

Raising Aspirations in Science Education (RAiSE)

Sustainability and legacy of programme investment

This paper will examine the impact of the RAiSE programme in local authorities which have exited the two-year formal funding period, profiling how the foundations developed by the RAiSE intervention have been grown and further embedded by local authorities.

About RAiSE

RAiSE is a programme of The Wood Foundation, Education Scotland, Scottish Government, and participating local authorities. It has engaged half of Scotland's local authorities since launching in January 2017.

Through a two-year funding and support model, local authorities appoint a Primary Science Development Officer (PSDO) to develop and lead upon the local strategy and implementation of measures to improve the STEM experiences and outcomes for primary pupils. The PSDOs' interventions are designed to increase practitioner confidence by developing and delivering professional learning opportunities, creating networks and partnerships, and providing a vital central support role for local learning communities.

The PSDO network is anchored by the National Education Officer for Primary Science who leads upon the programme strategy, PSDO professional learning, and reporting. The National Education Officer is employed on a permanent contract by The Wood Foundation but based within Education Scotland under a Collaborative Worker Agreement. This approach allows systemic embedment, alongside long-term stability of the programme with continuity of learning and leadership.

RAiSE, which was developed in 2016, supported the development of the Scottish Government's STEM Education and Training Strategy and addresses Developing the Young Workforce priorities. The programme further supports practitioners to employ STEM as a vehicle for addressing a range of curricular drivers with an added value, rather than add-on, approach.

The national structure is implemented on an authority-by-authority basis reflective of local context to ensure maximum impact, delivered as a partnership with authorities. [Overview](#)

RAiSE was launched as a two-phase pilot with eight local authorities. Their growth and continued journey in terms of primary science and STEM will be examined in this paper. Due to the success of the pilot, the programme is now open to national invitation and has since engaged a further eight authorities who were still within their formal funding window until at least December 2020 so will therefore not be referenced in this paper.

The eight authorities selected for the pilot period are deliberately diverse in terms of urbanity and rurality, Scottish Index of Multiple Deprivation (SIMD), education and employment priorities, and STEM learning experience. This approach has evidenced the flexibility of the programme to be a proven success factor.

Pilot authorities and their RAiSE journey:

NAME	FUNDING PERIOD	CONTINUED POSITION
City of Edinburgh	January 2017 to December 2018	Associate Development Officer in post until June 2020. Primary STEM Network

		Coordinator has been in post since August 2020.
Moray	January 2017 to December 2018	No officer in post after formal funding period. Team members remain engaged with RAiSE network.
Highland	January 2017 to December 2018	Maths and Numeracy with STEM Development Officer remains in post, supported by local Strategic Lead.
West Dunbartonshire	January 2017 to December 2018	PSDO in post until April 2019. Team members remain engaged with network.
Angus	August 2017 to June 2019	PSDO remains in post.
Dumfries & Galloway	August 2017 to June 2019	Four members in STEM team until June 2020. Curriculum Support Officer with STEM in remit now in permanent post.
Fife	August 2017 to June 2019	PSDO in post until June 2020.
Glasgow City	August 2017 to June 2019	Two STEM Development Officers remain in post.

The paper will profile how the RAiSE investment has acted as a catalyst for high quality STEM education regionally and nationally, analysing the impact on strategic positioning of STEM, practitioner confidence, pupil experiences, and partnerships beyond the lifetime of a local RAiSE funding award.

A series of virtual interviews took place during summer 2020, supplemented by ongoing data collection, case studies, and focus groups.

Evaluation of the pilot

The Robert Owen Centre for Educational Change at the University of Glasgow undertook an external evaluation of the pilot which was published in April 2019. Key findings from the report include:

- 71% of teachers more confident in science pedagogy since engaging with RAiSE.
- 87% of teachers saying the programme has allowed pupils to experience challenge in their learning.
- 77% of teachers saying pupil aspirations had increased.
- The role of the PSDO as an anchor for STEM learning activity regionally was vital.
- A flexible approach has been key to success.
- Systemic change and sustainable practices lie at the heart of the programme.

Local authorities' strategic STEM approaches

RAiSE is a flexible intervention which works in partnership with local authorities to devise approaches aligned to their respective local contexts, priorities, and drivers, while addressing national and curriculum focuses. This approach, which embeds systemic change, has been vital for the sustainability and far-reaching impacts of the investment.

Local authorities have reported using the funding period to better understand the role and potential of STEM education, creating a proven foundation upon which to build. To date, half of exited

authorities retain a member of staff in the PSDO, or similar, position. A further third had someone in post for at least a year after exiting funding.

The PSDO, or similar, post has been critical in achieving maximum legacy impact from the programme investment.

Juliet Lunniss, former PSDO, City of Edinburgh: “RAiSE was important in Edinburgh in cementing the position of STEM as a key educational driver. It was also important in terms of gender balance and digital technologies. I have witnessed a huge leap in confidence and output from practitioners I worked alongside and seen many of the partnerships develop and grow.”

10,000 professional learning hours delivered by exited authorities in

5000 engagements with practitioners by exited authorities in 2019/20

All exited authorities have remained engaged with the network, through attendance at collaborative professional learning events, receiving communications, and sharing best practice. The National Education Officer is a vital anchor for this network and provides individualised, tailored support to authorities.

DUMFRIES & GALLOWAY STRATEGIC COMMITMENT TO STEM

Dumfries & Galloway has built upon the engagement strategies, partnerships, and opportunities developed throughout the RAiSE funding term. Its STEM approach throughout the 3-18 curriculum has been influenced by RAiSE. The former PSDO, who is now a permanent Curriculum Support Officer with STEM in her remit, is an active and engaged member of the network. Key successes since Dumfries & Galloway’s exit from formal funding in June 2019 have been:

- Curriculum Support Officer position is now permanent.
- Recognition by GTCS for digital work across clusters.
- The evolution of the Regional STEM Partnership which collaborated to create a regional STEM strategy to address the Scottish Government’s STEM Education and Training Strategy which includes school representatives, as well as Education Scotland, further and higher education institutions, industry, Developing the Young Workforce and colleagues from the Community Learning and Development team. The strategy aligns with the region’s 10 industry growth sectors which include construction and renewable energy.
- The annual Dumfries & Galloway STEM Conference, which moved online due to Covid-19 in 2020, has been shared nationally as an example of best practice. It attracted more than 200 participants, who engaged with more than 30 partners and professional learning opportunities.

David Maxwell, Strategic Lead, Dumfries & Galloway: “The time was right for RAiSE in Dumfries & Galloway. It provided a vital structure for us to explore the potential of STEM for our youngest learners and, as a rural authority, the co-created framework of delivery was important. We now have a five-year strategy for primary STEM.”

The ongoing engagement with the RAiSE network and National Education Officer, alongside the wider Education Scotland STEM Team, supports stronger strategic alignment to national priorities, opportunities, and initiatives such as interdisciplinary learning, the Skills 4.0 agenda, and gender balance and equality. There have also been clear examples of exited authorities using the lessons learned from their RAiSE involvement to inform and develop STEM education in both early years and Broad General Education (BGE) phases.

Growth of practitioner confidence

One of the principal objectives of RAiSE is to increase practitioner confidence. The programme architects strongly believe that it is only through investment in our existing teaching workforce that we can improve the wider potential of our workforce of the future.

Alistair Harbison, Class Teacher, Angus: "My involvement with RAiSE has increased my personal confidence in STEM teaching and to weave it into our school ethos. We can recognise how our actions align with our curriculum objectives. The external support of the PSDO was of fundamental importance in terms of time, space, activity, and direction."

**85 Glasgow
Primary STEM
Leaders
continuing to
collaborate**

The pilot clearly demonstrated RAiSE interventions were contributing to the growth of confidence relating to STEM pedagogical approaches and content, as well as across other areas of the curriculum. This growth continues to be nurtured once authorities have exited RAiSE through continued professional learning opportunities, self-sustaining networks offering vital peer support.

ANGUS STEM LEADERS INSPIRING OTHER AUTHORITIES

Angus launched the Primary Science Leaders in 2017, during its RAiSE investment period, and has since then empowered more than 25 practitioners in the region.

Eight sessions delivered over a period of six months involve practitioners collaborating with peers and the PSDO to develop action plans which they will then deliver in their settings.

These upskilled, confident practitioners become science leaders of learning within their setting and cascade their learning, develop new opportunities, and create strong regional partnerships.

The success of the Angus model for leadership in science has been used to inform Dumfries & Galloway's approach which is being delivered across three geographical areas. Falkirk, West Lothian, and Clackmannanshire have used the Angus approach to develop a STEM Leadership professional learning course which will be offered across their Regional Improvement Collaborative, including Stirling which is not a RAiSE authority. Key partners in all programmes include Education Scotland's Improving Gender Balance and Equality team, a STEM Education Officer, attainment advisors, and the National Education Officer will all support the learning.

Key successes of Primary Science Leaders in Angus have been:

- Participants leading professional learning across authority.
- Participants leading cluster approaches to STEM learning.

Mel Richards, PSDO, Angus: "The Science Leaders programme created an incredible network of practitioners who support one another, support their school communities, and support their learners. The potential cascade effect of these empowered educators is very powerful."

PRIMARY STEM MEET-UPS EDINBURGH

These were launched by the Associate Development Officer as a legacy to the RAiSE funding. She attended RAiSE professional learning sessions in her class teacher role and they increased her confidence in delivering STEM professional learning to such an extent she has taken on a leading STEM role within the authority. This group has met in-person and virtually six times and engaged more than 130 practitioners. They sit alongside the region's STEM Developers sessions which have engaged more than 30 practitioners.

*Amy Dixon, Primary STEM Coordinator (formerly Associate Development Officer), Edinburgh:
"These supportive, collaborative networks are so important in terms of increasing confidence and developing new and exciting ideas. I took a lot from it personally and it's great to see that cascaded impact across the network."*

Recognising the synergies and potential for complementarity, SSERC's Primary Cluster Programme has further embedded the opportunities for cluster working, further impacting the capacity and confidence of practitioners. The self-sustaining mentor networks can be further supported by the PSDO and recognise additional opportunities for collaborative working.

A key tenet of RAiSE's continued evolution is the ongoing monitoring and evaluation of its impact in terms of professional learning hours and engagements, alongside qualitative and quantitative analysis of the impact on practitioners to ensure interventions are addressing need. This has provided a vital level of insight and evidenced that the models utilised during the investment period continue in exited authorities.

In terms of the PSDOs' impact within local authorities, the majority of officers who have exited the RAiSE position have moved into a promoted post and are becoming a key local authority or Education Scotland influencers and leaders of, and for, learning.

Improved and enriched pupil experiences

The ultimate stakeholder for all RAiSE activity is pupils. The investment in increased practitioner confidence is designed to provide pupils with improved and enriched STEM experiences which motivate and engage them with the curriculum. Instilling curiosity and problem-solving skills from an early age will develop critical thinkers with the understanding, desire, and confidence to continue developing STEM skills throughout their learning, life, and work.

The PSDO, and associated roles, offer tailored support to schools and practitioners, collaborating on opportunities which continue to have direct impact on pupils.

The PSDO audits and reviews the wealth of resources and opportunities available for practitioners, quality assuring materials and offering vital insight into adaptations to suit context and stage. Associated training and discussion around these resources benefits the quality of experience being delivered. Increased exposure and understanding are making practitioners more confident in exploring the potential of external sources to contextualise learning throughout their curriculum.

The ongoing impact of schools' involvement with RAiSE is evident in Dumfries & Galloway. The Head Teacher of three local schools has committed to STEM strategically and one of the schools has been recognised by the Scottish Education Awards for STEM.

Sheila Baillie, Head Teacher, Dumfries & Galloway: "I felt a great sense of pride watching how our teachers embraced the opportunity to upskill in this way. This continues to be recognised across our school community."

Exited authorities have contributed to an online science planning resource, as well as context planners which showcase interdisciplinary and blended learning opportunities. This national offer includes suggested activities, key questions and vocabulary, as well as 'how to' videos which support practitioners with their planning for learning, teaching, and assessment. This legacy work has continued to support all authorities. There is also a host of online materials, events, and social media feeds, available to all practitioners, which continue to promote inspiration and innovation, sharing delivery guides and resource, as well as professional learning.

RAiSE is committed to supporting practitioners to realise the additionality STEM can offer across a range of contexts, embedding it within the curriculum to support a range of drivers. STEM can bring literacy, numeracy, and health and wellbeing to life and authorities continue to benefit from this holistic approach which is embedded during the funding period. There are also a number of ongoing examples of national and international celebration weeks being promoted, along with STEM learning resources, to support pupils in benefitting from context-driven lessons.

STEMaStory, GLASGOW

Developed with the Literacy Challenge Leaders of Learning as part of Glasgow's Improvement Challenge, STEMaStory was created by the Primary STEM Leaders network in 2017 and links STEM with the Bookbug content shared with primary pupils. Each school uses the annually updated resources in ways which suit their context, including parental engagement, pupil-led research, and outdoor learning.

It has been recognised that issues outwith the classroom must also be addressed to ensure equitable pupil engagement in STEM. Primary STEM offers avenues in which to better motivate pupils at risk of disengaging with their education, as well as engaging families. RAiSE has given practitioners the tools and confidence to realign their thinking in terms of STEM to find innovative, ongoing ways to increase confidence and enjoyment of educational opportunities through STEM. These models, which have been supported by the PSDO, are growing from one class pilots to being cascaded throughout learning communities and across curricular areas. Inspiring and motivating all children, regardless of their home background or circumstance, provides real equity of STEM experience.

CURIOSITY CLUBS, EDINBURGH

The clubs were developed by the former PSDO in her new role, supported by the Associate STEM Development Officer as a legacy project of RAiSE. The scheme has been rolled out to four schools.

At Craighour Park Primary, this initiative initially engaged looked after young people, a group traditionally facing significant challenge, in a forensics project. The learnings and successes of this intervention led to the clubs being offered to all P6 pupils and took the form of team STEM Challenges, incorporating language development and providing relevant, real-world contexts for learning.

The school also used this as a catalyst for its STEM leads to develop engineering lessons which featured cross-class peer support and increased cluster working. A Science Club has also been established with university students.

STEM BAGS, ANGUS

Warddykes Primary, a school with a high proportion of children in SIMD 1, used STEM bags to encourage family engagement, and instill confidence and excitement in young people about STEM learning. The initiative was borne of a practitioner's involvement with RAiSE training and supported by the PSDO. It has engaged 45 pupils and their families thus far, with intention to expand the initiative to encompass all classes. There was a 97% return on the associated STEM homework in phase one.

RAiSE interventions give pupils relatable opportunities to understand how their STEM learning is applied throughout their communities and local industries, and showcases a diversity of role models. PSDOs have been responsible for establishing vital and enduring partnerships, created network clusters, and fostered collaboration opportunities which provide memorable experiences. Events launched during the RAiSE investment period are being sustained and developed in new ways to further engage pupils.

INCREASING GENDER BALANCE AND EQUALITY (IGBE)

All RAiSE PSDOs have undergone training with Education Scotland's IGBE team which has been cascaded throughout their practices with practitioners. A collaborative working relationship continues with exited authorities to ensure activities are mutually supportive of STEM and IGBE objectives.

PSDOs have also identified and supported the application process for grants which further enhance the classroom experience. Securing these grants give practitioners ownership of their innovative lesson approaches and potential to test bed new ideas, further increasing practitioner confidence and extending the legacy impact on pupil experience.

Sustainability of networks and partnerships

Partnerships lie at the heart of the RAiSE model between practitioners, local authorities, Education Scotland, Scottish Government, The Wood Foundation, industry, and community. Bringing learning

to life requires collaboration and co-design. Ensuring the improvement journey catalysed by RAiSE investment continues beyond the funding lifecycle requires collective ownership of, and commitment to, the mandate for more high-quality, equitable primary STEM learning and teaching.

PSDOs embed relationships which offer sustainable development opportunities in order to best realise the long-term value of partnerships.

A key success of the legacy of RAiSE investment has been an increase in cluster approaches in terms of practitioner collaboration, including transition activities for senior primary pupils.

A number of higher education facilities, trade bodies, and other institutions are committed to engaging with education but seek to do so meaningfully and with tangible impact. Without dedicated resource the introduction, nurture, and management of these relationships can be challenging. The central resource of a PSDO, or associated position, to make these connections and ensure engagements are appropriate, tailored to stage and circumstance, and can be mutually beneficial and self-sustaining has proven fundamental to success and longevity of relationships. RAiSE is an important conduit in linking primary schools with a range of opportunities and contextualising the curriculum for both practitioners and learners.

UNIVERSITY OF EDINBURGH, ASTROBIOLOGY, NATIONAL OFFER

The Astrobiology Transition Project was co-designed and developed with the Edinburgh PSDO, National Education Officer, and the University. It brings P7s together at their new secondary school to work in teams on a range of tasks which encourage research and teamwork.

It has engaged **3000** pupils and **50** practitioners throughout the country. It was paused in 2020 due to Covid-19 but there are plans to reintroduce it for next year's cohort. All PSDOs have now been trained on the offering and will continue to cascade the learning.

The Developing the Yong Workforce agenda is an important driver in Scottish education and RAiSE's commitment to industry links aligns with these aims to give young people an exposure to, and understanding of, employment opportunities and pathways. A number of key industry relationships are established, developed, and nurtured by the PSDO. These relationships, because of their relevance to learning and management of expectations, are successful and sustainable. A strong example of this is the Progression Pathways project in Fife whereby the PSDO worked with local STEM industries to align their outreach offers with curriculum content. These offers will be offered across multiple years to the region's schools.

NEWTON ROOMS. HIGHLAND

The local PSDO worked closely with the Newton Rooms team to develop module content for senior primary pupils addressing seven of the region's STEM growth sectors. These lessons are being shared and implemented across Highland schools, giving pupils relevant, hands-on, and impactful STEM experiences. Due to the success of these activities, the Science Skills Academy is now considering developing additional modules for early years and younger primary pupils.

The Energy Skills Partnership introduced the FIRST Lego League to RAiSE authorities in 2018. Since then it has engaged 65 schools with more 130 teams. RAiSE supported the alignment of the opportunity with Curriculum for Excellence to deepen its impact.

Wendy Findlay, Energy Skills Partnership: "The support of RAiSE has without doubt increased the effectiveness of our STEM programmes, providing outreach into the most rural and deprived areas of Scotland whilst ensuring that the resources provided are used for maximum effectiveness."

QUAYBRIDGE, NATIONAL

Quaybridge worked with the National Education Officer to develop an online resource which showcased the range of roles offered in the renewables industry and the STEM skills and pathways available. This website, which is now freely available for all, also addresses gender balance and is a lasting, self-sustaining resource.

Continued opportunities for STEM development in exited authorities

Two years since the first tranche of authorities exited the funding, there continues to be tangible opportunities for the programme's legacy to be further extended and embedded.

The focus on growing online opportunities in 2020 has galvanised a digital approach which transcends traditional regional parameters for professional learning and networking opportunities, offering greater equity for all practitioners.

The regional Education Scotland STEM Education Officers, appointed in early 2019, will offer important support to further realise the ongoing potential of opportunities founded during the RAiSE investment and build upon those in a strategic way alongside core local authority staff responsible for STEM.

Regional Improvement Collaboratives (RICs) have a role to play in uniting STEM learning and collaboration, offering further opportunities for growth. The success of the school cluster model employed through RAiSE initiatives can be applied on a regional scale. The programme is now deliberately engaging authorities in this manner based on this learning and three of the four authorities in the Forth Valley West Lothian and South West Regional Improvement Collaboratives are all now engaged.

Conclusion

This report clearly demonstrates the ongoing legacy of the RAiSE investment, beyond the two-year funding model. Local authorities have grown and embedded the opportunities, approaches, and systems devised during the PSDOs' tenure. The funding provides the structure, space, and strategies to discover what will work for the authority in realising its STEM potential and catalyse its implementation.

The continued investment by local authorities in the PSDO, or similar, position has been a key factor in maintaining the momentum and building upon the RAiSE funding period. However, the self-sustaining partnerships and confident, upskilled practitioners engaged during the funding period will continue to impact their learning communities in tangible ways beyond any additional financial investment.

An engaged, supportive strategic lead in local authorities is critical for meaningful engagement during the RAiSE investment and to ensure a continued strategic, impactful, locally relevant legacy which embeds STEM learning within their wider educational and economic priorities.

It is clear empowered practitioners are leading change and, by investing in their development, RAiSE is nurturing a new generation of young people excited about the opportunities of STEM. The eventual aim of this investment is that there will be increased uptake on STEM subjects in secondary school and through further and higher education, leading to improvements in the STEM talent pipeline entering the workforce. Longitudinal evaluation will establish the long-term success of this approach.