Education Scotland
Foghlam Alba

Professional Learning in STEM

Findings from the Annual STEM Survey 2020/21

School-based technical support staff

April 2022

For Scotland's learners, with Scotland's educators

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Introduction

This report presents the key findings from Education Scotland's Annual STEM Survey for school-based technical support staff covering academic year 2020/21.

Education Scotland has continued to gather and analyse annual STEM surveys since 2016/17 to inform and support the ongoing implementation of the STEM Education and Training Strategy (2017)[1]. A dedicated survey for school-based technical support staff was introduced in 2018/19.

The findings from the surveys[2] provide valuable insights into the professional learning needs of practitioners and technical support staff; the challenges they face in accessing professional learning and their professional learning priorities. The survey findings have been used by Education Scotland to help shape the national professional learning offer, including the projects supported through the Enhancing Professional Learning in STEM Grants Programme. A wide range of partner organisations have also used the survey findings to help them align their professional learning programmes and strategies to the needs of practitioners and technical support staff.

Education Scotland will continue to measure progress against the following STEM Strategy key performance indicator[3]:

> **II. Increased practitioner confidence in STEM learning in the early years, primary years and in CLD settings and increased practitioner engagement in STEM professional learning opportunities. (Excellence)**
>
> - Increase the cumulative hours of STEM professional learning accessed by early years, schools, college and CLD practitioners annually.

Progress against this key performance indicator, and others, are reported on annually with detailed findings available through the First[4], Second[5] and Third STEM Strategy Annual Reports[6].

Due to the COVID-19 pandemic, a survey was not issued in 2019/20. In addition, the 2020/21 survey coincided with the COVID Omicron wave, resulting in a significant reduction in the response rate in comparison to previous years. Care should, therefore, be taken when comparing results year on year.

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[1] STEM Education and Training Strategy for Scotland: https://www.gov.scot/publications/science-technology-engineering-mathematics-education-training-strategy-scotland/
[2] A summary of STEM resources: https://education.gov.scot/improvement/learning-resources/a-summary-of-stem-resources/
[3] STEM strategy: key performance indicators: https://www.gov.scot/publications/stem-strategy-key-performance-indicators/
[4] STEM Strategy for Education and Training in Scotland - First Annual Report: https://www.gov.scot/publications/stem-strategy-education-training-scotland-first-annual-report/
[5] STEM Strategy for Education and Training in Scotland - Second Annual Report: https://www.gov.scot/publications/stem-strategy-education-training-scotland-second-annual-report/
[6] STEM Strategy for Education and Training in Scotland - Third Annual Report: https://www.gov.scot/publications/stem-strategy-education-training-scotland-third-annual-report/

Key findings

Number of responses – There were 44 responses to the 2020/21 survey. This is 79.5% lower than the number of responses to the 2018/19 survey. Of the 44 respondents, 43 worked in the secondary sector and 1 in the primary sector. It is important to note that the information contained within this report is based on a much smaller sample size than previous surveys and care should be taken when drawing comparisons or identifying trends.

Type of technical support provided – The majority of respondents (32) provided technical support for sciences as part of their role. Technical support was also provided by 17 respondents for both digital/ICT and technologies. Almost one quarter of respondents (10) stated that they provided technical support for all curricular areas.

Cumulative hours of professional learning – The total number of cumulative hours of STEM professional learning accessed between 1 August 2020 and 31 July 2021 by the 44 school-based technical support staff who responded to the survey was 647 hours. This equates to 14.7 hours per person per annum. This is an increase of 3 hours per person per annum when compared with the average of 11.7 hours per person per annum reported in the 2018/19 survey.

Types of professional learning accessed – Respondents were asked about the types of professional learning they accessed and how valuable each format was. The top three types of professional learning that were identified as ‘valuable’ or ‘very valuable’ were:

1st.	Online professional learning	40.9% (18 responses)
2nd.	Professional reading and engaging with research	38.6% (17 responses)
3rd.	Working with other practitioners within my setting	29.5% (13 responses)

Organisations providing STEM professional learning – When asked which organisations provided the STEM professional learning they had engaged with, the three most popular responses from school-based technical support staff were:

1st.	SSERC	54.5% (24 responses)
2nd.	Technician Service Centre	27.3% (12 responses)
3rd.	Local authority	18.2% (8 responses)

Accessing professional learning in STEM – Only 4.9% of school-based technical support staff reported that it was 'easy' or 'very easy' to access professional learning in STEM. The most common barriers to accessing professional learning in STEM were:

1st.	Changing role/workload due to the COVID-19 pandemic	50.0% (22 responses)
2nd.	Lack of funding to pay for professional learning	36.4% (16 responses)
3rd.	Difficulty in finding staff cover	27.3% (12 responses)
=	Don't know where to get information about professional learning	27.3% (12 responses)
=	Lack of funding to pay for associated travel/ accommodation costs	27.3% (12 responses)

STEM professional learning priorities for 2021/22 – The top three responses for STEM professional learning priorities for school-based technical support staff in the year ahead were:

1st.	Sciences	59.1% (26 responses)
2nd.	Support with new equipment	56.8% (25 responses)
3rd.	Health and safety update	54.5% (24 responses)

Annual STEM Survey 2020/21

About the survey

Background

The aim of the Annual STEM Survey is to track enhancements in STEM professional learning undertaken by school-based technical support staff.

The survey covers aspects such as:

- Number of hours of STEM professional learning accessed
- STEM professional learning priorities of school-based technical support staff
- Barriers to accessing professional learning.

Three further surveys were issued in 2020/21 to gather data from other sectors including:

- Early learning and childcare and schools, including additional support needs (ASN)
- Community learning and development (CLD) practitioners
- Organisations that provide STEM professional learning.

The data presented in the 2020/21 survey findings was collected during an unprecedented period of disruption to the Scottish education system. Survey questions were adapted from previous years to take cognisance of the impact of the COVID-19 pandemic on the professional learning of practitioners. The response rate to the 2020/21 survey was significantly lower than previous years. This was largely the result of the rapid spread of the COVID Omicron variant, shortly after the survey had been issued. Education Scotland reduced its promotion of the surveys accordingly to avoid putting undue pressure on practitioners. Therefore, care should be taken when comparing data from the 2020/21 survey with previous years as these results provide a limited snapshot of STEM professional learning within the wider context of education recovery.

Structure and purpose

The survey was available made available to all school-based technical support staff via an online survey. It was promoted widely via Education Scotland and Scottish Government communication channels.

The survey findings have played, and will continue to play, a crucial role in shaping the implementation of the professional learning actions in the STEM Education and Training Strategy (http://bit.ly/STEMstrategy).

The findings from previous surveys have directly influenced the framing of the Enhancing Professional Learning in STEM Grants Programme which has seen over £4 million awarded to support professional learning programmes since its inception in 2018. The ambition of the grants programme is to ensure that practitioners in relevant sectors, and in various geographical locations, have access to high-quality professional learning which meets their needs. The survey highlights priority areas for action and gaps that need to be addressed. The evidence provided by the surveys are also directly informing the work of and the professional learning

offer from Education Scotland's regional teams. These teams play a key role in supporting and coordinating professional learning in STEM.

In addition, the survey data allows Education Scotland to track progress against the following key performance indicator in the STEM Education and Training Strategy:

II. Increased practitioner confidence in STEM learning in the early years, primary years and in CLD settings and increased practitioner engagement in STEM professional learning opportunities. (Excellence)

- Increase the cumulative hours of STEM professional learning accessed by early years, schools, college and CLD practitioners annually.

About you

Number of survey responses

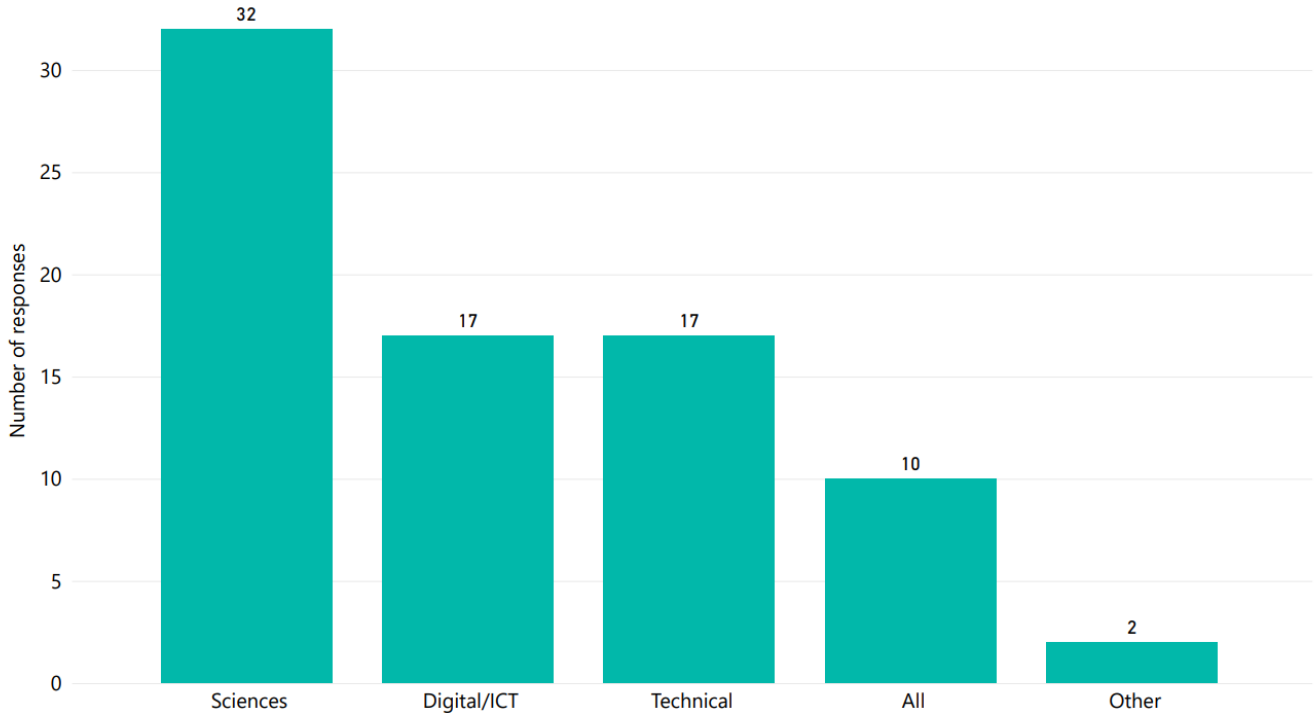

Figure 1. Number of responses per type of technical support delivered

Note. The number of responses in this figure exceeds the total number of responses as multiple selections were possible for this question in the online survey.

Respondents' work pattern

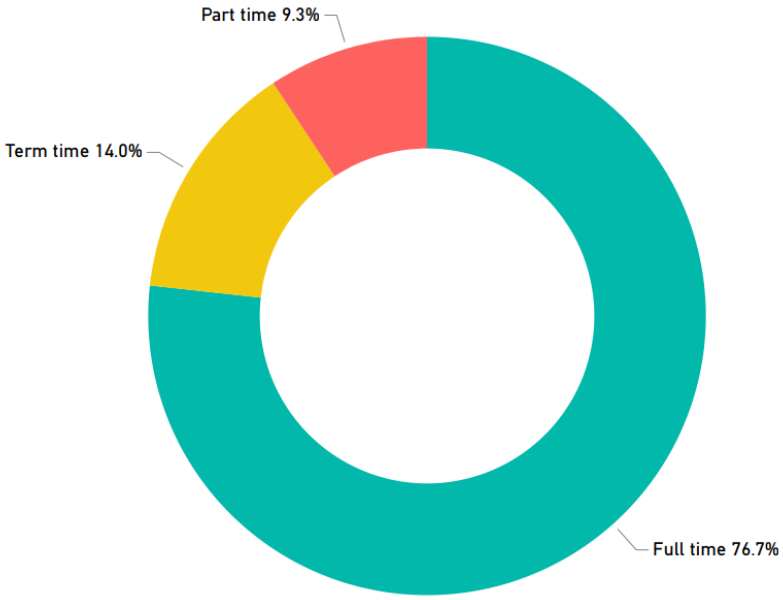

Figure 2. Respondents' work pattern

Note. 43 respondents provided a reply to this question.

The overall number of responses decreased by 79.5% from 215 responses in the 2018/19 survey to 44 responses in the 2020/21 survey. 43 responses were submitted by technical support staff working in the secondary sector and one from the primary sector.

Respondents were asked to identify which type of technical support they provided. Almost one quarter of respondents said they provided technical support across all areas. The distribution of the remaining responses reflects the 2018/2019 survey with the majority of respondents providing science support and a smaller number providing support for digital/ICT and technical.

The majority of respondents stated that they worked on a full-time basis. Four respondents worked part-time and the remaining six respondents worked term-time only.

Your professional learning

Total number of hours of professional learning in STEM

The **total number of cumulative hours** of STEM professional learning accessed by the 44 survey respondents between 1 August 2020 and 31 July 2021 was **647 hours**. This equates to a mean average of **14.7 cumulative hours per person per annum**. This shows an increase in the average figure of 11.7 hours reported in the 2018/2019 survey.

21 respondents stated that they did not participate in any STEM professional learning in the given time period and almost three-quarters of the total hours can be attributed to the five respondents reporting the highest number of individual hours. The median value was 1 hour of STEM professional learning per practitioner per annum.

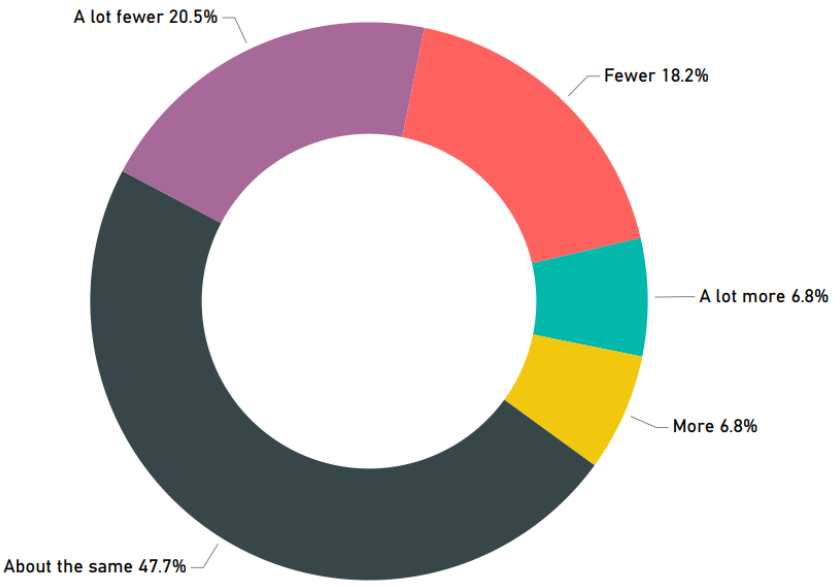

Figure 3. Hours of STEM professional learning accessed in 2020/21 compared with 2019/20

Respondents were asked if they accessed more or fewer hours of STEM professional learning than in the previous year. The majority of respondents said the number of hours of professional learning they accessed in 2020/21 was greater than or equal to the hours accessed in 2019/20.

Types of professional learning accessed and perceived value

Technical support staff were surveyed about which types of STEM professional learning they accessed during the 2020/21 academic year and were also asked to rate how valuable they found each format. When compared to the 2018/19 survey results, the proportion of respondents engaging in online learning increased whilst the number of respondents engaging in professional learning outwith their setting decreased.

The 2020/21 survey identified that the top three types of professional learning that were recognised as 'valuable' or 'very valuable' with regards to impact were:

1. Online professional learning
2. Professional reading/engaging independently with research
3. Working with other practitioners within my school or setting.

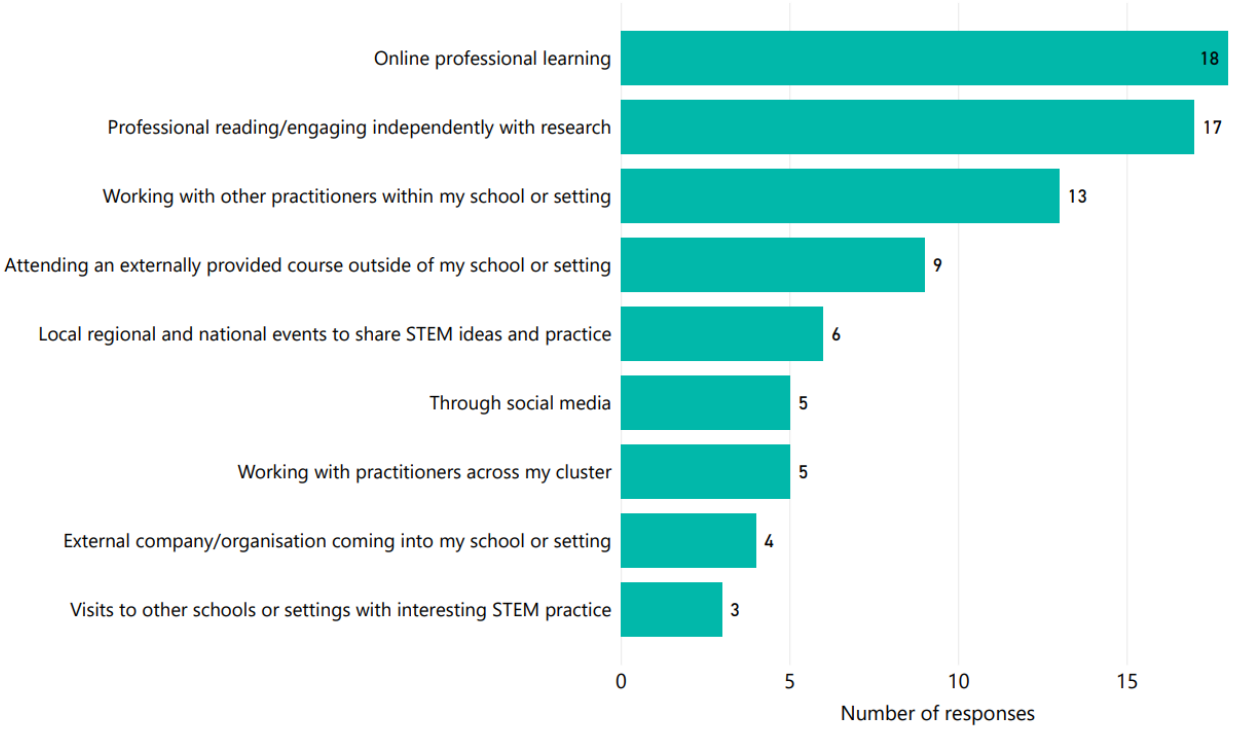

Figure 4. Professional learning accessed which had an impact of 'valuable' or 'very valuable'

Note. The number of responses in this figure exceeds the total number of responses as multiple selections were possible for this question in the online survey.

Organisations that provided STEM professional learning

Respondents were asked which organisations provided STEM professional learning. Table 1 outlines the top three responses from recent surveys and Figure 6 shows the full range of responses in the 2020/21 survey.

	2018/19	2019/20	2020/21
1	SSERC	–	SSERC
2	Local authority	–	Technician Service Centre
3	Scottish Technicians Advisory Council (STAC)	–	Local authority

Table 1. Top three organisations that provided STEM professional learning

Note. 2019/20 data is not available as survey was not issued.

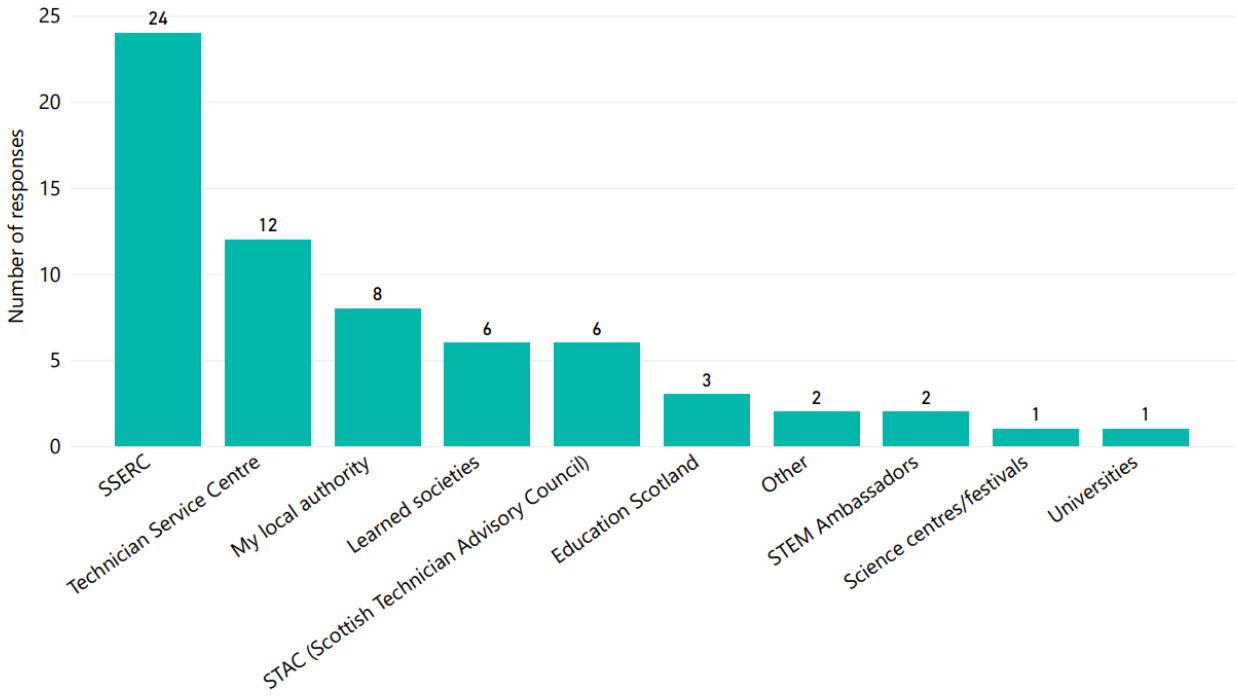

Figure 5. Organisations providing STEM professional learning to technical support staff

Note. The number of responses in this figure exceeds the total number of responses as multiple selections were possible for this question in the online survey.

Ease of accessing professional learning in STEM

Figure 6 shows how easy respondents found it to access STEM professional learning. The proportion of respondents reporting that it was ‘easy’ or ‘very easy’ to access STEM professional learning decreased by 10% from 14.9% in the 2018/19 survey to 4.9% in 2020/21.

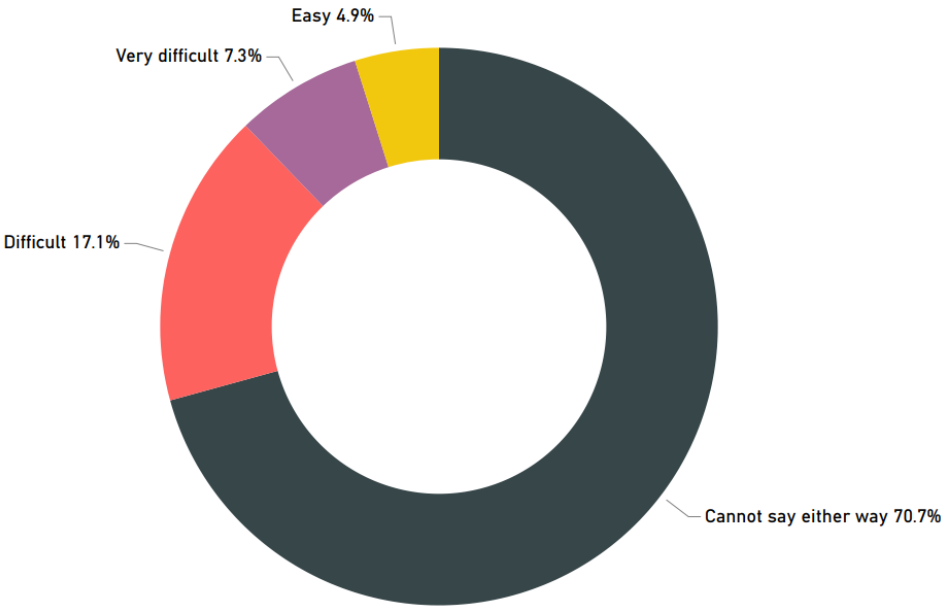

Figure 6. Accessing professional learning in STEM

Main barriers to accessing professional learning in STEM

The 2020/21 survey highlighted a number of barriers to accessing professional learning in STEM. The responses to this question are shown in Figure 7. Due to the global pandemic a new response relating to the impact of COVID-19 on role/workload was included.

Table 2 outlines the top three responses from recent surveys and Figure 7 shows the full range of responses in the 2020/21 survey.

	2018/19	2019/20	2020/21
1	Lack of funding to pay for professional learning	–	Changing role/workload due to the COVID-19 pandemic
2	Lack of funding to pay for associated travel/accommodation	–	Lack of funding to pay for professional learning
3	Lack of support in my organisation	–	= Difficulty in finding staff cover = Don't know where to get information about professional learning = Lack of funding to pay for associated travel/accommodation costs

Table 2. Top three barriers to accessing professional learning in STEM

Note. 2019/20 data is not available as survey was not issued.

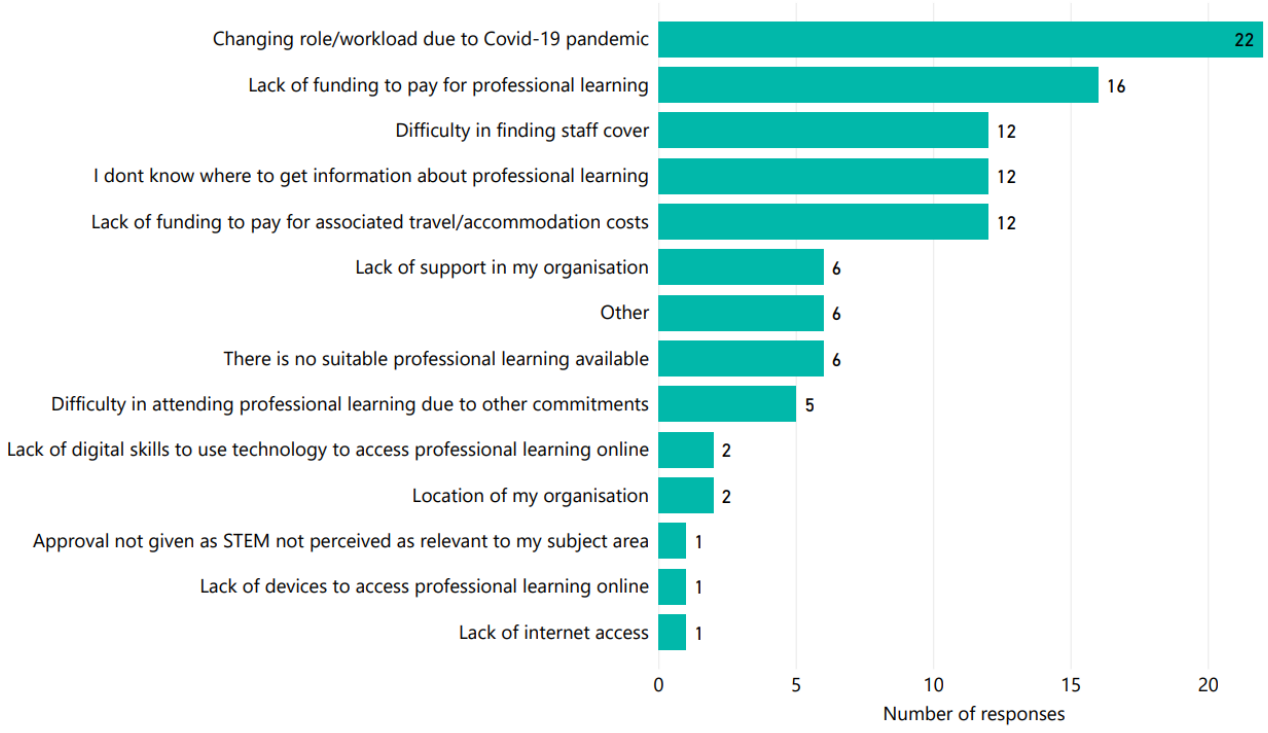

Figure 7. Main barriers to accessing professional learning in STEM

Note. The number of responses in this figure exceeds the total number of responses as multiple selections were possible for this question in the online survey.

STEM professional learning priorities for the academic year 2021/22

In the 2020/21 STEM professional learning survey technical support staff were asked what their professional learning priorities were for the year ahead. Table 3 compares the top three responses from the 2020/21 survey with the previous 2018/19 survey. Support with sciences and health and safety updates remain key priorities from the previous survey.

The 2020/21 survey contained two options relating to new equipment 'New equipment' (21 responses) and 'Support with new equipment' (15 responses). For simplicity these have been grouped together in Figure 8 under the heading 'Support with new equipment' showing the 25 unique respondents who selected either or both responses relating to new equipment.

	2018/19	2019/20	2020/21
1	Sciences	–	Sciences
2	Health and safety update	–	Support with new equipment
3	Supporting advanced higher projects	–	Health and safety update

Table 3. Top STEM professional learning priorities in 2018/19 and 2020/21

Note. 2019/20 data is not available as survey was not issued.

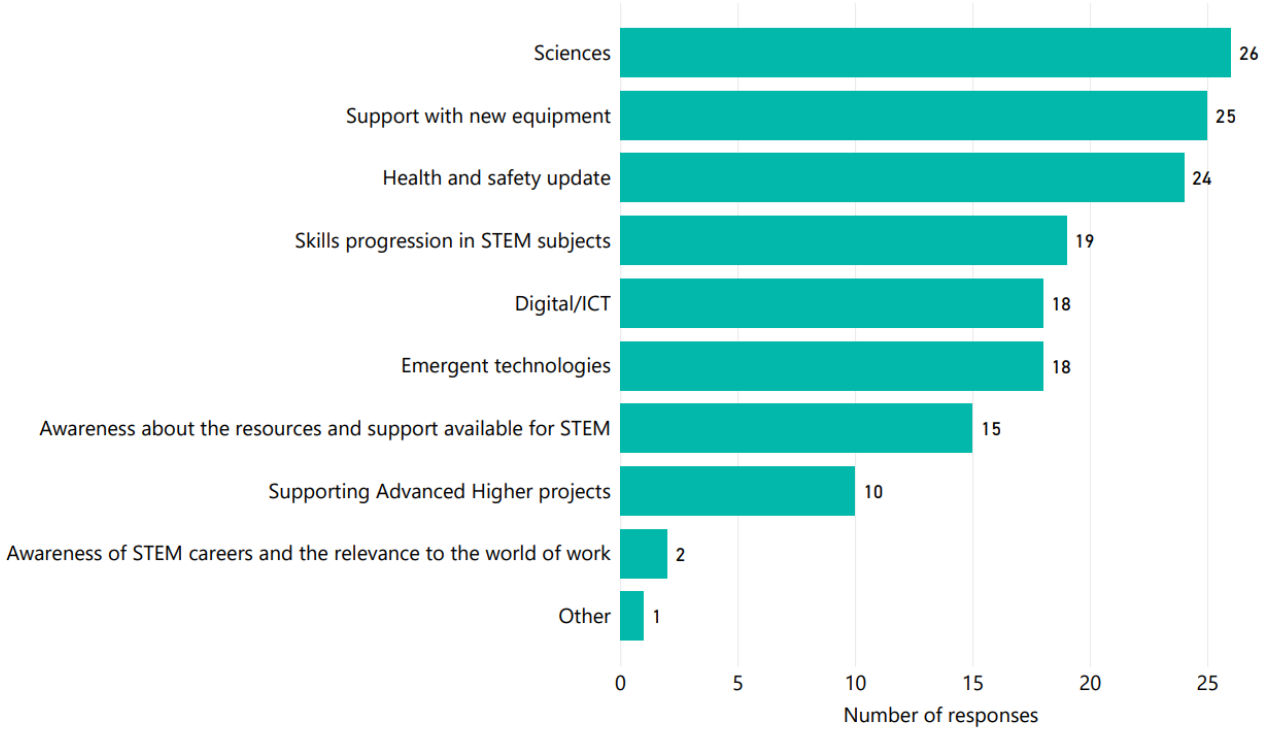

Figure 8. STEM professional learning priorities for academic year 2021/22

Note. The number of responses in this figure exceeds the total number of responses as multiple selections were possible for this question in the online survey.

Education Scotland response

Academic year 2020/21 marked the fourth year of implementation of the STEM Education and Training Strategy. During this period Education Scotland continued to put in place the key national infrastructure and resources required to address the priorities and needs identified by practitioners in relation to STEM. In addition, Education Scotland's Regional Teams put very significant support in place to support practitioners during the COVID-19 pandemic. This included an extensive programme of online professional learning to build the digital skills of practitioners and the collation of many thousands of classroom resources to support remote learning. These resources are now available through the National e-Learning Offer.

Enhancing Professional Learning in STEM Grants Programme

Education Scotland awarded a total of £430,000 of STEM professional learning grants in financial year 2021/22, supporting 84 projects in Round 3. This funding was aligned to the priorities and findings from the previous STEM annual practitioner surveys. Since the grants programme started in 2018, over £4 million has been awarded to 248 projects, including support for the Scottish Technicians Advisory Council. An estimated 58,161 practitioners have benefitted from the three funding rounds which have run to date. More information about the grants being supported is available from the STEM summary page on the National Improvement Hub.

Education Scotland Regional Teams

Throughout this period, Education Scotland's Improving Gender Balance and Equalities (IGBE), Numeracy & Mathematics, Digital/Technologies and Community Learning and Development teams contributed to the provision of STEM professional learning on a local, regional and national basis.

Education Scotland's Regional STEM Officers have engaged widely with Regional Improvement Collaboratives and local authorities to identify and support the STEM professional learning needs of practitioners. Between 1 August 2019 and 23 March 2022 the Education Scotland STEM team undertook 2115 direct engagements reaching 922 distinct establishments and 10,632 attendees. In total this amounted to over 2900 hours spent on engagements. This activity represented a wide range of engagements including delivering professional learning, providing professional advice and supporting policy and strategy developments. Similarly, Education Scotland's Improving Gender Balance and Equalities Team has supported 866 sessions since January 2019 which have reached 9422 practitioners in 1156 distinct establishments.

When the COVID pandemic struck in March 2020, Education Scotland adapted quickly to meet the local, regional and national needs of stakeholders at that time, with all support moving to an online delivery format. This increased the reach and scale of delivery with positive feedback from practitioners in more remote and rural areas. Included in the engagements noted above, 4,847 practitioners and stakeholders attended the 77 online webinar sessions led by the team from the start of COVID lockdown (March 2020). Professional learning was provided on a range of themes to support the immediate priorities of practitioners during lockdown. This included directing them to valuable resources to support remote learning and also subject support for the SQA Alternative Certification Model.

Education Scotland's STEM Team has also now developed an interactive STEM resources directory spreadsheet to help settings access the right STEM support. See Education Scotland's STEM Nation Online Resource to access this directory: https://blogs.glowscotland.org.uk/glowblogs/stemnation/stem-resources/

Similarly, Education Scotland's Improving Gender Balance and Equalities Team has supported 866 sessions since January 2019 which have reached 9422 practitioners in 1156 distinct establishments. In addition to supporting the Education Scotland STEM professional learning programmes and providing bespoke support and advice to STEM grantees, the Improving Gender Balance & Equalities (IGBE) team launched a new IGBE self-evaluation framework.

Furthermore, the IGBE team has worked collaboratively with SSERC to develop and deliver a suite of resources for both STEM Ambassadors and the Young STEM Leaders Programme. A suite of six complimentary sessions for STEM Ambassadors, has been co-developed with SSERC colleagues and delivered by the IGBE team. A train the trainer programme is now underway to enable SSERC colleagues to continue the delivery of these sessions. A set of modules with a focus on gender stereotypes and unconscious bias has been co-created for the Young STEM Leaders Award.

RAiSE Programme

The Raising Aspirations in Science Education (RAiSE) programme aims to build the capacity of practitioners, particularly in primary school settings, to deliver inspiring and engaging learning in science and STEM. The programme is led by Education Scotland and funded by The Wood Foundation, Scottish Government and participating local authorities. The programme was established in 2016 and is now being extended nationally, following its successful pilot. The local authorities that are participating, or have participated, in the programme to date include:

- Angus Council
- City of Edinburgh Council
- Clackmannanshire Council
- Comhairle Nan Eilean Siar
- Dumfries and Galloway Council
- Falkirk Council
- Fife Council
- Glasgow City Council
- Moray Council
- North Ayrshire Council
- North Lanarkshire Council
- Orkney Islands Council
- Renfrewshire Council
- South Ayrshire Council
- South Lanarkshire Council
- The Highland Council
- West Dunbartonshire Council
- West Lothian Council

Local authorities participating in the RAiSE Programme, are provided with co-funding to support the recruitment of a Primary Science Development Officer (PSDO). These officers coordinate and lead professional learning in science and STEM across authority establishments. Since it was established in 2016, the RAiSE Programme has reached 19,372 practitioners through 1675

professional learning sessions. This has resulted in over 57,500 cumulative hours of professional learning being provided.

RAiSE Officers also collaborated to produce a comprehensive Science Planning Resource and context planners which are freely available to all nationally. See the National Improvement Hub for more information about the RAiSE Programme.

National e-Learning Offer

Education Scotland's STEM Officers provided critical support for the development of all three aspects of the National e-Learning Offer (NeLO) including collaborating with West Online School to support the development of recorded lessons and direct delivery of e-Sgoil live lessons. STEM Officers also led developments on the supported resources within NeLO, drawing inspiration from its sciences network to grow it into an extensive bank of online resources to support the STEM curriculum.

In response to requests from practitioners, Education Scotland's STEM team worked with a wide range of partners to film videos of practical science experiments. Since the start of COVID lockdown, over 240 videos have now been produced. See our STEM Nation Online Resource to access all these videos: https://blogs.glowscotland.org.uk/glowblogs/stemnation/stem-resources/

STEM Networks

Education Scotland has continued to lead and support a number of local, regional and national STEM networks. These provide practitioners and local authority STEM leads with opportunities to share practice, collaborate and learn together.

National practitioner networks were launched to support STEM exploration and learning in early learning and childcare settings, develop STEM pedagogy in primary schools and support ASN settings. Furthermore, Education Scotland's Secondary Sciences Network of 600 science teachers has collectively shaped a programme of professional learning relating to STEM curriculum development and broadening pathways.

Education Scotland has also re-established the local authority STEM Leads Network and STEM Partners Network to ensure those with a responsibility for strategic leadership in STEM within local authorities and Regional Improvement Collaboratives have the opportunity to connect, share practice, collaborate and inform national developments.

Engaging with partners

In recognition of the significant disruption to education and the pressures on educators to adapt to remote teaching during the national lockdown, the 2019/20 Professional Learning in STEM surveys were not issued. However, a number of STEM professional learning providers were still able to share very useful data as part of the 2019/20 Annual STEM Provider Data Gathering exercise.

The provider data report featured 105 responses from 82 unique providers. This included returns from settings and organisations in receipt of Enhancing Professional Learning in STEM grant funding from Education Scotland. The provider data covered the period from 1 August 2019 to 31 July 2020 and provided a useful snapshot of the provision of STEM professional learning throughout the academic year leading up to and including the pandemic.

The survey findings have been used by Education Scotland to help shape the national professional learning offer, including the projects supported through the third round of the Enhancing Professional Learning in STEM Grants Programme. A wide range of partner organisations have also used the survey findings to help them align their professional learning programmes and strategies to the needs of practitioners.

More information about the RAiSE programme can be found on the National Improvement Hub.

Appendix: Survey questions

2020/21 survey questions for school-based technical support staff
Which sector do you work in?
Which subjects do you provide technical support for in your setting?
Please tell us about your work pattern. Which of the following most closely aligns with your work?
Which local authority do you work in?
Please provide the full postcode of your school/setting. The postcode provides important information about rurality and SIMD. If you don't know the postcode please input street/setting name.
Approximately how many hours of professional learning in STEM did you complete between 01 August 2020 to 31 July 2021?
Was this more or fewer hours than the same period last academic year (i.e. from 01 August 2019 to 31 July 2020)?
Please tell us more about the types of professional learning in STEM that you accessed between 01 August 2020 to 31 July 2021.
If you completed another kind of professional learning please tell us in the box below.
Which, if any, of the following organisations provided you with professional learning support between 01 August 2020 and 31 July 2021?
How easy has it been for you to access professional learning in STEM?
What, in your opinion, were the barriers (if any) to you accessing professional learning in STEM?
What are your STEM professional learning priorities for this academic year (01 August 2021 - 31 July 2022)?

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