of
CLD practitioners

159

Total number of CLPL hours
for CLD practitioners

£8k

Total project
spend

Rationale, objectives and targets for the project

The project sought to support community learning and development (CLD) practitioners with professional learning, peer learning and mentoring to increase their skills, knowledge, confidence and understanding of digital tools. The project used ICT to support learners and promote progression pathways, working collaboratively with colleagues across sectors locally and across the region.

The objectives of the project were to:

1. Increase confidence and skills of CLD practitioners;
2. To increase the use of digital technologies as learning tools;
3. Increase the use of digital technologies to support professional learning and collaborative practice; and
4. To promote learning pathways for learners

The project sought to engage 50 CLD practitioners (paid and voluntary), as well as practitioners in ELC (12), primary (12) and secondary (10) for a relatively modest project spend of £9,466.

Target groups and engagement

The project was led by the CLD Service in the Scottish Borders, directly engaging the CLD team there and practitioners across the Service, working with partners in the South East Improvement Collaborative (SEIC) region.

Practitioners were mainly drawn from the Scottish Borders but also from the CLD Services in Midlothian and Edinburgh City. Ultimately the CLD Service seeks to engage the most 'at risk' learners in communities including vulnerable young parents, marginalised adult learners, children, disengaged young people and older people.

Delivery model, learning mode and content

Delivery of the project was in the form of:

- **Training workshops for volunteers and CLD partners.** These included: digital storytelling (Scottish Book Trust model); digital technologies; unconscious bias workshops, and iPad training.
- **A Mentoring programme** - to increase confidence in CLD practitioners across all learning communities; mentors following up with (20) paid staff and small focus group work; and
- **New collaborative tools** for evaluation (Phases 1 and 2), including SLACK, an online forum.



1

Scottish Borders Council CLD

Digitally Active, connected and collaborative CLD practitioners

Due to the COVID-19 pandemic, Phase 2's intentions of encouraging visit's by CLD practitioners to local educational settings was not possible. The anticipated full online collaborative learning network were similarly not quite developed as initially anticipated.

A baseline questionnaire was used to design a training matrix for practitioners to aid the development of their digital literacy and skills.

The Service successfully requested that Scottish Borders CLD practitioners have access to GLOW and MS Teams. Business cases were developed for new laptops and iPads for CLD practitioners and Adult Learners. Practitioners participated in Digital Storytelling, SLACK and Zoom training.

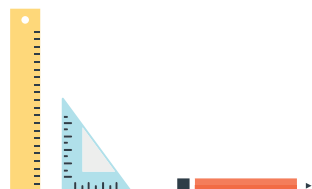
Impact on practitioners and learners

Practitioners reported **increased confidence and skills** to use digital technologies such as GLOW and MS Teams as learning tools for delivery of CLD learning programmes and collaborative practices such as video conferencing.

Through the above, digital technologies allowed CLD delivery to be more creative and relevant to learners, with regular use of MS Teams and use of applications such as quizzes and questionnaires. Practitioners valued and now use digital photography techniques and iPads for digital storytelling.

Practitioners have certainly valued their digital skills development and increase in confidence.

As one said. **"The opportunities provided [through the STEM project] were excellent and team training with colleagues is a fantastic way to reduce 'techno-fear'".**



Working with partners



The CLD project delivered support to CLD practitioners in Midlothian and Edinburgh City. It linked to schools in the region (in the Borders via the Inspire Learning programme) and to Borders College for training. It has very much been a partnership project for CLD across SEIC.

Key learning

The project has highlighted the **absolute importance of digital skills** in CLD practitioners, particularly with the increasing reliance on online learning and communication. Practitioners were introduced to Zoom and video calls through Lync and were able to use these tools immediately when lockdown commenced. Most CLD team members are now participating in weekly virtual team meetings and are confidently using these now essential resources.

The project highlighted the need for CLD practitioners to have **access to the right digital/IT equipment**. The CLD practitioners' existing IT equipment was not fit for purpose and is now being addressed. The digital skills base amongst many CLD practitioners was low and the project has enabled skills to be increased. Of value was the mentoring/support available to practitioner colleagues within the CLD Service after they had undertaken training to help them adapt their learning and put this into practice.

The whole experience has been positive. As the Service leader Oonagh McGarry states

"The project was a life-saver for practitioners. the [STEM professional learning project] has also demonstrated to me its value and given me the confidence to apply for and support two staff members to continue their upskilling and practice in digital learning and STEM across the CLD consortium. We are also clear that digital is clearly writ large in two of the three 2021-2024 CLD Strategic Priorities which have a direct impact on learners".

The project has now received funding for Round 3 of the STEM Grants Programme.

2 Fraserburgh Academy/North East Scotland College (NESCOL) Craft Maths and Digital learning Tech Upskill Project

24

Practitioners engaged
(22 secondary teachers
and 2 school technicians)

75

Learners engaged
(Craft Maths)

6

Learners engaged
(Senior secondary
females in Robotics)

2

Establishments directly benefited
(Fraserburgh Academy and
NESCOL)

Rationale, objectives and targets for the project

The project was to take the Crafts Mathematics Course from a Further Education (FE) setting into a secondary school, through training Secondary School Mathematics teachers at Fraserburgh Academy in Aberdeenshire and supporting a skills-share with the North East of Scotland College (NESCOL), the local FE college. This allows learners to reach Level 5 (L5) Mathematics whilst at secondary school, as the traditional way of teaching Mathematics in secondary school means that many do not have L5 in Mathematics to allow them to pursue engineering courses at the local college.

The same approach was developed for Engineering, connecting learners to the Foundation Apprenticeship (FA) in Mechanical Engineering. The Nat 5 Engineering and FA in Mechanical Engineering offer **new career pathways**. Both the Craft Mathematics and the new in-school Engineering provision increase the number of learners progressing from school and taking STEM at FE, and in turn increases the number going on to take a career in STEM.

The project also involved a Digital Learning Tech element which upskilled two practitioners trained on maintaining and deploying digital tech in the form of Spheros for improving digital learning in Mathematics, Physics and Computer Science.

Overall, the project anticipated 90 learners engaged in L5 (Craft) Mathematics; 12 secondary practitioners benefiting from training and 2 school technicians.

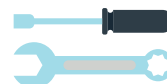
Target groups and engagement

The town of Fraserburgh is characterised by high levels of deprivation, lower skills attainment and higher than average unemployment, with its history of traditional employment sectors, notably fishing. There are however strong opportunities in engineering and related sectors, such as offshore renewables, if learners can be equipped with the skills to take up these opportunities.

The project, therefore, targets those who have an interest in STEM careers but who lack the core Mathematics L5 qualification to enable them to progress to FE to pursue their interest. The approach was to **build the capacity** of the secondary school teachers and equip them with the skills to deliver the new provision.

Delivery model, learning mode and content

The project was very much a **collaborative approach** with the FE College, NESCOL. This was at all stages, from working with the college in the upskilling of secondary school teachers and engaging learners, through to NESCOL doing the accreditation and verification of Craft Mathematics Nat 4 and Nat 5 level in school. There had always been close co-operation between Fraserburgh Academy and NESCOL, but this form of collaborative working has taken the relationship “to the next level”.



2 Fraserburgh Academy/North East Scotland College (NESCOL)

Craft Maths and Digital learning Tech Upskill Project

The Craft Mathematics Course was therefore successfully brought from FE into the secondary school context through training 8 Maths teachers initially and via skills share with the local FE College. This allowed 75 learners in the first session to reach level 5 Maths. The Digital Tech strand was extended to include the upskilling of Science practitioners using **new instrumentation** technologies, in response to a new progression path opening up into FE in Automation and Renewables, further cementing relationships between Fraserburgh Academy and NESCOL.

Impact on practitioners and learners



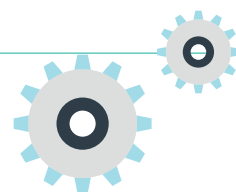
The Craft Mathematics Course has **addressed inequity in access** to L5 Maths for SIMD 1-4 learners, of which Fraserburgh, in the North East of Scotland has an above average number. Many learners would not have passed their traditional Mathematics Nat 4/5 (the project lead estimates only 10% had previously passed) even though many wanted to go on to STEM type subjects at college. The Craft Mathematics provision has also benefited ESOL learners who had previously struggled with the language element of National 5 question paper.

The Digital Learning Tech Upskill element has **improved gender balance** in inspiring young women to consider robotics and coding as a career path. This has been trialled through an extracurricular group and is beginning to roll out to curriculum areas.

In the first session, 75 Craft Mathematics learners achieved a L5 Maths who would otherwise have had no progression beyond L4. There were also six senior girls engaging in robotics via the extracurricular club. There are new curriculum plans in the use of robotics in Mathematics, Computer Science and Physics and further plans for introducing Level 6 Tech Maths following the Craft Maths Model.



Working with partners



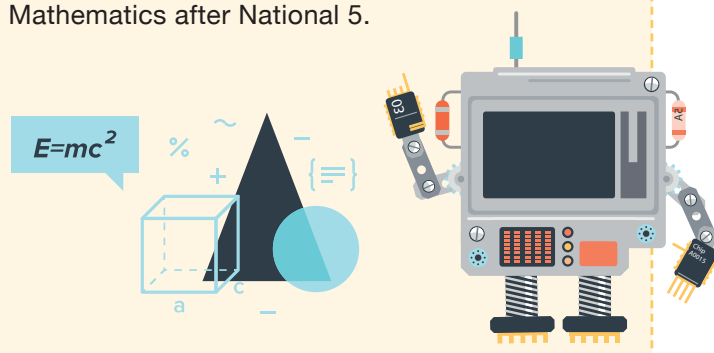
The project has demonstrated excellent partnership working between the secondary school, Fraserburgh Academy, and the FE College, NESCOL. The STEM Professional Learning Grant project has enabled the partnership to be cemented through the practical provision of Craft Mathematics and the Engineering Nat 5 and FA in Mechanical Engineering in the school context.

Key learning

There was a strong project lead from the secondary school throughout, which helped strengthen the relationship with the local FE college. The project lead encouraged the secondary school Mathematics teachers to develop and 'own' the new course provision, so that the school can deliver this new provision in future years.

The project has been an undoubted success, and the project lead has ambitions to extend their approach to STEM to pupils of all ages and is actively leading on the development of a 3-18 STEM strategy for the cluster.

There are also future plans to extend the positive working between the Senior phase and the College even further. The Level 6 Tech Maths represents a progression route as an alternative to Higher Mathematics, for those learners who would otherwise cease to progress in Mathematics after National 5.



3 Royal Highland Education Trust (RHET) Food, STEM and Sustainability: from farm to fork

4

Total number
of face-to-face
sessions

701

Total number of practitioners engaged
(416 through online portal, 94 face-to-face,
191 through webinars)

4

Total number of
industry visits
pre-COVID

4

Total number
of webinars
delivered

£6k

Total
project
spend

Rationale, objectives and targets for the project

Despite the food and drink sector being a priority industry in Scotland, the sector faces a skills gap, with thousands of recruits required across food manufacturing and agriculture over the short and longer term.

RHET, therefore, set out to equip secondary school teachers with increased confidence and knowledge of the food and drink sector in Scotland. This was to be achieved through professional learning and training designed to develop each practitioner's skillset in the areas such as science, mathematics and technologies with clear links to food manufacturing and sustainability, with a focus on the relevance of STEM to the sector.

The main targets of the project were the same across both phases: Delivery of 6 training sessions reaching 240 secondary school practitioners; delivery of an industry visit for all participants; and support in setting up industry engagement for all schools engaged in training.

Each phase would target practitioners from different local authorities:

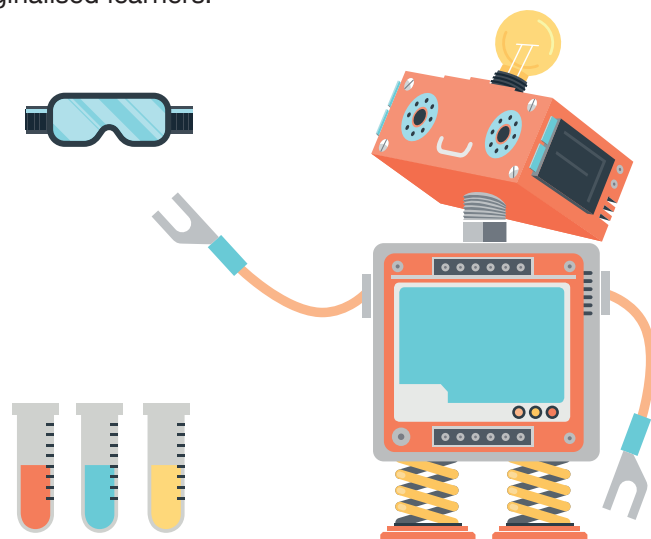
- **Phase 1**
Moray, Perth, Aberdeen, Dundee, Dumfries and Galloway, and Argyll and Bute;
- **Phase 2**
Edinburgh, Glasgow, Stirling, Clackmannanshire, Angus, and Scottish Borders;

However, due to COVID-19 and the restrictions placed on face-to-face engagement, CLPL was delivered online in Phase 2.

Target groups and engagement

The project sought to engage secondary school practitioners through upskilling that would enable them to apply knowledge in STEM subject areas to activities in the food and drink sector. The move to online delivery in Phase 2, however, allowed practitioners from **primary and community learning and development (CLD)** settings to engage with the training resources. The project was led by the RHET, in partnership with Food and Drink Federation Scotland, Quality Meat Scotland, The National Museum of Rural Life, and The University of Aberdeen Rowett Institute.

The development of online learning modules meant over **700 practitioners** were engaged across an online training and resource portal, as well as face-to-face delivery and webinars, with practitioners drawn from across Scotland. RHET set out to engage with as many practitioners as possible from schools in all areas, including rural and remote, and those without sufficient immediate access to CLPL training, or with more marginalised learners.



3 Royal Highland Education Trust (RHET) Food, STEM and Sustainability: from farm to fork

Delivery model, learning mode and content

In Phase 1, training was delivered face-to-face with 6 sessions taking place in Argyll and Bute, Dumfries and Galloway, Aberdeen, Moray, Perth, and Dundee. Following these, industry visits were facilitated for participants, including to a trout farm, a dairy farm, and a distillery, where practitioners and students were able to see their STEM learning and activity in action in a food and drink setting.

An online portal, '**Good Food Champions**', was launched by RHET and partners in Phase 2 in February 2021, presenting activities and links to STEM curriculum subjects. Practitioners were able to register onto the online portal and complete the training at their own pace. Resources made available were linked to issues such as climate change, waste, food security, and health and wellbeing, with activities drawing on STEM-related tasks such as using forestry and agricultural datasets in the classroom. The portal provided a range of resources, including webinars, presentations, quizzes, and podcasts, developed with input from industry and educational experts, and aligned with SQA units from National 4 to Advanced Higher.

Impact on practitioners and learners



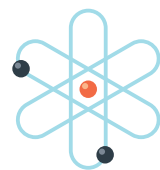
Across both the face-to-face delivery and online portal use, practitioners reported an increase in their knowledge of the food and drink sector and confidence around how to effectively integrate STEM learning and activities to the sector.

Through the Good Food Champions online portal, practitioners were able to access a wide range of STEM and food and drink-related resources which meant a greater array of learning tools were available. This meant practitioners could deliver increasingly creative and

interesting lessons to pupils, as well as share resources and expertise with other practitioners in their settings.

Some practitioners were also able to develop new links with the food and drink industry through RHET support, site visits, and expert webinars, thereby widening their network of STEM and industry contacts and bringing greater awareness of STEM pathways to the attention of their pupils.

Working with partners



The project delivered training and resources to practitioners across Scotland, linking secondary schools to industry through site visits and guest webinars. It has also been a successful collaborative project drawing on expertise and engagement from a range of sector-based organisations, including RHET, Food and Drink Federation Scotland (FDF Scotland), Quality Meat Scotland (QMS), and the Rowett Institute at the University of Aberdeen, together forming the Good Food Champions partnership.

Key learning



The project has provided a platform for RHET and partners to develop and sustain an online learning portal that can reach a wide range of practitioners across different settings, including rural and remote. The adaptation of resources to an online format was a positive change and one that has become the default method of delivery for the project moving forward. This means the project can reach a wider and more potentially more inclusive group of practitioners without the barriers generated by travel capacity, costs, and infrastructure challenges. This also highlights the wider need for IT equipment access across secondary education.

A key point of learning from the project is the benefits to and successes of collaboration between education and industry to ensure key linkages are made and learning pathways are opened for both pupils and practitioners.

4 Sunflower Family Nurture Centre

Building STEM capital across the locality

86

Total number of practitioners (86 ELC, 1 ASN)

10

Total number of school early adopters

234

No of STEM session hours delivered

5

STEM champions

£6k

Total spend across session hours

Rationale, objectives and targets for the project



Believing STEM should be planned for and have a high quality child centred approach, the project organisation wanted to ensure that staff in primary schools across the localities of the Lochgelly and Cowdenbeath area were confident and skilled at delivering STEM.

Target groups and engagement

The project sought to engage with Early Level practitioners in nurseries and Primary 1 to help them embed STEM into the everyday learning. They aimed to build up the skills in the staff at the centre to then have **STEM champions** to send out to these settings and share their expert knowledge. Associated with this, the staff would put their learning into practice in their engagement with the learners, helping to identify ways in which STEM can be engaged throughout every aspect of the day.

Delivery model, learning mode and content

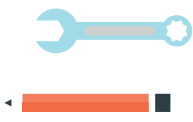


The project aimed to support the following:

- Learners across the Beath locality with access to **high-quality STEM learning experiences** through core provision and well-planned interdisciplinary approaches.
- Professional learning support for practitioners in the locality to **build their skills, knowledge and confidence** and enhance pedagogical approaches to ensure STEM is delivered effectively.
- Support **equity of access to high quality learning opportunities** through the cluster High Schools.
- Allow practitioners to **collaborate, problem solve and learn together** and build a network of STEM champions across the locality at the Early Level.
- Work closely with local schools and businesses to ensure **use of skills and expertise available** within the locality.

Phase 1

The initial Phase focused on **building up the knowledge, skills, and confidence** of practitioners. STEM champions were out in settings working with Early Years Officers to support them with children in STEM by observing them in play and helping guide the next steps for STEM delivery for the short and long term. It was based in live settings with children and mainly focused on on-the-job learning to help practitioners think on their feet with STEM engagement. Moreover, there was some twilight training and professional learning sessions which were opportunities for staff to get together to have professional dialogue around STEM learning.



4 Sunflower Family Nurture Centre

Building STEM capital across the locality

• Phase 2

Phase 2 delivery focussed on taking this learning in the nursery to Primary 1 classes and **embed STEM learning** in this setting. Children were often leaving nursery settings with high level skills and experience with materials, drills, woodwork and more, but the Primary 1 staff did not feel they could develop on these. This phase aimed to train up Primary practitioners on the skills required to embed STEM in a free flow manner through play.

Due to the COVID-19 pandemic, the delivery was refocused on to one school with woodwork. This included Primary 1 and nursery children working together to make Christmas trees out of pallets and selling these online to families through a joint enterprise project. Every child had the opportunity to learn something and this woodwork learning continued so that it was eventually embedded into the curriculum and life of the class.

were often engrossed in the work they were doing, indicating a behavioural management aspect to it.

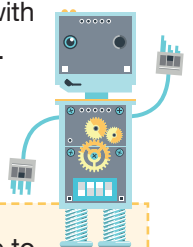
Improving the gender balance was an important aspect of the project, with emphasis placed on how staff and parents speak and approach moments with children, and ensuring that activities are appealing to all children with equal opportunities.

Working with partners



There has been successful collaboration with local nurseries and schools, with Early Years Officers and practitioners. It has been useful to learn from one another, for example, hearing from Primary 1 staff where they feel children should be by the time they arrive from nursery, and vice versa. There has also been wider engagement with a local care home where the children worked with them to build benches, as well as partnerships with local businesses, such as Purvis to support them with the materials they need to undertake projects.

Key learning



The project has highlighted that staff have to feel confident on what skills they are delivering. It is important to be learning to align the skills of the future with how children experience every day and where science concepts naturally occur. This will help them be prepared and engaged as much as possible to build on this at different stages of their education.

The project is not yet putting in an additional funding application. They have had a high turnover of staff and are aiming to open a third setting this year and want to ensure that the centre and the staff are familiar with what they need to be doing.

The next year will be about continuing to work with more locality schools in the area, supporting similar work like woodwork, although there is so much opportunity to widen this scope with the STEM work.

An example of the STEM embedding process is the Small World project at the centre. This is a project that the children have worked on to create a world through woodwork and other crafts in the outdoor garden. One child identified that the houses in the Small World did not look like their home, as a lot of the children in the area live in flats. This became a learning opportunity on Housing and Homes and resulted in the children building their own block of flats that was relatable to them. This went on for 5-6 weeks with the children regularly adding to it and redecorating the flats. It was a key opportunity to embed STEM skills in supporting their learning and widen their understanding.

Impact on practitioners and learners



The project has been able to support practitioners and **increase their confidence and skills in delivering STEM**. They had the resources they needed that would support them in delivering STEM learning. The children

5 East Ayrshire Council

Raising Attainment in Numeracy and Mathematics CLPL Programme

250

Practitioners
directly engaged

50

Establishments
directly benefited

Rationale, objectives and targets for the project

The Raising Attainment project was developed and put into practice primarily with the intention of raising attainment for children and young people in Numeracy and closing the poverty related attainment gap between the most and least socially advantaged. The project aimed to provide them with the best possible life chances, and it is believed this can be achieved through enhancing the quality of learning and teaching in Numeracy and Mathematics through practitioners. In addition, it also looked to build a better understanding of Mathematics in and beyond the classrooms.

East Ayrshire Council is an Attainment Challenge Authority, with 25 primary schools and five secondary schools previously involved in the Raising Attainment in Numeracy training for practitioners. Previously, the training programmes have had a positive impact on the confidence, attitudes and attainment for teachers and pupils. This Raising Attainment project looked to increase the pace and reach of the programme to build on the momentum that has already been gained.

It was anticipated that the work will achieve the following objectives:

- **Enhance quality of learning and teaching in Numeracy and Mathematics by building strong practices to support closure of the attainment gap;**
- **Provide CLPL opportunities for high quality learning, teaching and assessment;**

- **Develop a wider range of strategies and representations to enhance understanding of mathematic concepts;**
- **Improve practitioner confidence in determining gaps in pupils conceptual understanding and knowledge, supporting learners and identifying specific learning difficulties.**

The project sought to engage 650+ participants in East Ayrshire, including Primary (400+), Secondary (100+), ELC (120+) and ASN (20+) for a project spend of c.£13,000.

Target groups and engagement

The primary target group for this project was both practitioners and pupils. The project was designed to educate and equip teaching professionals with the knowledge and ability to deliver a more engaging programme of Numeracy and Mathematics to pupils. The project also utilised Virtual Learning Environments (VLE) technology such as Glow to increase the pace and reach of the twilight training provided across the region.

Delivery model, learning mode and content

Delivery of the project in Phase 1 was mainly in the form of twilight sessions and school collegiate sessions focused on specific aspects of Numeracy and Mathematics pedagogy. The Numeracy Leaders designed and delivered eight twilight sessions, including the development of the mathematical learning environment and the pedagogy underpinning effective practice. These CLPL sessions were delivered virtually through MS Teams and VScene platforms.

Two twilight sessions re-visited mental calculation strategies and 'Number Talks', and support was provided to schools who already have 'Number Talks' well established in their setting, to ensure this is maintained and developed.

5 East Ayrshire Council

Raising Attainment in Numeracy and Mathematics CLPL Programme

A further four twilight sessions in 'Developing Fractional Reasoning' built on these. A focus of these training sessions incorporated key messages relating to developing mathematical mindsets, challenging and transforming public attitudes to mathematics.

Phase 2 of the project built on Phase 1 activities, supporting the design, development and delivery of Numeracy and Mathematics into future sessions. It also developed the Numeracy and Leaders network to help develop a self-sustaining Teacher Learning Community (TLC).

Impact on practitioners and learners



The training programmes had positive impacts on teachers' and pupils' confidence and attitudes to Numeracy, as well as pupil attainment in Numeracy. The project also strengthened the network of Numeracy Leaders and supported the development of a Numeracy and Mathematics pedagogy across all education groups.

Almost all the practitioners had an increase in confidence in delivering 'Number Talks', teaching Numeracy and Mathematics, and using EAC planners to inform and plan teaching, and many also believed that children are more confident working with numbers.

"Children's mathematical vocabulary has improved, number processing strategies used to solve calculations is now more varied and is explored more."

An East Ayrshire Numeracy and Mathematics blog was developed to provide a single communication channel for East Ayrshire practitioners as they plan learning, teaching and assessments in Numeracy and Mathematics. This has provided support for practitioners as they plan learning within COVID-19 recovery, blended and online learning. A digital space was also developed for the Raising Attainment in Numeracy training to provide a digital space for practitioner engagement and collaboration in STEM CLPL and it has just under 400 members.

Working with partners



The project has demonstrated excellent partnership working between the Numeracy Leaders Team of East Ayrshire Council and varying professionals within the education system, from early learning and childcare institutions to primary and secondary schools. Additionally, by incorporating 'Mathematical Reasoning using Bar Models' designed and developed by the SWEIC Maths Group, the twilight training CLPL programme in East Ayrshire initiated contact and support networks between Numeracy and SWEIC leads, and will continue to produce training inputs which will further supplement the Raising Attainment in Numeracy and Mathematics CLPL Programme.

Key learning



The project has been a clear success, and the project lead and practitioners benefiting from the project are enthused about the learner outcomes to date and the future potential of working in this way. There are ambitions to extend their approach to STEM to pupils and further build on the enhancement of the Numeracy and Mathematics pedagogy.

The project achieved its aims of continuing to develop the East Ayrshire Numeracy Leader Network, provide a space for practitioners to collaborate, share effective practice in relation to Numeracy and Mathematics, and deliver a suite of professional learning available to all East Ayrshire practitioners. The Numeracy Leader network has seventeen practitioners who are developing and delivering Numeracy and Mathematics training inputs and resources for authority colleagues across all curriculum levels in broad general education.

The project has helped to build the capacity of practitioners to improve gender balance and promote equality and address inequity through a universal offer to all establishments to training.

Based on key learning through this project, the next phase will aim to enhance and expand provision to support the planning for learning, teaching and assessment in Numeracy and Mathematics and strengthen Numeracy Leader and TLC networks.