

Professional Learning in STEM

Findings from the Annual STEM Provider Survey 2017/18

May 2019

Overview

In 2017, the Scottish Government published the [STEM Education and Training Strategy for Scotland](#). A key ambition of the Science, Technology, Engineering and Mathematics (STEM) Strategy is to enhance the provision of high-quality career-long professional learning (CLPL) for educational practitioners.

Progress against this commitment is being tracked through the following [key performance indicator](#): *Increase the cumulative hours of STEM professional learning accessed by early years, schools, college and CLD (community learning and development) practitioners annually.*

Education Scotland will, therefore, be gathering data on an annual basis to track the progress that is being made in terms of the provision of STEM professional learning. This is being done in a number of ways:

- An annual STEM practitioner survey for the early learning, primary, additional support needs (ASN) and secondary sectors
- An annual STEM practitioner survey for the community learning and development sector
- A STEM provider survey to gather data about the external professional learning being provided to the target sectors, including colleges.

In addition, a separate survey was issued in 2018 by the Scottish Technicians Advisory Council and the Scottish School Education Research Centre (SSERC) to determine the needs of school-based technical support staff.

About this report

This report presents the findings from the 2018 STEM provider survey. This data was gathered through an online survey that was promoted to a range of STEM providers in October 2018. It was promoted to contacts in the following organisations: local authorities, college STEM hubs, higher education, science centre and festival contacts, third sector partners, learned societies and a range of STEM provider organisations. The survey was promoted via email and other communication channels including Education Scotland's STEM bulletin, STEM Central in Motion Blog and through Twitter. Providers were asked to provide their retrospective data for the STEM CLPL they delivered between 1 August 2017 and 31 July 2018.

Providers were asked to provide data on the number of cumulative hours of STEM professional learning they delivered. This is defined as the total number of hours of CLPL undertaken by participants during a CLPL session e.g. if the session lasted for 3 hours and there were 10 participants, then the total cumulative hours delivered would be 30 (i.e. session duration x number of participants).

Given that this was the first year of the survey, and also because it was being completed retrospectively, those completing the survey were also given the option of submitting estimated figures where required. The findings in this first year, therefore, provide an indicative baseline of STEM CLPL provision. As we go forward, Education Scotland will continue to work with providers to support the accurate tracking of provision on an ongoing basis. We will also work with providers to increase the number of responses to ensure a greater breadth of provision is reported.

Education Scotland would like to express its gratitude to all those organisations who took time to respond to this provider survey. The findings of this survey, and the [annual STEM practitioner surveys](#), are enormously useful and are helping to shape the national STEM CLPL offering. A new *Enhancing Professional Learning in STEM Grants Programme* has recently been launched by Education Scotland to address the needs that practitioners have identified. The findings from the STEM practitioner and provider surveys will also be shared widely with STEM providers to help them with their planning and to shape their offer around practitioner needs.

Next steps

Education Scotland is currently planning to issue the next round of surveys in August 2019, including a further STEM provider survey. These surveys will gather data about the STEM CLPL provision between 1 August 2018 and 31 July 2019.

STEM Provider Survey 2018

Target group

The purpose of the STEM Provider Survey is to track the provision of externally-provided career-long professional learning in STEM and digital skills to the following groups and sectors:

- Early learning and childcare (ELC) practitioners
- Primary school practitioners
- Additional support needs practitioners
- Classroom assistants
- Secondary school practitioners
- School-based technical support staff
- College/FE practitioners
- Initial teacher education students
- Community learning and development (CLD) practitioners.

Why did we ask for this data?

A key commitment in the STEM Education and Training Strategy is to enhance the provision of professional learning in STEM. As we progress with our plans, we want to be sure that practitioners have appropriate access to high-quality professional learning that meets their needs. We also need to ensure that there is an equity of provision across all sectors, geographical areas and work patterns and that the priorities of various groups and sectors are being met. This data will help us to allocate resources to where they are needed most to address gaps and imbalances.

This document presents the findings of the STEM Provider Survey 2018. It will be shared with Scottish Government teams and agencies, and also STEM providers and partners. This will inform decision-making and planning in relation to the future resourcing and implementation of the STEM strategy.

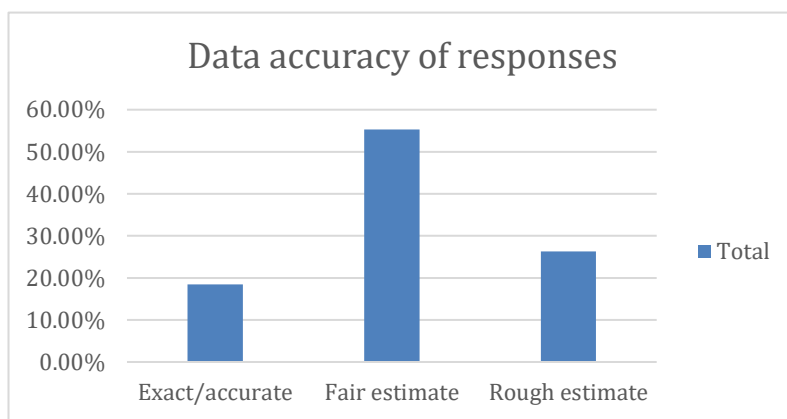
Findings for 2017/18

Responses

There were a total of forty-four responses to the STEM Provider Survey in 2018. Of those that responded, there was a 100% completion rate. There is no accurate or comprehensive record of all STEM providers in Scotland. As such, it is not possible to give an indication of the percentage of providers across Scotland that have completed the survey. The data captured reflects the delivery of STEM CLPL during the period 1 August 2017 to 31 July 2018.

Education Scotland recognised that it would be challenging for STEM providers to provide accurate information as this is the first time we have asked for information of this nature. The data was also being asked for retrospectively, which again will have been challenging for some providers. Providers were, therefore, given the option of indicating the level of confidence they had in their data. The breakdown in their responses is indicated below.

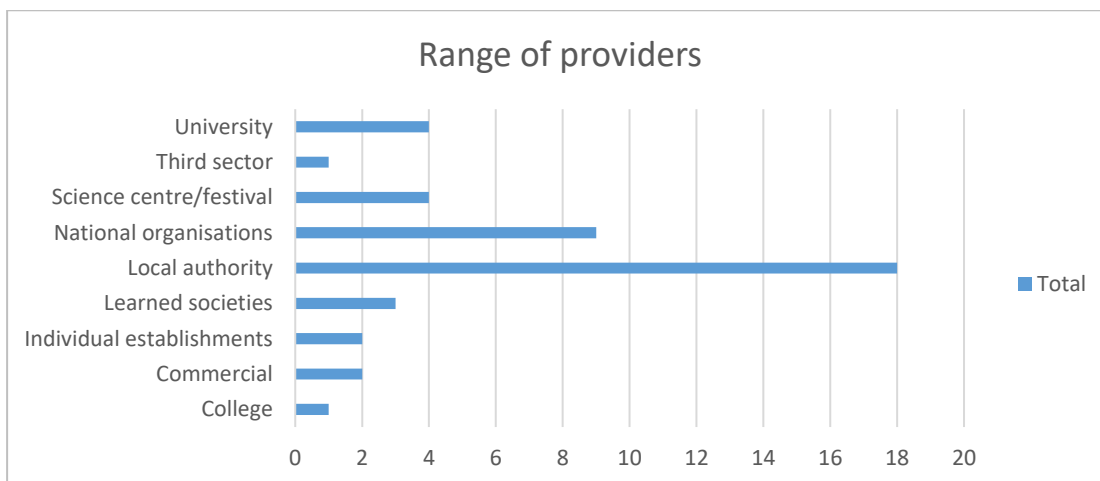
Figure 1: Data accuracy as estimated by providers



Range of providers

A range of providers participated in the survey as outlined in the chart below. A list of the providers that were happy to be named and included in this report can be found in the appendix on page 13.

Figure 2: Range of providers surveyed



The responses to the 2018 STEM Provider Survey include 1 out of 26 colleges, 4 out of 15 universities and 18 out of 32 local authorities. The figures, therefore, in this first year of the survey need to be treated with caution. Education Scotland will work with partners across sectors to encourage and support greater response rates to future surveys.

Cumulative hours

The total number of cumulative hours of STEM CLPL delivered by the forty-four providers who responded to the survey was **109,969 hours**. The breakdown of provision by target sector is outlined below.

Table 1: Provision of CLPL to different groups

Target sector	Cumulative hours
Early learning and childcare	8,883
Primary	50,897
Secondary	29,606
ASN	696
Classroom assistants	734
Technical support staff	3,475
Community learning and development	404
College/FE practitioners	11,552
Initial teacher education students	3,722
Total hours	109, 969

The greatest proportion of the STEM CLPL provided was to the primary sector, representing some 50,897 cumulative hours (46% of the total). The section below illustrates that the RAiSE Programme and SSERC Primary Cluster Programme, both with a significant focus on the primary sector, have had a significant influence on the findings. However, the limited number of responses from providers nationally means that the data outlining the proportion of professional learning being provided nationally to each sector, has to be treated with caution.

Further details as to how CLPL was accessed by practitioners (by type of offer, by sector and the provider) are available from the STEM Professional Learning Survey [Findings 2019](#).

Examples of provision

This section provides some examples of the organisations that responded to the survey and made a significant contribution to the total cumulative hours of CLPL provided.

The RAiSE Programme

The Raising Aspirations in Science Education (RAiSE) programme is led by Education Scotland and funded by The Wood Foundation, Scottish Government and participating local authorities. It aims to build the capacity of practitioners, with a focus on primary schools, to deliver high-quality science and STEM learning. Participating local authorities receive grant funding to appoint a primary science development officer to lead and coordinate professional learning programmes. During the time period covered by this survey, the RAiSE programme was operating in eight local authorities: Angus, Dumfries and Galloway, Edinburgh, Fife, Glasgow, Highland, Moray and West Dunbartonshire.

The RAiSE Programme has contributed **14,936** cumulative hours of CLPL for practitioners, mainly in the primary and early learning and childcare sectors.

Scottish Schools Education Research Centre (SSERC)

SSERC is a shared-service across all 32 local authorities; providing career-long professional learning (CLPL) in addition to its guidance and advisory services. During 2017/2018, SSERC worked in partnership with the Scottish Government, National STEM Learning Centre, The

Primary Science Teaching Trust and others to deliver a programme of experiential CLPL for primary and secondary teachers, student teachers and technicians.

SSERC contributed **20,801** cumulative hours of CLPL.

Scottish Qualifications Authority (SQA)

The SQA provided **8,291** cumulative hours of professional learning in STEM-related areas for secondary and college staff. Of this, 96% was delivered to the secondary sector and 4% was to the college sector. The range of STEM subjects included were as follows:

Biology and Human Biology	Applications of Mathematics/Lifeskills Mathematics
Chemistry	Design and Manufacture
Environmental Science	Engineering Science
Physics	Computing Science
Mathematics of Mechanics	Graphic Communication
Statistics	Practical Metal/Wood Working
Mathematics	Practical Electronics

Education Scotland

Education Scotland offered CLPL sessions in mathematics, science and digital learning. CLPL was also offered through a range of STEM-related sessions as part of the Scottish Learning Festival. In total, Education Scotland contributed **3,414** cumulative hours of CLPL.

Online learning

CLPL was also offered online by some of the providers participating in the survey. A total of **2480** cumulative hours was provided online to practitioners in primary, secondary and college sectors. Of this, 2380 hours were accessed by primary practitioners. Of the providers that responded, some indicated that they are considering increasing their online professional learning offer. This is to be welcomed as the findings from the Annual STEM Practitioner Survey 2018 demonstrate a demand for online professional learning.

Geographical provision

The table on the next page provides an overview of the geographical spread of professional learning support being provided by external providers to local authorities. This does not include hours delivered by local authorities themselves. SQA data is also not included in the table as the data provided did not include details of provision to specific local authorities.

The data has also been grouped into regional improvement collaborative areas. The table shows where the delivery took place and the total number of hours provided by external providers.

The final three columns show:

- a percentage breakdown of the total hours of professional learning delivered by external STEM providers to each local authority (early learning and childcare, primary, secondary and ASN sectors only).
- the full-time equivalent number of practitioners in each authority; based on the Scottish Government's [2017 Teacher Census](#) for primary, secondary and ASN teachers, and also the [Early Learning and Childcare Provision in Scotland Census](#) from September 2017.
- the percentage of the national workforce located within each authority (early learning and childcare, primary, secondary and ASN sectors only).

This shows the extent to which the percentage of the external STEM professional learning provided to each local authority correlates with the local authority's percentage share of the national early learning and childcare, primary, secondary and ASN practitioner workforce.

STEM CLPL provided by external providers to local authorities

Authority	Total hours CLPL by external provider to local authority	% of CLPL hours	ELC/Prim/Sec/ASN practitioner numbers	% of practitioners nationally
Clackmannanshire	113	0.4	553	1.0
Falkirk	1,209	3.8	1,732	3.2
Stirling	608	1.9	1,015	1.9
West Lothian	1,177	3.7	2,047	3.8
Aberdeen City	2,146	6.7	1,809	3.3
Aberdeenshire	1,257	3.9	2,773	5.1
Argyll and Bute	507	1.6	865	1.6
Eilean Siar	289	0.9	345	0.6
Highland	1,091	3.4	2,440	4.5
Moray	310	1.0	922	1.7
Orkney	79	0.2	266	0.5
Shetland	161	0.5	343	0.6
East Lothian	882	2.7	1,038	1.9
Edinburgh City	2,608	8.1	3,742	6.9
Fife	3,540	11.0	3,648	6.7
Midlothian	301	0.9	979	1.8
Scottish Borders	169	0.5	1,123	2.1
Dumfries and Galloway	887	2.8	1,536	2.8
East Ayrshire	306	1.0	1,294	2.4
North Ayrshire	682	2.1	1,548	2.8
South Ayrshire	786	2.4	1,151	2.1
Angus	417	1.3	1,207	2.2
Dundee	414	1.3	1,454	2.7
Perth and Kinross	1,279	4.0	1,453	2.7
East Dunbartonshire	146	0.5	1,339	2.5
East Renfrewshire	1,173	3.7	1,374	2.5
Glasgow	4,730	14.7	5,535	10.2
Inverclyde	85	0.3	793	1.5
North Lanarkshire	2,522	7.9	3,743	6.9
Renfrewshire	259	0.8	1,801	3.3
South Lanarkshire	293	0.9	3,549	6.5
West Dunbartonshire	1,191	3.7	1,051	1.9
Independent**	496	1.5	-	-
Totals	32,113	100.1	54,468	100.2

STEM CLPL provided by external providers to regional areas

Regional area	Total hours CLPL by external providers to regional area	% total hours CLPL per region	ELC/Prim/Sec/ASN practitioner numbers	% practitioner numbers per region
Forth Valley and West Lothian	3,107	9.8	5,347	9.8
North	5,840	18.5	9,763	17.9
South East	7,500	23.7	10,530	19.3
South West	2,661	8.4	5,529	10.1
Tayside	2,110	6.7	4,114	7.6
West	10,399	32.9	19,185	35.2
Totals	31,617	100.0	54,468	99.9

Please note that due to rounding, the percentages do not always total 100.

This comparison has been created using workforce data about early learning and childcare, primary, secondary and ASN practitioners only.

It should also be noted that the STEM CLPL hours listed are the totals from 16 providers (excluding local authorities and SQA). The data in this first year of the provider survey should therefore be treated with caution.

** Information about the hours of professional learning provided to independent schools and settings has been included in the first two data columns as this information was gathered in the Provider Survey. Data about independent schools has not been included in the final two columns as the workforce census data used focusses on publically-funded provision.

Conclusion

- The total number of cumulative hours of STEM CLPL delivered by the forty-four STEM providers who completed the survey is **109,969**. Collectively, the providers responding to the survey delivered CLPL across all 32 local authorities.
- A significant proportion of the CLPL delivered by external providers was to the primary sector. The support to the primary sector represented 46% of all professional learning offered by the providers that responded to the survey.
- Online professional learning is a delivery method offered by a number of providers and is likely to increase further to support issues of rurality and practitioner need. This is welcome as it aligns with the requests from practitioners for more online professional learning support to be made available.
- There is some geographical variation in the external professional learning support being provided to local authorities. In subsequent years, Education Scotland will encourage a greater response rate so that more robust evidence is available to help us ensure an equity of provision.

Next steps

- Education Scotland's Regional Teams will work with local authorities, universities, college STEM hubs and providers to address any gaps in the provision of professional learning, including through the Enhancing Professional Learning in STEM grants programme.
- Education Scotland is taking steps to evolve, improve and align data gathering in 2019-20 to ensure it provides a robust and comprehensive account of CLPL provision and to help track progress. We are continually engaging with more organisations to ensure we achieve a higher response rate from providers.
- We have provided STEM CLPL providers with a tracker document to support the accurate recording of CLPL provision. We will continue to provide support to help providers use it to track their CLPL effectively. Some providers have already provided feedback stating that it is a useful tool for helping them to track their own provision more effectively.
- An annual return survey will be issued in August 2019 to enable STEM CLPL providers to enter their STEM CLPL data for the period between 1 August 2018 and 31 July 2019.

Appendix

Providers who participated in the survey*

Provider	Organisation type
Aberdeen City Council	Local authority
Aberdeen Science Centre	Science centre/festival
City of Glasgow College	College
Creative STAR Learning Ltd	Commercial
Dumfries & Galloway Council	Local authority
Dynamic Earth	Science centre/festival
Early Years Scotland	National organisation
East Ayrshire Council	Local authority
East Lothian Council	Local authority
East Renfrewshire Council	Local authority
Education Scotland	National organisation
e-Sgoil	Local authority
Energy Skills Partnership	National organisation
Fife Council	Local authority
Food and Drink Federation Scotland	National organisation
Forestry Commission Scotland	National organisation
Glasgow City Council	Local authority
Highland Council	Local authority
Highland Science Skills Academy	Science centre/festival
Improving Gender Balance/IOP	National organisation
Institute for Research in Schools	Learned society
John Muir Trust	National organisation
Moray Council	Local authority
Peel Primary School	Individual establishment
Primary Engineer	Commercial
RAiSE programme	Local authority**
Renfrewshire Council	Local authority
Royal Horticultural Society	Learned society
Royal Society of Chemistry	Learned society
Scottish Borders Council	Local authority
South Ayrshire Council	Local authority
SQA	National organisation
SSERC	National organisation
Stirling Council	Local authority
TechFest	Science centre/festival
University of Dundee	University
University of Glasgow***	University
University of Glasgow***	University
University of the Highlands and Islands	University
West Dunbartonshire Council	Local authority
West Lothian Council	Local authority

*41 out of the 44 providers who responded gave permission for their names to be published.

** The RAiSE Programme has been defined here as a local authority as activity is led locally by a primary science development officer seconded by the local authority.

*** University of Glasgow responses were submitted by two separate departments.

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