

# Professional Learning in STEM Findings from the Annual STEM Provider Data Gathering 2018/19

**March 2021** 

For Scotland's learners, with Scotland's educators

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### **Executive summary**

### Introduction

This report presents the key findings from Education Scotland's Annual STEM Provider Data Gathering Exercise covering academic year 2018/19.

Education Scotland has continued to gather and analyse data relating to STEM career-long professional learning (CLPL) provision within Scotland since 2016/17 to inform and support the ongoing implementation of the STEM Education and Training Strategy (2017)<sup>1</sup>.

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 date gathering exercise to collect information about the external professional learning being provided to the target sectors, including colleges.
- A STEM practitioner survey for technical-based school staff. •

The findings from the surveys<sup>2</sup> provide valuable insights into the professional learning needs of practitioners; 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.

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

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

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

Progress against this key performance indicator, and others, are reported on annually with detailed findings available through the First STEM Strategy Annual Report<sup>3</sup> and Second STEM Strategy Annual Report<sup>4</sup>.

<sup>&</sup>lt;sup>1</sup> STEM Education and Training Strategy: <u>http://bit.ly/STEMstrategy</u>

<sup>&</sup>lt;sup>2</sup> Education Scotland's STEM Summary page on the NIH: <u>https://education.gov.scot/improvement/learning-resources/a-summary-of-stem-</u> resources/

<sup>&</sup>lt;sup>3</sup> First Annual Report of the STEM Education and Training Strategy <u>https://www.gov.scot/publications/stem-strategy-education-training-scotland-</u> first-annual-report/ <sup>4</sup> Second Annual Report of the STEM Education and Training Strategy: <u>https://www.gov.scot/publications/stem-strategy-education-training-</u>

scotland-second-annual-report/

### **Key findings**

*Number of responses* – The number of survey responses increased by 29.5% from 44 responses in 2017/18 survey to 57 responses in the 2018/19 survey. 46 out of the 57 responses were from unique providers.

**STEM CLPL hours delivered** – The total number of cumulative hours of professional learning provided by the 57 survey respondents between 1 August 2018 and 31 July 2019 was 130,145 cumulative hours. This compares with 106,247 cumulative hours in 2017/18. This is an increase of 22.5%.

*Attendee numbers per sector* – The top three sectors per attendee number at STEM CLPL sessions:

٠	Primary	48.1% (20,504 hours)
•	Secondary	30.3% (12,907 hours)
٠	Early learning and childcare	8.4% (3,598 hours)

The total number of attendees at STEM CLPL sessions in 2018/19 was 42,647.

*Number of STEM CLPL sessions delivered* – The total number of STEM CLPL sessions provided in 2018/19 was 1297.

*Types of organisations providing STEM CLPL* – The top three types of organisations providing STEM CLPL in 2018/19 were:

•	National organisation	48.6% (63,294 hours)
•	Local authority	32.4% (42,123 hours)
٠	College/university	10.0% (13,043 hours)

Sectors accessing STEM CLPL – The top three sectors accessing STEM CLPL were:

•	Primary	43.8% (57,009 hours)
•	Secondary	35.4% (46,092 hours)
٠	College/further education	5.5% (7,009 hours)

*Theme of STEM CLPL provided* – The top three aspects of STEM CLPL provided were:

٠	Sciences	33.3% (76,852 hours)
•	Technologies	16.8% (38,713 hours)
•	Digital skills	15.7% (36,269 hours)

**Geographical analysis** – The number of STEM CLPL hours delivered and attendees per Regional Improvement Collaborative (RIC)

RIC	Number of STEM CLPL sessions	Hours per RIC	Number of attendees
FVWL	243	14,366	5681
Independent sector	159	5,614	1536
Northern Alliance	328	16,366	5230
South East	346	14,579	4440
South West	396	18,234	8358
Tayside	259	5,879	2140
Unknown	83	26,095	8197
West Partnership	393	29,012	7065
Total	1297	130,145	42647

Table 1: Number of STEM CLPL hours and attendees per RIC

### Annual STEM Provider Data Gathering 2018/19 Findings

### About the data gathering exercise

### Background

The purpose of the Annual STEM Provider Data Gathering Exercise is to track the provision of STEM CLPL 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
- 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.

### Structure and purpose

This provider data was predominantly gathered through an Excel Tracker document that was distributed to a range of STEM providers in October 2019. 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 data gathering 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 2018 and 31 July 2019.

The data gathering findings have played, and will continue to play, a crucial role in shaping the implementation of the CLPL actions in the STEM Education and Training Strategy (<u>http://bit.ly/STEMstrategy</u>).

The findings directly influenced the framing of Round 2 of the Enhancing Professional Learning in STEM Grants Programme which saw over £1.3 million allocated to 140 professional learning programmes. This grants programme seeks 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 and CLPL offer of Education Scotland's regional teams. These teams are playing an important role in supporting and coordinating professional learning in STEM.

### Number of returns

2017/18 Provider CLPL survey	44 data returns
2018/19 Provider CLPL survey	57 data returns

Table 2: Number of returns for the 2017/18 and 2018/19 annual data gathering exercises



Figure 1: Breakdown of 2018/19 returns by organisation type

The number of STEM provider data returns increased by **29.5%** from 44 responses in 2017/18 to 57 responses in 2018/19. This includes returns from 46 unique providers.

### Number of cumulative hours of STEM CLPL accessed

The *total number of cumulative hours* of STEM CLPL delivered between 1 August 2018 and 31 July 2019 was 130,145.



Figure 2: Number of cumulative hours of STEM CLPL in 2018/19 by organisation type

Type of organisation	Total cumulative hours of STEM CLPL delivered
National organisation	63,294
Local authority	42,123
College/University	13,043
Science centre/festival	4,642
Learned societies	3,563
Third sector organisation	3,480
Total	130,145

Table 3: Number of CLPL hours delivered by organisation type



#### Total cumulative hours of STEM CLPL Sector Primary 57,009 Secondary 42,447 College/FE practitioners 7,100 Early learning & childcare 5,622 5,436 Unknown Technical support staff 4,512 Initial teacher education students 3,645 Community learning & development 3,486 ASN 547 Classroom assistants 342 Total 130,145

Table 4: Hours of STEM CLPL 2018/19 delivered by sector

Figure 3: Hours of STEM CLPL 2018/19 delivered by sector



Figure 4: Hours of STEM CLPL 2017/18 delivered by sector

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

Table 5: Hours of STEM CLPL 2017/18 delivered by sector



Figure 5: Hours of STEM CLPL delivered in 2017/18 and 2018/19 by sector

### **Attendees of STEM CLPL**



Figure 6: Number of attendees per sector in 2018/19



Figure 7: Number of attendees and cumulative hours per sector in 2018/19

### Aspect of STEM CLPL delivered



Figure 8: Number of attendees and cumulative hours by aspect of STEM in 2018/19



Figure 9: Breakdown of sessions of CLPL delivered by aspect of STEM in 2018/19



Figure 10: Number of sessions in 2018/19 by month

### **Geographical analysis**

The analysis in this section 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.

This analysis includes:

- 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 <u>2018 Teacher Census</u> for primary, secondary and ASN teachers, and also the <u>Early Learning and Childcare Provision in Scotland Census</u> from September 2018.
- the percentage of the national workforce located within each authority (early learning and childcare, primary, secondary and ASN sectors only).
- 2018/19 analysis includes SQA data.



#### • 2018-19 % of total number of hours • 2018-19 % of total number of practitioners

Figure 11: Number of STEM CLPL hours and attendees per RIC

The following table shows the comparison data of 2017/18 and 2018/19 cumulative hours of STEM CLPL. There is an increase in provision of STEM CLPL provided by external providers.

Local authority	RIC	2017-18 Cumulative hours of STEM CLPL	2018-19 Cumulative hours of STEM CLPL	2018-19 Number of attendees	% increase/decrease in cumulative hours of STEM CLPL from 2017/18 to 2018/19
Aberdeen City	Northern Alliance	2,146	4,531	2,242	7.4%
Aberdeenshire	Northern Alliance	1,257	2,332	590	3.4%
Angus	Tayside	417	1,229	284	2.5%
Argyll & Bute	Northern Alliance	507	731	174	0.7%
City of Edinburgh	South East	2,608	4,495	1,051	5.9%
Clackmannanshire	FVWL	113	498	103	1.2%
Dumfries & Galloway	South West	887	2,680	682	5.6%
Dundee City	Tayside	414	1,513	496	3.4%
East Ayrshire	South West	306	638	132	1.0%
East Dunbartonshire	West Partnership	146	1,207	218	3.3%
East Lothian	South East	882	1,112	233	0.7%
East Renfrewshire	West Partnership	1,173	2,107	745	2.9%
Falkirk	FVWL	1,209	3,537	636	7.3%
Fife	South East	3,540	3,282	897	-0.8%
Glasgow City	West Partnership	4,730	12,102	2,215	23.0%
Independent sector	Unknown	496	5,599	1,516	15.9%
Inverclyde	West Partnership	85	1,242	161	3.6%
Midlothian	South East	301	1,912	178	5.0%
Moray	Northern Alliance	310	1,370	397	3.3%
North Ayrshire	South West	682	1,550	359	2.7%
North Lanarkshire	West Partnership	2,522	4,584	1,096	6.4%
Orkney Islands	Northern Alliance	79	954	100	2.7%
Perth & Kinross	Tayside	1,279	1,477	359	0.6%
Renfrewshire	West Partnership	259	1,838	224	4.9%
Scottish Borders	South East	169	781	209	1.9%
Shetland Islands	Northern Alliance	161	293	25	0.4%
South Ayrshire	South West	786	1,808	205	3.2%
South Lanarkshire	West Partnership	293	1,759	346	4.6%
Stirlingshire	FVWL	608	2,977	510	7.4%
The Highlands	Northern Alliance	1,091	3,932	706	8.9%
West Dunbartonshire	West Partnership	1,191	1,092	423	-0.3%
West Lothian	FVWL	1,177	2,424	597	3.9%
Western Isles	Northern Alliance	289	726	272	1.4%
Total		32,113	78,306	18,381	143.8%

Table 6: Number of STEM CLPL hours and attendees by local authority

#### 2018-19 % of total number of hours 2018-19 % of total number of practitioners



Figure 12: Percentage of hours of STEM CLPL and attendees by local authority

### Geographical analysis – Forth Valley & West Lothian (FVWL)

9,435

1846

211

Hours of STEM CLPL

Number of attendees

Number of sessions

### STEM CLPL hours and attendee numbers

	CLPL delivered	Number of attendees
Clackmannanshire	498	103
Falkirk	3,537	636
Stirlingshire	2,977	510
West Lothian	2,424	597
Total	9,435	1846



Table 7: Number of STEM CLPL hours and attendees for authorities in FVWL

Figure 13: Number of STEM CLPL hours and attendees by sector in FVWL

#### STEM CLPL by month and STEM aspect



Figure 14: Number of sessions delivered in FVWL by month



Figure 15: Sessions in FVWL by aspect of STEM

#### **Geographical analysis – Northern Alliance**

14,868

### 4506

264

Hours of STEM CLPL

Number of attendees

Number of sessions

### STEM CLPL hours and attendee numbers

<ul> <li>Total cumulative hours</li> </ul>	<ul> <li>Number of attendees</li> </ul>
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Table 8: Number of STEM CLPL hours and attendees for local authorities in the Northern Alliance

Figure 16: Number of STEM CLPL hours and attendees by sector in Northern Alliance

#### STEM CLPL by month and STEM aspect









#### **Geographical analysis – South East**

11,580

Hours of STEM CLPL

2568

Number of attendees

Number of sessions

252

### STEM CLPL hours and attendee numbers

Local authority	Hours of STEM CLPL delivered	Number of attendees
City of Edinburgh	4,495	1051
East Lothian	1,112	233
Fife	3,282	897
Midlothian	1,912	178
Scottish Borders	781	209
Total	11,580	2568



Table 9: Number of STEM CLPL hours and attendees for local authorities in the South East

Figure 19: Number of STEM CLPL hours and attendees by sector in South West

#### STEM CLPL by month and STEM aspect





Figure 20: Number of sessions delivered in South East by month Figure 21: Sessions in South East by aspect of STEM

#### **Geographical analysis – South West**

6,676 Hours of STEM CLPL

1378 Number of attendees

Number of sessions

164

#### **STEM CLPL** hours and attendee numbers

<ul> <li>Tot</li> </ul>	al cumi	lative	hours	Numl	ber of	atten	de





Table 10: Number of STEM CLPL hours and attendees for local authorities in the South West

Figure 22: Number of STEM CLPL hours and attendees by sector in South West

#### STEM CLPL by month and STEM aspect





Figure 24: Sessions delivered in South West by month

Figure 23: Sessions in South West by aspect of STEM

### Geographical analysis – Tayside

4,218

Hours of STEM CLPL

1139

Number of attendees

## 176

Number of sessions

### STEM CLPL hours and attendee numbers

Hours of STEM CLPL delivered	Number of attendees
1,229	284
1,513	496
1,477	359
4,218	1139
	1,229 1,513 1,477



Table 11: Number of STEM CLPL hours and attendees for local authorities in Tayside

### Figure 25: Number of STEM CLPL hours and attendees by sector in Tayside

### STEM CLPL by month and STEM aspect





#### Figure 27: Sessions in Tayside by aspect of STEM

Figure 26: Number of sessions delivered in Tayside by month

#### **Geographical analysis – West Partnership**

25,930

Hours of STEM CLPL

5428

Number of attendees

Number of sessions

318

### STEM CLPL hours and attendee numbers

<ul> <li>Total cumulative hours</li> </ul>	<ul> <li>Number of attendees</li> </ul>
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Local authority	Hours of STEM CLPL delivered	Number of attendees
East Dunbartonshire	1,207	218
East Renfrewshire	2,107	745
Glasgow	12,102	2215
Inverclyde	1,242	161
North Lanarkshire	4,584	1096
Renfrewshire	1,838	224
South Lanarkshire	1,759	346
West Dunbartonshire	1,092	423
Total	25,930	5428



Table 12: Number of STEM CLPL hours and attendees for local authorities in the West Partnership

*Figure 28: Number of STEM CLPL hours and attendees by sector* in West Partnership

#### STEM CLPL by month and STEM aspect







Figure 29: Number of sessions in West Partnership by month

5,6141536159Hours of STEM CLPLNumber of attendeesNumber of sessions

### STEM CLPL hours and attendee numbers



Figure 31: Number of attendees at STEM CLP sessions for the Independent sector

#### STEM CLPL by month and STEM aspect



Figure 32: Sessions delivered in Independent sector by month



### **Education Scotland response**

Academic year 2018/19 marked the second year of implementation of the STEM Education and Training Strategy. In relation to Education Scotland's work, the focus for this period has been to continue to put in place the key national infrastructure and resources to address the priorities and needs identified by practitioners.

**Engaging with partners** – Education Scotland has disseminated the findings from the 2017/18 Annual STEM Practitioner Survey and Data Gathering Exercise to a wide range of partners and STEM providers. This has helped many organisations to plan and shape their professional learning offers to align more closely to the needs of practitioners and to the new national model of professional learning.

**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
- South Ayrshire Council
- The Highland Council
- West Dunbartonshire Council
- West Lothian Council

More information about the RAiSE programme can be found on the National Improvement Hub: <u>https://education.gov.scot/improvement/learning-resources/Raise</u>

**Enhancing Professional Learning in STEM Grants Programme** – Education Scotland awarded a total of £1.9 million of STEM professional learning grants in financial year 2019-20, supporting 162 projects. Over 11,498 practitioners from more than 1,138 settings, and 4,196 childminders, benefitted from this funding in Round 2 Phase 1 alone. This funding was aligned to the priorities and findings from the annual STEM practitioner surveys. For example, through the STEM grants we continued to invest in online learning and projects which build opportunities for leadership and collegiate professional learning at a school/setting/cluster level.

Online professional learning opportunities available for practitioners as a result of the grants include:

- University of Aberdeen <u>Biology: Online STEM Training for Teachers</u>
- Larbert High School <u>STEM Family Learning Programme</u>
- Royal Highland Education Trust Food, STEM and Sustainability: From farm to fork
- Clackmannanshire Council <u>Numeracy Champions Collaborative in Clackmannanshire</u>
- SWGfL Safe and Empowered: Responding to a Digital Generation

Round 2 Grants projects continuing into Phase 2 in 2020-21 have continued to provide practitioners with further opportunities for professional learning. More information about the grants supported is available from the <u>STEM summary page</u> on the National Improvement Hub.

**Professional learning** – Education Scotland's regional STEM, Numeracy & Mathematics and Digital Skills teams provided a range of face-to-face STEM professional learning opportunities across Scotland over the course of session 2019/20. The offer moved online as a result of the COVID-19 pandemic in 2020.

Education Scotland also worked with Scottish Government to support development of a <u>STEM in ELC</u> <u>Module</u> in collaboration with University West of Scotland. This is part of a package of training for ELC practitioners.

**Education Scotland's Regional Teams** – throughout this period, Education Scotland's Improving Gender Balance and Equalities (IGBE), Numeracy & Mathematics and Digital/Technology officers supported local and regional provision of CLPL. STEM professional learning was also supported through the Scottish Learning Festival.

In academic year 2018/19, Education Scotland provided over 228 professional learning sessions in STEM, Digital and Improving Gender Balance and Equalities resulting in 5,084 practitioner engagements and 9,151 cumulative hours of professional learning.

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