Education Scotland
Foghlam Alba

Professional Learning in STEM

Findings from the Annual STEM Practitioner Survey 2018/19

Community learning and development

July 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 Community Learning and Development (CLD) Practitioner Survey covering academic year 2018/19.

Education Scotland has continued to gather and analyse this data from the CLD sector since 2017/18 to inform and support the ongoing implementation of the STEM Education and Training Strategy (2017)[1].

The findings from the surveys[2] 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[3] and Second STEM Strategy Annual Report[4].

[1] STEM Education and Training Strategy: http://bit.ly/STEMstrategy

[2] A summary of STEM resources | Learning resources | National Improvement Hub (education.gov.scot)

[3] First Annual Report of the STEM Education and Training Strategy https://www.gov.scot/publications/stem-strategy-education-training-scotland-first-annual-report/

[4] Second Annual Report of the STEM Education and Training Strategy: https://www.gov.scot/publications/stem-strategy-education-training-scotland-second-annual-report/

Key findings

Number of responses – The number of survey responses increased by 1.4% from 139 responses in the 2017/18 survey to 141 responses in the 2018/19 survey.

Practitioner CLPL hours – The total number of cumulative hours of career-long professional learning (CLPL) accessed by the 141 survey respondents between 1 August 2018 and 31 July 2019 was 2,135 cumulative hours. The 2017/18 survey did not include a question on cumulative hours.

The average cumulative hours of STEM professional learning per CLD practitioner between 1 August 2018 and 31 July 2019 was 15.14 hours.

Practitioner confidence – The 2018/19 survey was changed to capture data relating to confidence levels within discrete areas of STEM. The findings are shown below for practitioners who responded agree or strongly agree with the statement ***"I feel confident in delivering…":***

- science-based learning in my practice 28.4% (40 responses)
- technologies-based learning in my practice 32.6% (46 responses)
- digital-based learning in my practice 49.6% (70 responses)
- engineering-based learning in my practice 12.8% (18 responses)
- mathematics/numeracy-based learning in my practice 63.1% (71 responses)
- gender balance, equity and equalities in my practice 48.9% (69 responses)

Confidence levels for CLD practitioners are low in comparison to the confidence levels of those who responded to the early learning and childcare (ELC), ASN and school survey. The only exception was the confidence levels of ELC practitioners in relation to digital-based learning which was 35.4% (compared to 49.6% for CLD).

Types of professional learning accessed by practitioners

Responses indicate that there has been a significant increase from the 2017/18 survey to the 2018/19 survey in relation to the following professional learning formats accessed by CLD practitioners: attending an externally provided course (30.5% in 2018/19 from 6.5% in 2017/18), collegiate working in my organisation (41.8% from 7.2%), collegiate working with similar organisations (22.7% from 2.9%), external company coming into my organisation (29.1% from 5.8%) and online learning (42.6% from 8.6%).

When asked about the impact of various professional learning formats, the following three formats were ranked highest in terms of positive impact ('valuable' or 'very valuable'):

- Professional reading/engaging independently with research 37.6% (53 responses)
- Online learning 31.9% (45 responses)
- Collegiate working within my organisation 29.1% (41 responses)

Main organisations providing STEM CLPL – The three most popular responses were:

- My employer 66.7% (94 responses)
- Education Scotland 22.7% (32 responses)
- National or local voluntary sector organisation 19.1% (27 responses)

Main barriers to accessing STEM CLPL – The top three barriers were:

- Difficulties attending professional learning due to other commitments 35.5% (50 responses)
- Lack of funding to pay for professional learning 29.8% (42 responses)
- I don't know where to get information about professional learning 22.7% (32 responses)

Professional learning priorities for 2019/20 – The top three priorities in relation to STEM were:

- Awareness about resources and support available for STEM 51.8% (73 responses)
- Learning approaches to deliver STEM within a CLD context 49.6% (70 responses)
- How to lead and coordinate STEM within a CLD context 33.3% (47 responses)

Support that would improve STEM CLPL for CLD – The top three priorities were:

- Dedicated online professional learning resources for CLD practitioners
  43.3% (61 responses)
- More information from Education Scotland on available professional learning
  36.2% (51 responses)
- The opportunity to apply for professional learning grants to develop practice
  31.2% (44 responses)

STEM partner or partners – In the 2018/19 survey, 35.2% of respondents confirmed that their service was engaging with a STEM partner(s). This question was not asked in the 2017/18 CLD survey.

Annual STEM CLD Practitioner Survey 2018/19

Findings

About the survey

Background

The aim of the Annual STEM CLD Practitioner Survey is to track enhancements in STEM career-long professional learning (CLPL) undertaken by practitioners in the community learning and development sector. The survey covers aspects such as:

- Number of cumulative hours of STEM CLPL accessed
- Practitioners' confidence in delivery of STEM learning
- STEM professional learning priorities of practitioners
- Barriers to accessing CLPL.

Other surveys were issued in 2018/19 to gather data from other sectors including:

- Early learning and childcare, additional support needs (ASN) and schools
- Organisations that provide STEM professional learning
- School-based technical support staff.

Structure and purpose

The survey was available made available to all practitioners via an online survey. It was promoted widely via Education Scotland and Scottish Government communication channels. The survey comprised five sections:

- About you
- STEM in your setting
- Your professional learning
- Digital technologies
- Numeracy & mathematics.

The survey 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 (http://bit.ly/STEMstrategy).

The findings have directly influenced the framing of Round 2 of the Enhancing Professional Learning in STEM Grants Programme which saw £1.9 million allocated to 140 professional learning programmes. 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 and CLPL offer of Education Scotland's regional teams. These teams will 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 (KPI) 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.

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

Section A – About you

Number of responses

2017/18 Practitioner CLPL survey	139 responses
2018/19 Practitioner CLPL survey	141 responses

Table 1: Number of responses to the 2017/18 and 2018/19 annual STEM CLD practitioner surveys

Responding organisations

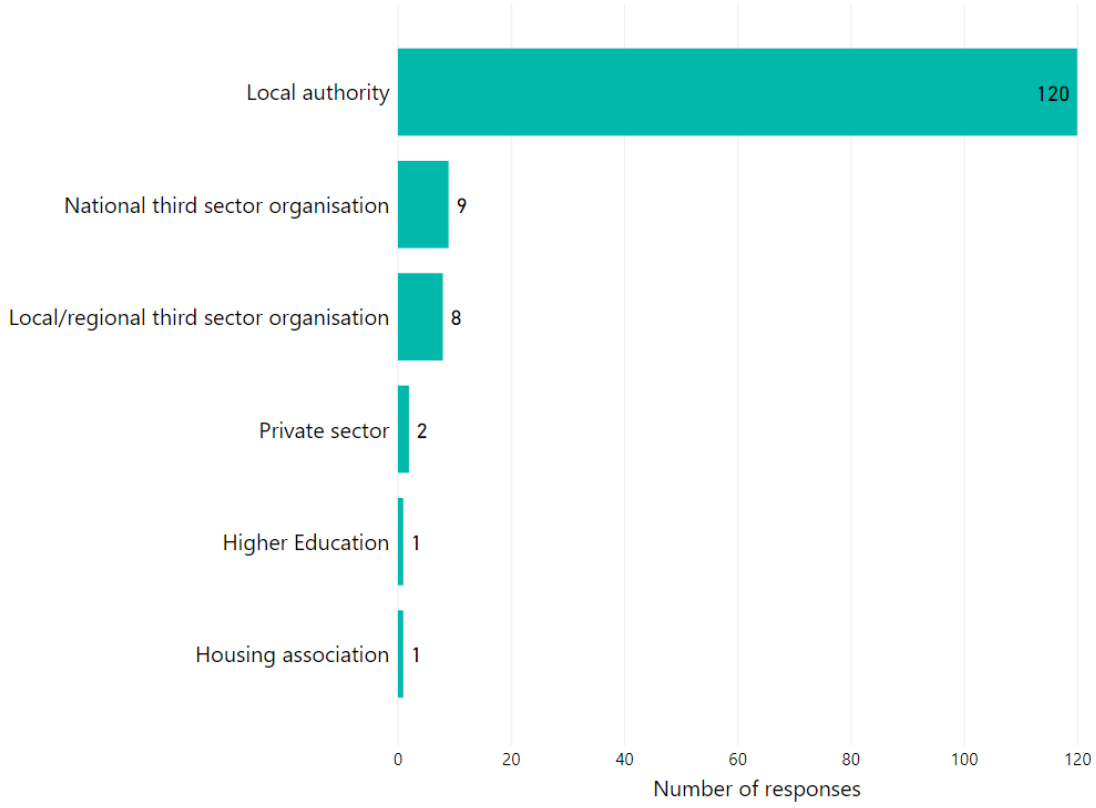

Figure 1: Number of responses by organisation type

Response by role

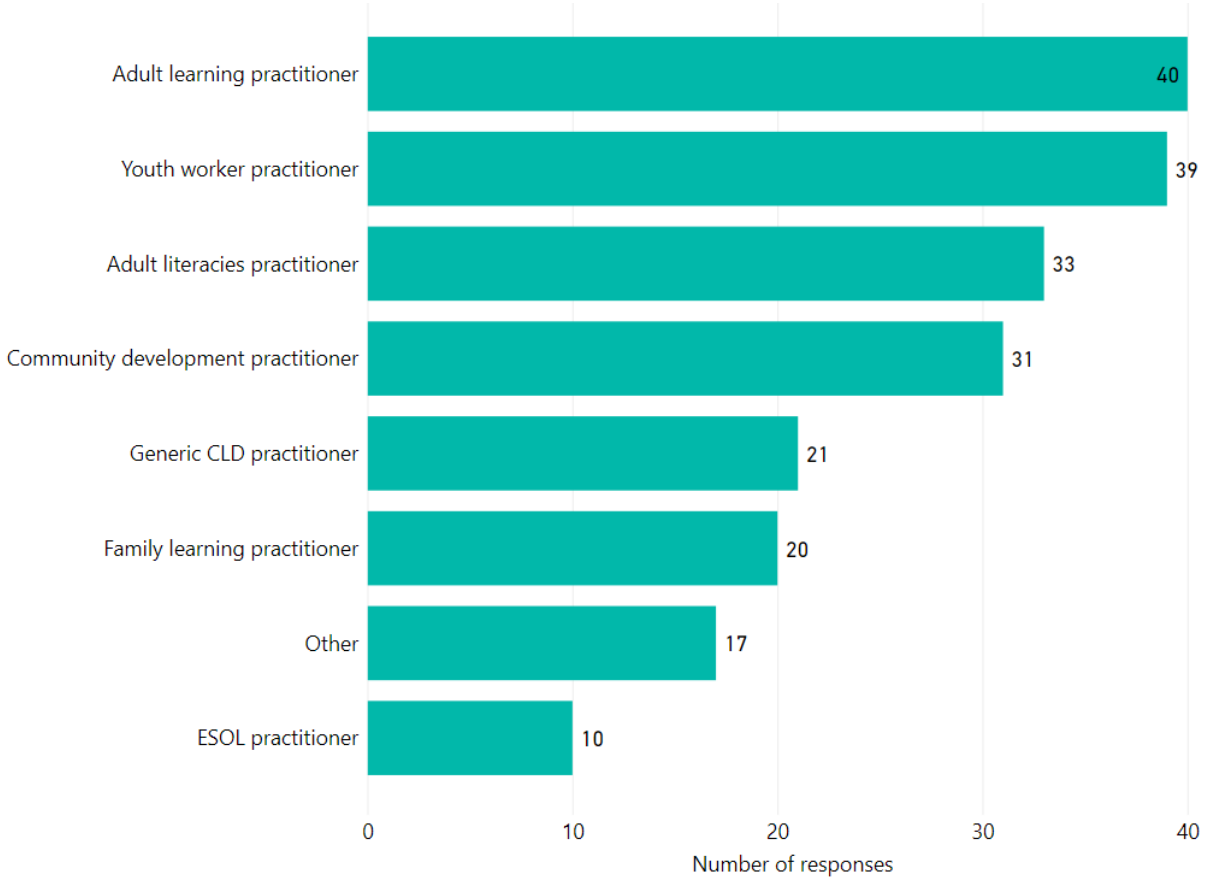

Figure 2: Number of responses by role

Note: the number of practitioners responding in Figure 2 exceeds the total number of responses as multiple selections were possible for this question in the online survey.

Respondents' work pattern

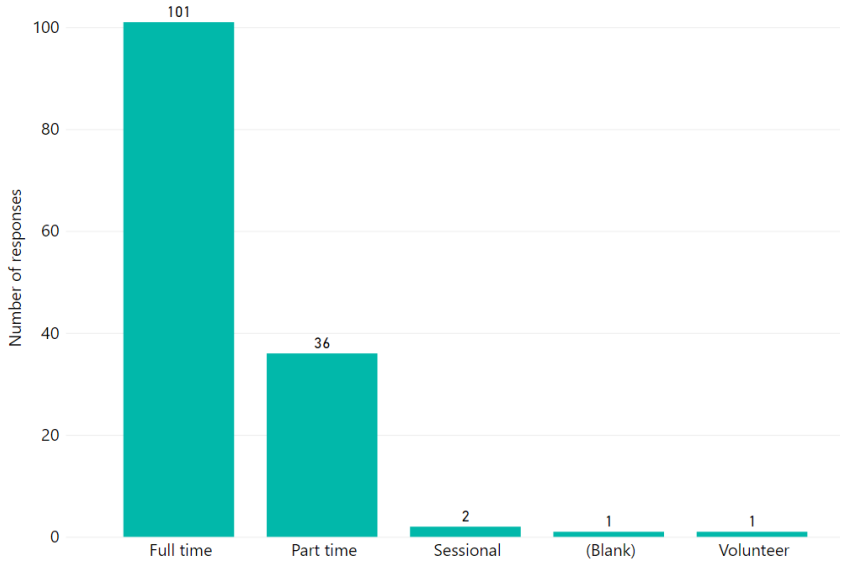

Figure 3: Respondents' work pattern

Section B – STEM in your setting

STEM partner(s) from private, public or third sector

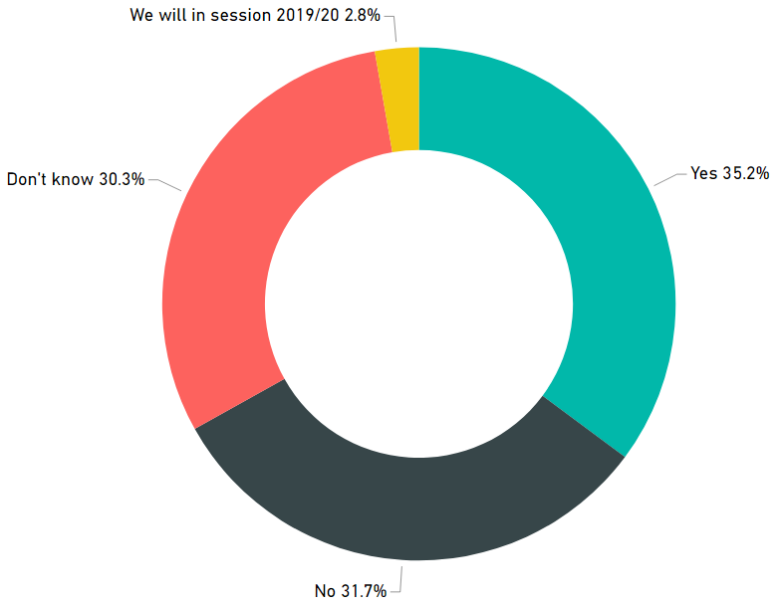

Figure 4: STEM partner(s) from private, public or third sector

- 35.2% (51 responses) confirmed that their service had a STEM partner(s) from the private, public or third sector.
- A further 2.8% (4 responses) stated that their service hoped to have a STEM partner(s) in session 2019/20.

Finding STEM partner organisations

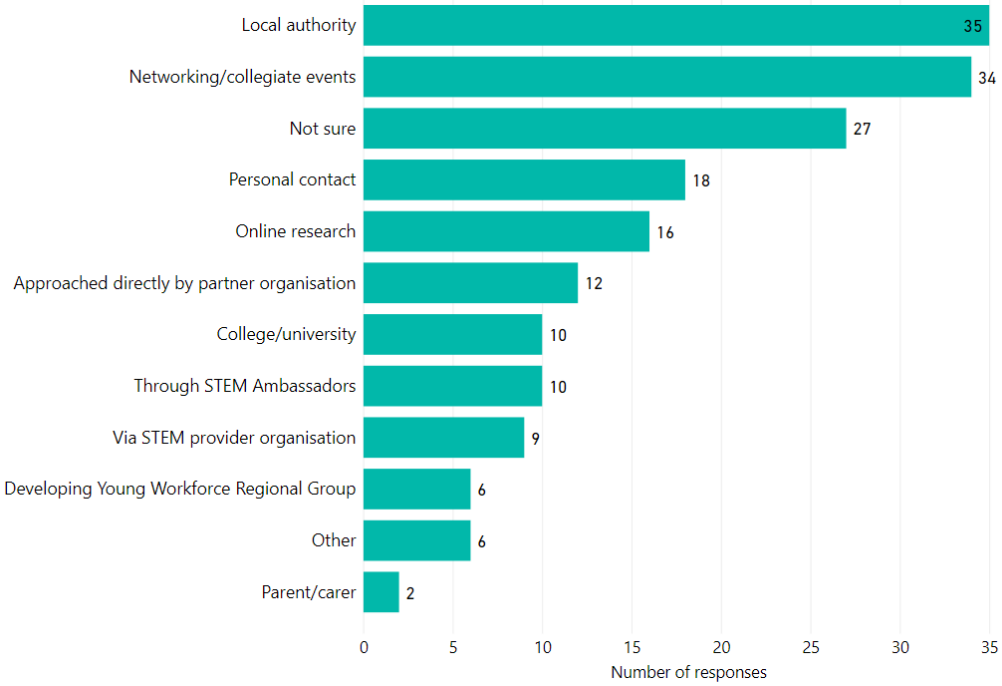

Figure 5: Finding STEM partner organisations

Number of cumulative hours of STEM CLPL accessed

The ***total number of cumulative hours*** of practitioner professional learning in STEM accessed by the 141 survey respondents between 1 August 2018 and 31 July 2019 was **2,153 hours**. This is an average of **15.3 cumulative hours per practitioner per annum**. This question was not asked in the 2017/18 CLD survey.

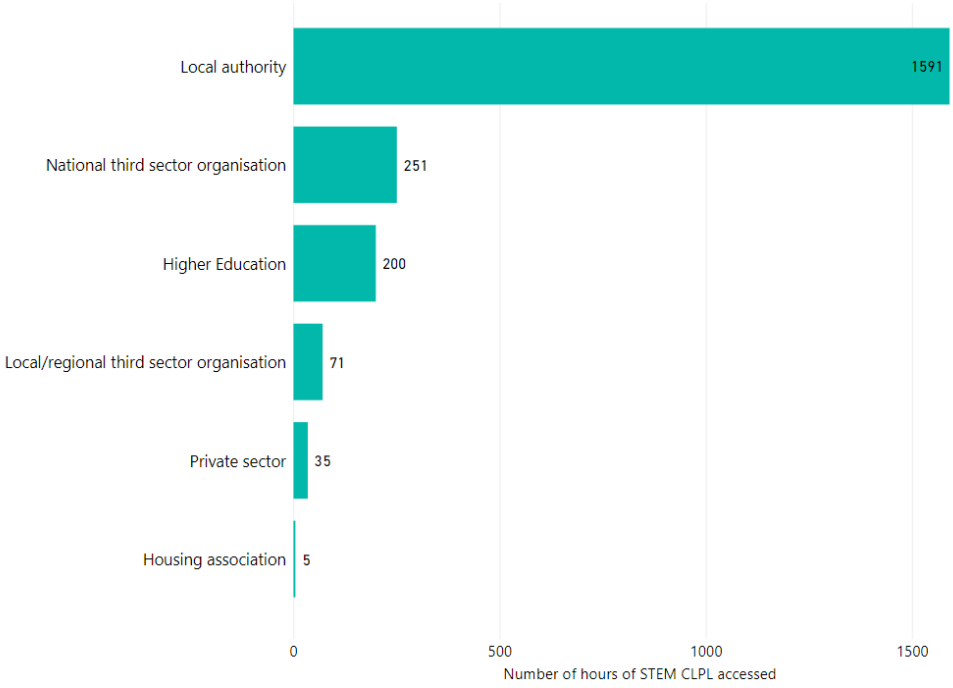

Figure 6 Number of hours of STEM professional learning accessed by sector

More than half of 2018/19 respondents said the professional learning they accessed in 2018/19 was about the same as in 2017/18.

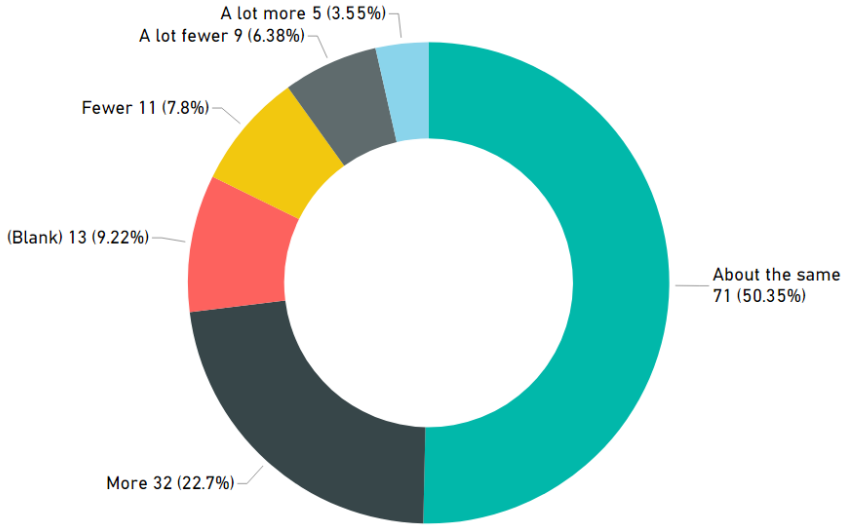

Figure 7: Comparison of hours of STEM CLPL accessed in 2017/18 and 2018/19

Types of professional learning accessed and impact

Responses indicate that there has been a significant increase from the 2017/18 survey to the 2018/19 survey in relation to the following professional learning formats: attending an externally provided course, collegiate working in my organisation, collegiate working with similar organisations, external company coming into my organisation and online learning.

Types of professional learning in STEM that have been accessed by practitioners	2017/18 survey	2018/19 survey	2018/19 Survey
	Response % (Response Count)	Response % (Response Count)	Impact of type of professional learning – 'valuable' and 'very valuable'
Attending an externally-provided course outside of my organisation	6.5% (9)	30.5% (43)	24.1% (34)
Collegiate working within my organisation	7.2% (10)	41.8% (59)	29.1% (41)
Collegiate working with similar organisations	2.9% (4)	22.7% (32)	18.4% (26)
External company/organisation coming into my organisation	5.8% (8)	29.1% (41)	23.4% (33)
Online learning	8.6% (12)	42.6% (60)	31.9% (45)
Attending local, regional and national events to share STEM ideas and practice	*	34.8% (49)	25.5% (36)
Attending open day visits to other organisations with interesting STEM practice	*	21.3% (30)	17.0% (24)
Professional reading/engaging independently with research	*	53.9% (76)	37.6% (53)
Social Media – Twitter/Facebook etc	*	29.8% (42)	19.1% (27)
Other	*	14.2% (20)	–

Table 2: Types of professional learning accessed by practitioners and the impact on learning

Note: Indicates top 3 responses

* Indicates question not in 2017/18 survey

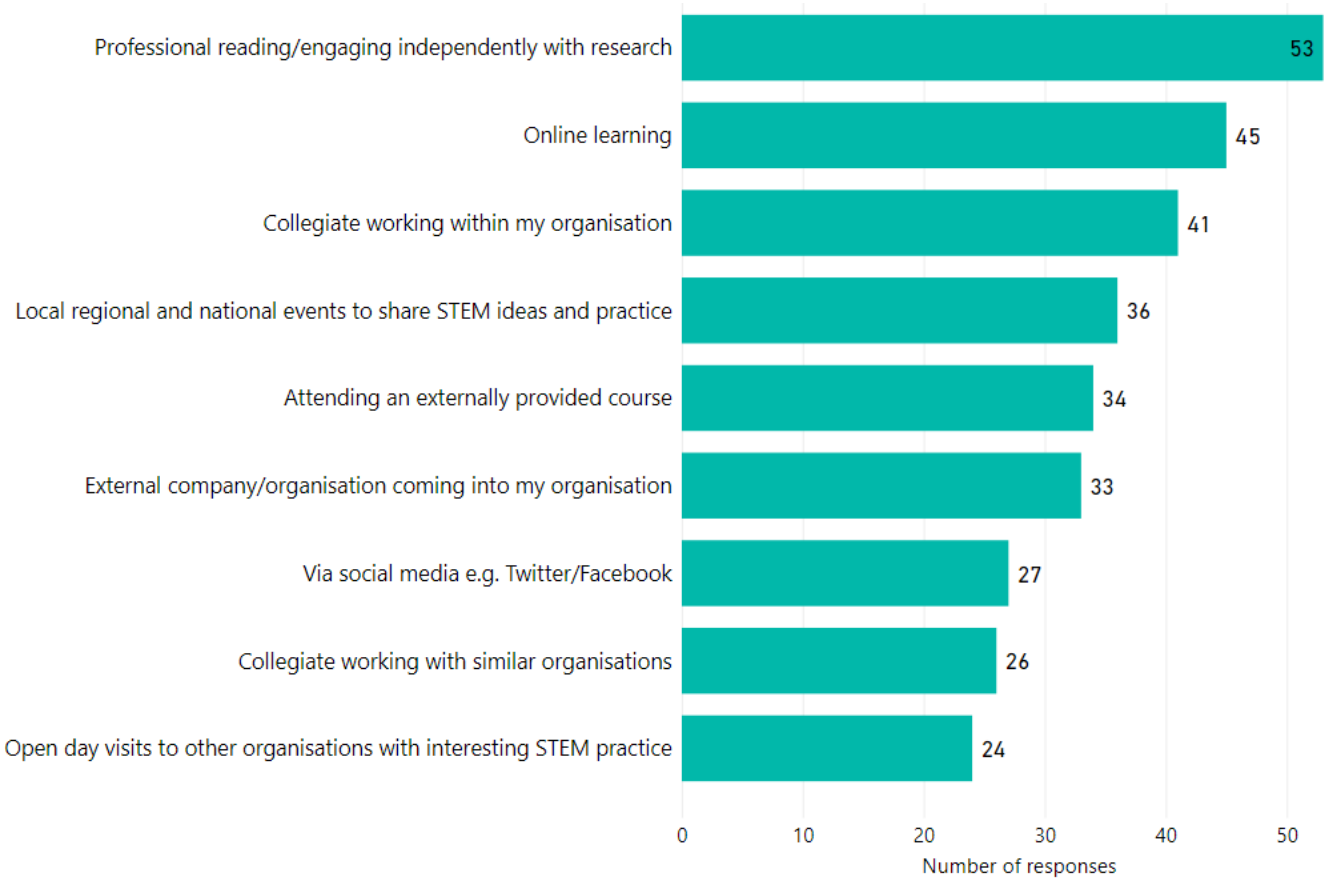

Figure 8: Types of professional learning accessed by practitioners and the impact on learning

Organisation(s) that provided STEM professional learning

In the 2018/19 survey, 66.7% (94) respondents indicated that they had accessed professional learning through their employer (local authority). This compared with 22.3% (31) respondents in the 2017/18 survey.

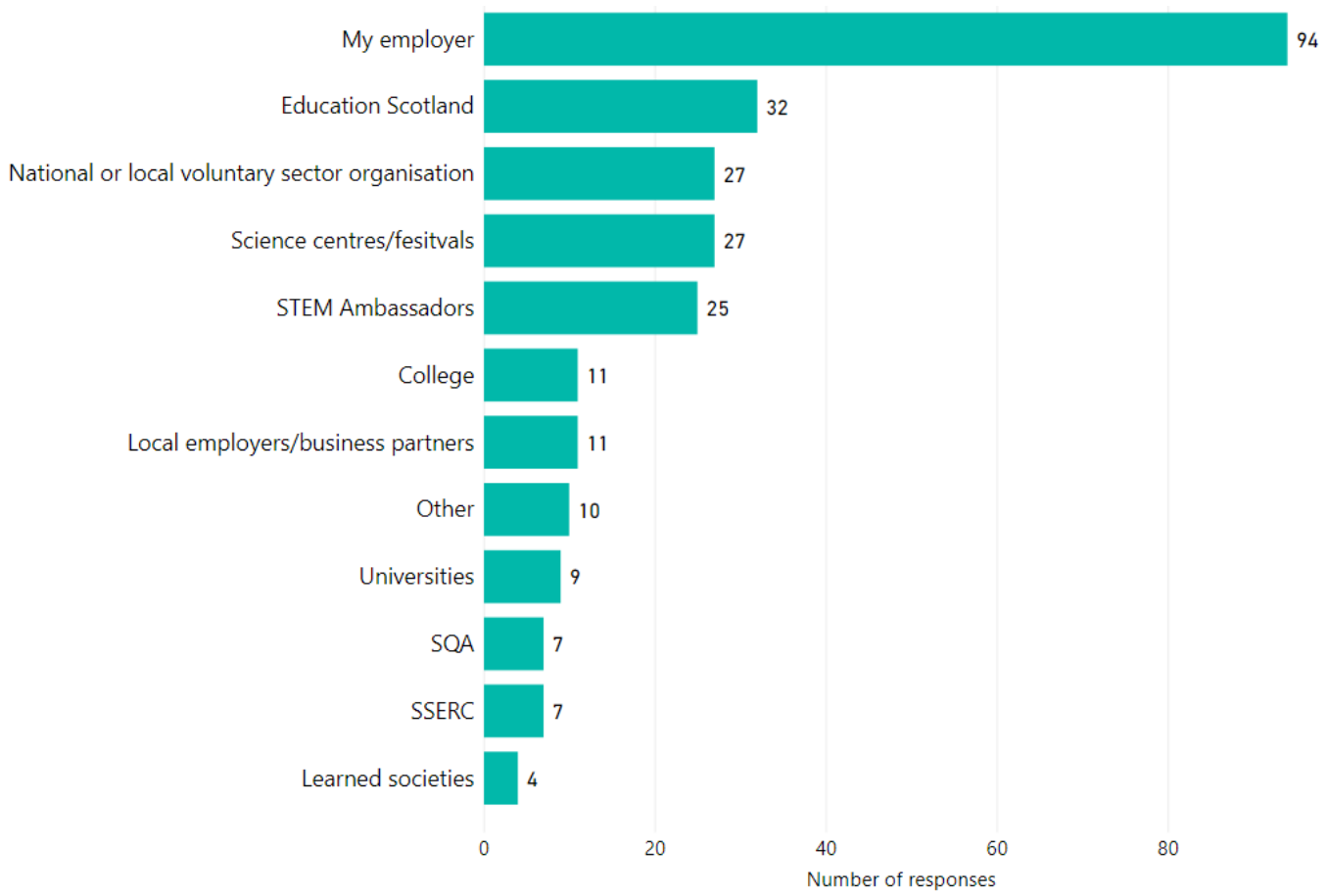

Figure 9: Organisations providing practitioner STEM professional learning

The table below outlines the top three responses from the last two surveys.

2017/18	2018/19
1. My employer (local authority)	1. My employer (local authority)
2. National or local voluntary sector organisation	2. Education Scotland
3. Education Scotland	3. National or local voluntary sector organisation

Table 3: Organisations that provided STEM professional learning

Ease of accessing professional learning in STEM

A total of 27.0% of respondents in the 2018/19 survey confirmed that it was *'Easy'* and/or '*Very easy'* to access STEM CLPL.

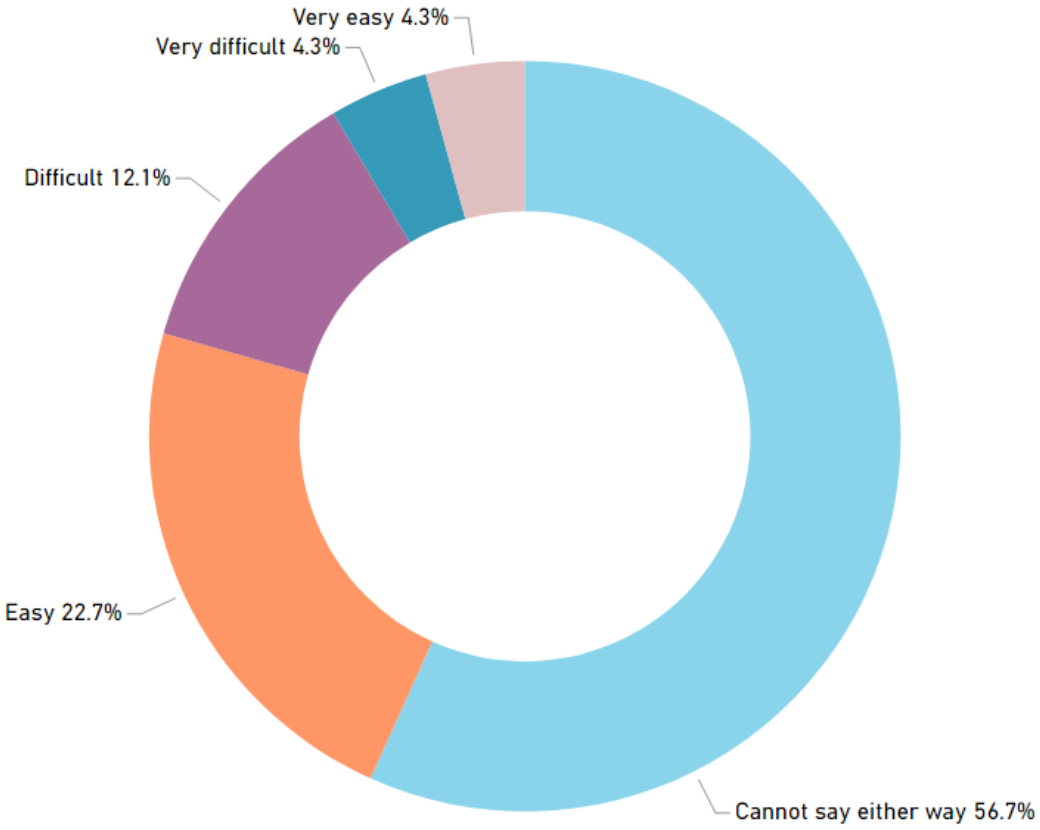

Figure 10: Ease of accessing professional learning in STEM

Note only 135 respondents replied to this question.

Main barriers to accessing professional learning in STEM

The 2018/19 practitioner survey highlighted a number of barriers to accessing professional learning in STEM.

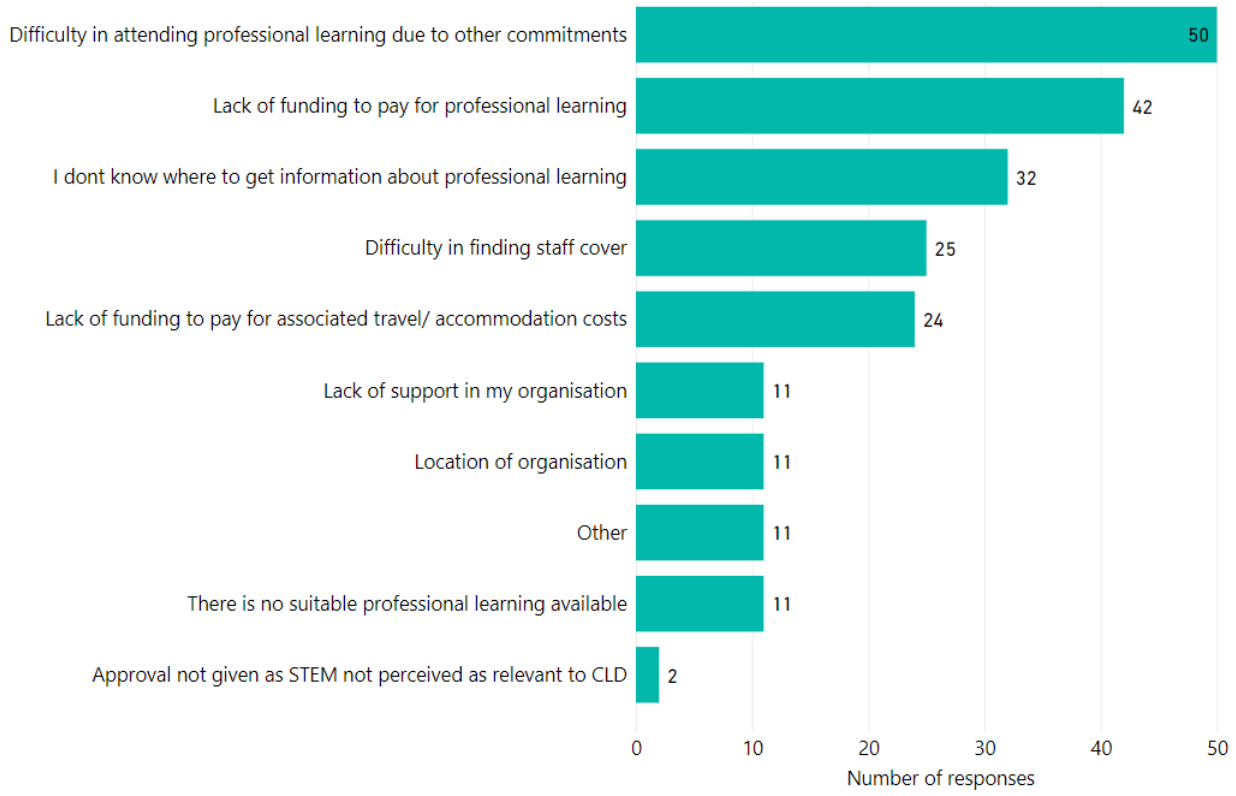

Figure 11: Main barriers to accessing professional learning in STEM

The table below lists the top three barriers to accessing professional learning in STEM over the last two surveys.

2017/18 survey	2018/19 survey
1. Lack of funding to pay for professional learning	1. Difficulty in attending professional learning due to other commitments
2. Difficulty in attending professional learning due to other commitments	2. Lack of funding to pay for professional learning
3. Difficulty in finding staff cover	3. I don't know where to get information about professional learning

Table 4: Main barriers to accessing professional learning in STEM

STEM professional learning opportunities ranked by impact

The following chart details STEM professional learning ranked by the positive impact that practitioners thought they would have.

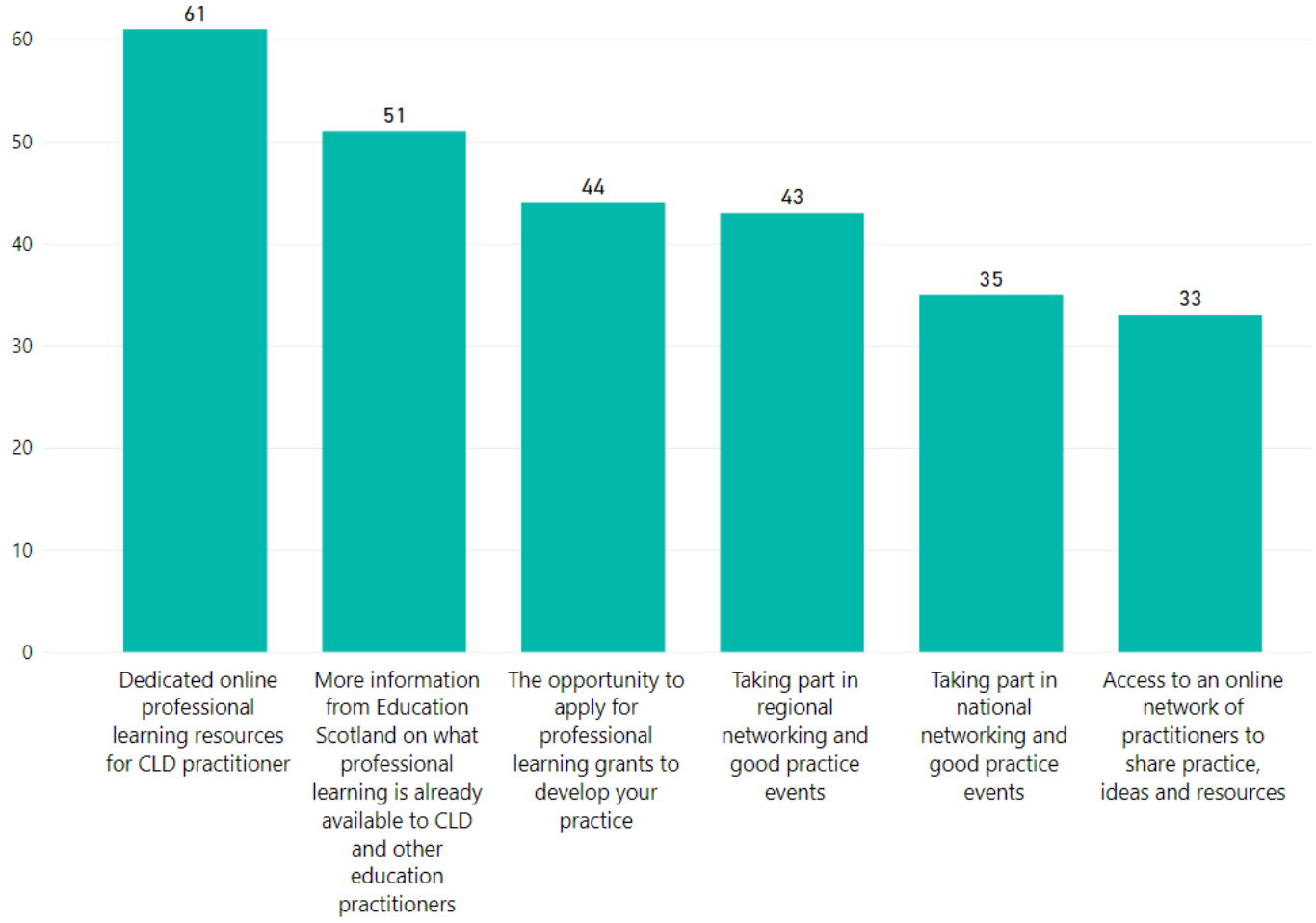

Figure 12: STEM professional learning opportunities that would deliver greatest impact

The table below lists the top three CLPL opportunities in terms of the positive impact that practitioners thought they would be likely to have.

2017/18 survey	2018/19 survey
1. Awareness about resources and professional learning available for STEM	1. Dedicated online professional learning resources for CLD practitioners
2. Understanding how to incorporate STEM subjects into my current practice	2. More information from Education Scotland on what professional learning is already available to CLD and other education practitioners
3. Using STEM as a context to increase skills in numeracy	3. The opportunity to apply for professional learning grants to develop your practice

Table 5: STEM professional learning opportunities with greatest impact

STEM professional learning priorities for academic year (1 August 2019 – 31 July 2020)

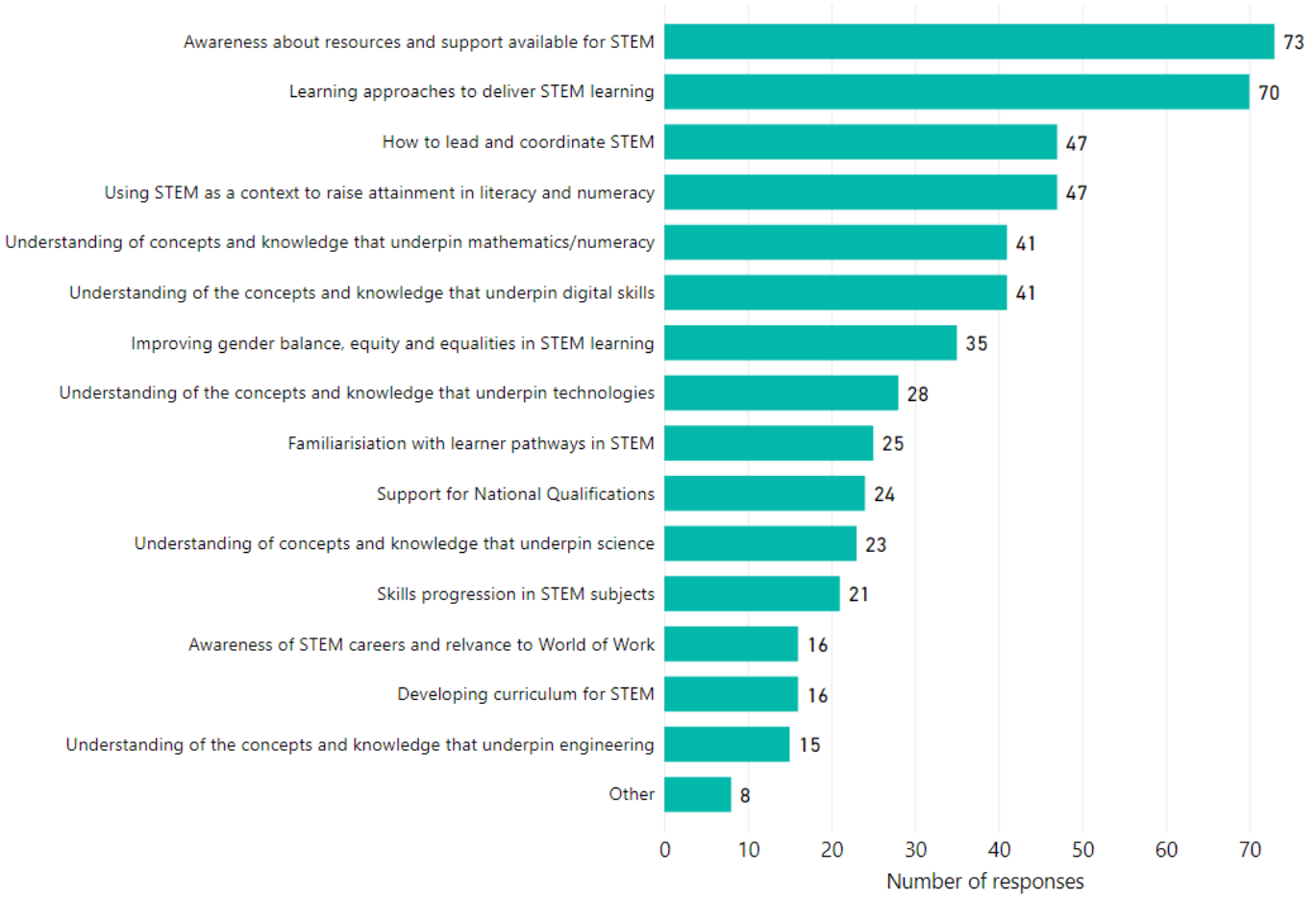

Figure 13: STEM professional learning priorities for academic year 2019/20

Practitioner confidence

In the 2018/19 survey, the question relating to confidence was changed to determine the confidence levels of practitioners in relation to each discrete area of STEM.

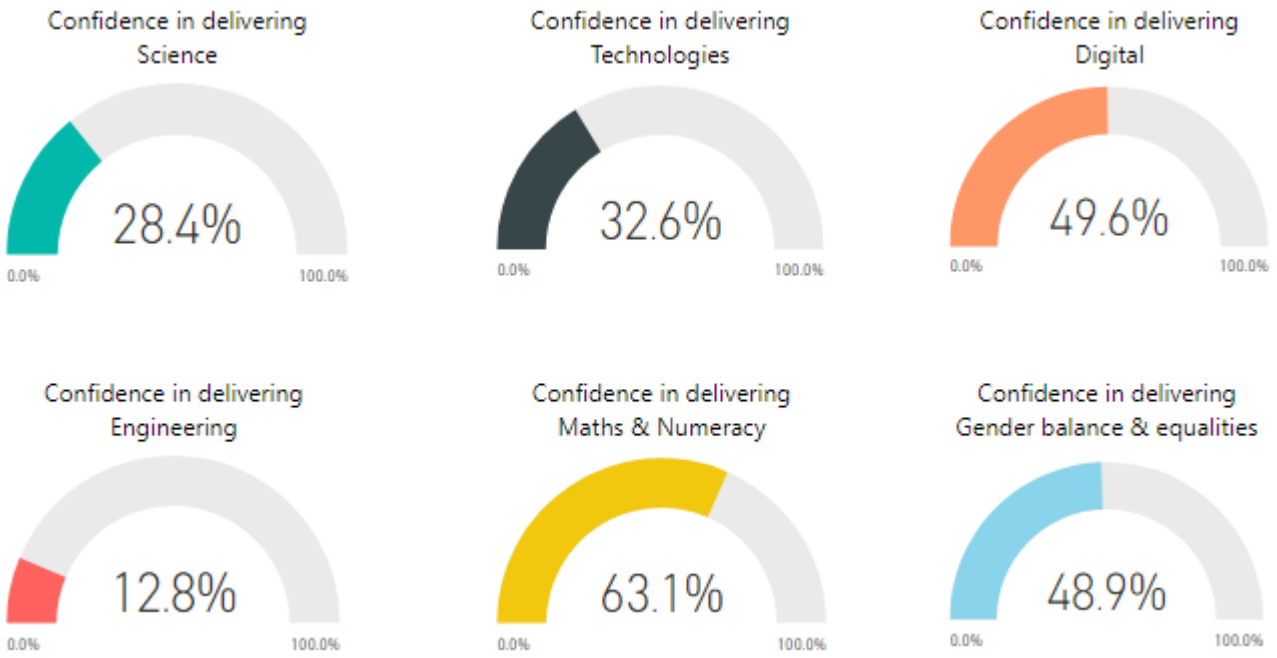

Figure 14: Practitioner confidence in delivering discrete areas of STEM

Confidence levels are low compared to practitioners within school or early learning and childcare settings.

Section D – Digital technologies

77.4% of respondents confirmed that they engage with learners in relation to digital technologies. The areas of engagement are listed in the graph below.

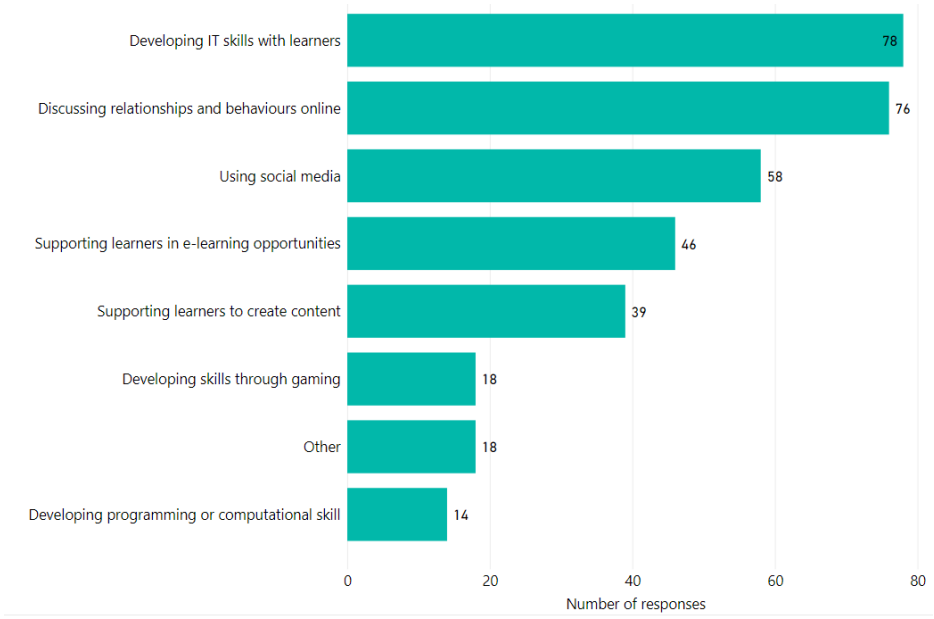

Figure 15: Main digital technology areas that are addressed with learners

56.7% of respondents confirmed that they had no access to professional learning in digital technologies. Practitioners who managed to access professional learning in this area mainly did so via online open-access content. The main barriers to accessing professional learning on digital technologies are detailed below.

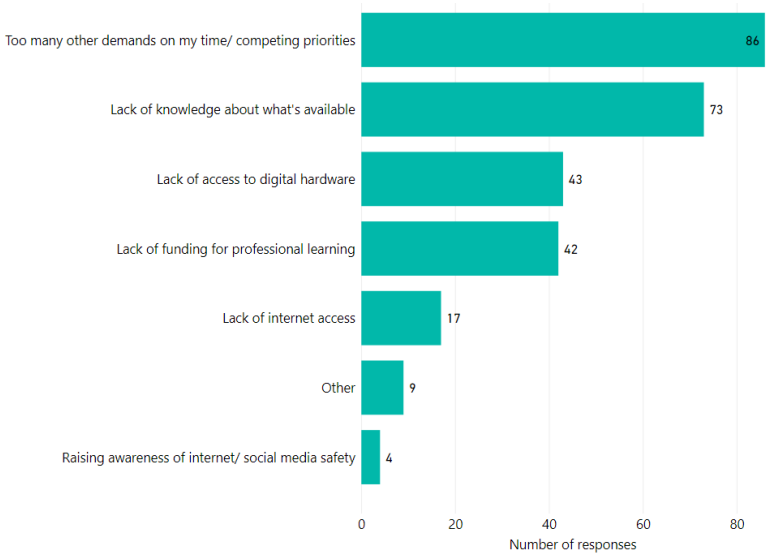

Figure 16: Main barriers to accessing professional learning in digital technologies

Section E – Numeracy & mathematics

58.9% of respondents confirmed that they have learners who are working on numeracy and mathematics. The ages of learners engaged with numeracy and mathematics activities are listed below.

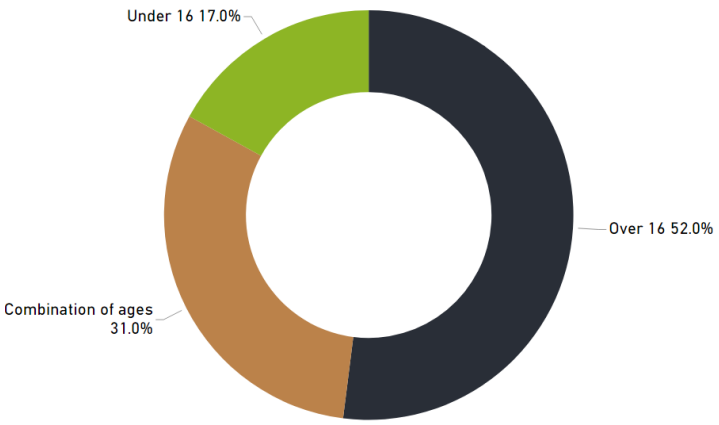

Figure 17: Age of learners that practitioners engage with regarding numeracy and mathematics

57.4% of respondents confirmed that between 0% and 25% of their learners are working to develop their numeracy skills. In addition, 60% of respondents' stated that the number of their learners working on numeracy skills has remained static over the last two years.

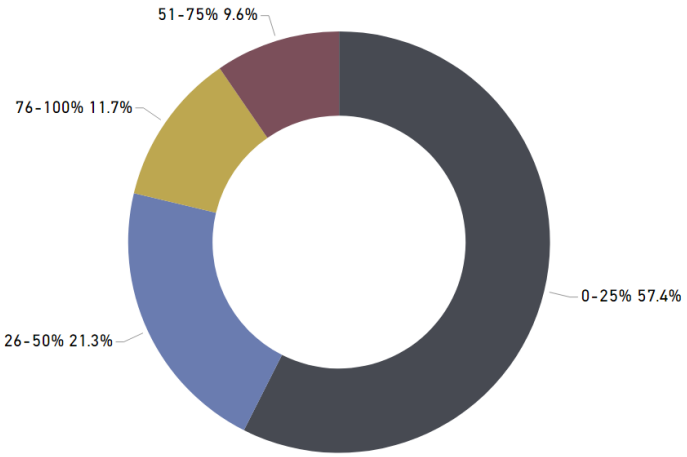

Figure 18: Percentage of learners working on numeracy skills

The chart below shows the four main reasons cited by respondents for learners to develop their numeracy skills.

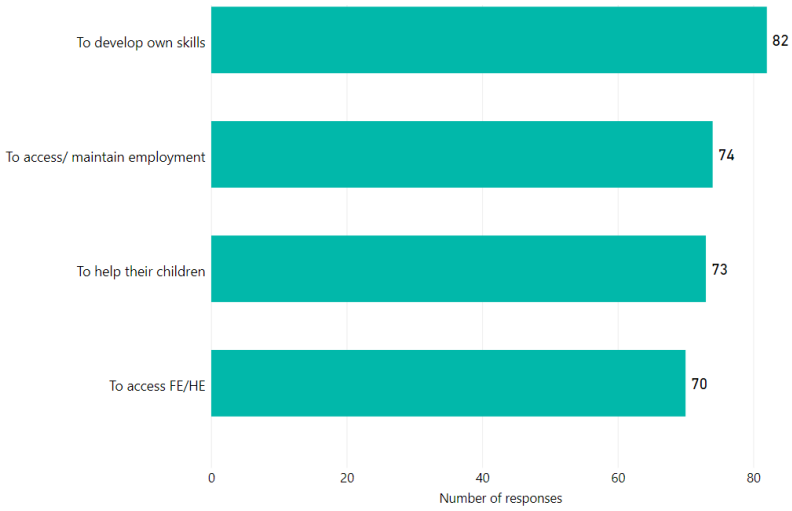

Figure 19: Main reasons for learners to develop their numeracy skills

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 to a wide range of partners and STEM providers, including those in the CLD sector. 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

RAiSE Officers within the local authorities above have sought to engage parents, families and communities in many ways to help build STEM capital. More information about the RAiSE programme can be found on the National Improvement Hub: https://education.gov.scot/improvement/learning-resources/Raise

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. This included support for community learning and development practitioners. This funding was aligned to the priorities and findings from the annual STEM practitioner surveys. More information about the grants being supported is available from the STEM summary page on the National Improvement Hub.

Professional learning – Education Scotland's Community Learning and Development Officers have engaged widely with the CLD sector to support their STEM professional learning needs. This was supported in partnership with Education Scotland's regional STEM, Numeracy & Mathematics and Digital Skills teams.

STEM professional learning opportunities continue in session 2020/21 providing a blend of national and regional webinars across the STEM subjects. For more information please see Education Scotland's Event page.

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