



2022 STEM Influencer Report – Teachers & Career Advisors

Prepared by YouthInsight for the
Department of Industry, Science and Resources

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Notes on interpreting the report

Significant differences – Differences between demographic groups cited in the report refer to statistically significant differences based on a 95% confidence interval. Charts in this report show statistically significant differences between subgroups using black or white arrows alongside the percentage results. If a difference is described as indicative, the difference is not statistically significant.

Weighted data and rounding – To ensure the survey results are representative of the population, weighting was applied to correct for under or over representation of the sample. Where the weighted population or proportions do not add up to 100%, this is due to rounding of decimal places up or down to the nearest whole number.

Multiple choice questions (MC) – Multiple choice questions will not add to 100% as respondents could select more than one answer. All multiple-choice questions have been labelled within the question text as MC.

Wave – When a survey is repeated multiple times, each occurrence is called a wave. The waves of this research are as follows:

- 2020 – wave 1
- 2022 – wave 2

Educators – This term is used throughout the report to refer to all respondents who completed this survey. This term is used to cover the broad range of respondents to the survey from across the education sector. For instance, the sample includes career advisors and co-ordinators who do not teach in the classroom but are classed as educators.

Teachers – This term is used when the survey question was asked only of those who teach within a primary or secondary classroom setting.

Advisors – This term is used when the survey question was asked only of those who provide career advice to students at least once per month or more often. This group includes full time career advisors as well as teachers and other educators who provide career advice in addition to their main role.

Non-binary respondents – Data was collected from survey respondents who did not identify with binary genders. While these respondents make up the overall sample size, due to low numbers, this report excludes any analysis based on these respondents.

Location / area – When referring to location or metropolitan vs regional areas, the report refers to the location of the school where the educators work, not the home location of the educators.

Socioeconomic status – Lower or higher socioeconomic status (SES) has been determined by using the Australian Bureau of Statistics Socio-Economic Indexes for Areas (SEIFA) which ranks areas in Australia according to relative socioeconomic advantage and disadvantage into deciles. The indexes are based on information from the five-yearly census. This survey employs the Index of Education and Occupation (IEO). Postcodes supplied by respondents have been mapped to the corresponding IEO decile. This report has grouped deciles one to five and classified this group as lower SES and deciles six to ten as higher SES.

STEM classifications: Below is a list of how STEM has been classified in this research report.

- **STEM definition in the context of this report:** STEM stands for science, technology, engineering and mathematics. In this survey, science refers to topics such as biology, chemistry, physics, and earth and environmental sciences. It does not include medicine, nursing, psychology or health sciences.
- **Technology** refers to topics related to information technology and programming, mechanics, electronics, and all other types of technology. Some technology courses could also be called engineering. There are many types of engineering, like aerospace and environmental engineering, and many types of mathematics, such as geometry, logic and statistics.
- **STEM subjects at primary school:** mathematics, science, technologies
- **STEM subjects at secondary school:**
 - **General STEM subjects:** mathematics, biology, chemistry, earth and environmental science, physics, geography, design and technologies and digital technologies
 - **Year 9-10 elective STEM subjects:** geography elective, agricultural technology, design and technology, food technology, graphics technology, industrial technology, information and software technology
 - **Year 11-12 elective STEM subjects:** agriculture, biology, chemical world science, chemistry, computing applications, design and technology, earth and environmental science, earth and space science, electrotechnology (VET), engineering studies, geography, human society and its environment, industrial technology, information and digital technology (VET), information processes and technology, investigating science, living world science, marine studies, mathematics, mathematics advanced, mathematics extension, metal and engineering (VET), physical world science life skills, physics, science extension, software design and development
- **STEM subjects at higher education:** agriculture, computing and information technology, engineering and technology, environmental studies, mathematics, biology, chemistry, physics, earth and environmental sciences.
- **STEM qualifications:** computing or information technology (IT), data analyst, engineering, mathematics, science
- **STEM jobs / careers:**
 - **Qualifying jobs / careers:** computing or information technology (IT), data analysis, engineer, mathematician, scientist
 - **Potential qualifying jobs / careers, depending on specific role:** entrepreneur, machinery operator or driver, professor, lecturer or teacher, public servant (includes Army, Airforce, Navy), technician or trade worker (mechanic, electrician, carpenter)

Executive summary

Building on from the Youth in STEM research, the Department of Industry, Science and Resources (DISR) has expanded the research to incorporate parents, teachers and career advisors. These audience segments have been identified as key influencers of young people's choices when it comes to education and career selection. Understanding their perceptions and attitudes towards STEM can assist families, educators and policy makers in supporting girls throughout their STEM education and consider future STEM-related careers. This report contains the results from the second wave of research with Teachers and Career Advisors.

Separate online surveys were conducted among parents and educators (including teachers and careers advisors) from August to October 2022 with a representative sample of 1,509 parents and 730 educators across the country. Respondents were sourced from a range of online panels and through direct partnerships with Education Services Australia (ESA) and Careers Development Association Australia (CDAA). This report outlines the detailed findings from the *Teachers & Career Advisors 2022/23* research.

It's important to observe the composition of survey respondents, were 85% women and 15% men, which is reflective of Australia's school education sector. Two thirds of the respondents were primarily classroom teachers, while a third reported working in other roles such as teacher support / aides, school coordinators and assistant / deputy principals. Overall, only 3% of the sample were career advisors, although many classroom teachers also advise students on careers. There was considerable role crossover, with two in five teachers reporting to have other roles in addition to classroom teaching. The survey also included 8% of educators from the tertiary sector.

While the study is vastly detailed, this report focuses on a set of key metrics used to evaluate educators' awareness and understanding of STEM, perceived importance of STEM, feelings of qualification and confidence in teaching STEM and connecting STEM content with real-world applications, along with other metrics such as gender biases.

Given the recent COVID-19 pandemic, the current study also explicitly sought to understand any potential impact of the pandemic on educators' likelihood to encourage STEM subjects or careers, and whether they think it has had an impact on youth interest in STEM.

A summary of the findings for each of the key metrics, along with a summary table, can be found below.

Summary of findings

The results presented in this section summarise key insights and differences between research waves 1 and 2.

Table 1: Key metrics across wave 1 and wave 2.

Key metric	Wave 1	Wave 2
Prior STEM qualifications / education	35%	40%
Awareness of STEM acronym	87%	88%
Confidence in teaching STEM (as an integrative set of skills)	61%	63%
Confidence in connecting STEM content with real-world applications	72%	75%
Perceived importance of STEM for future employment	89%	89%
Feeling qualified to teach STEM (as an integrative set of skills)	58%	59%

Teaching roles and STEM

Reflecting the multiple roles that teachers have, significant overlaps were seen between educators who specialise in STEM and those who do not. Three in ten (28%) secondary teachers reported teaching only STEM subjects, a further three in ten (32%) teach both STEM and non-STEM subjects, and the final four in ten (40%) do not teach STEM at all.

Regarding teaching roles held by men and women, the survey found that men were more likely to be teaching STEM subjects compared to women across both primary and secondary school settings, a finding that is consistent with the previous wave. Among secondary teachers, 44% of men taught only STEM subjects compared to 23% of women. Among primary teachers, the sample size was not large enough to report on gender differences, but indicatively we see the same story. These insights suggest that students are more likely to see men in STEM teaching roles, potentially influencing their associations between gender and STEM careers or STEM expertise.

STEM qualifications and further education

Among all respondents, 40% had obtained a STEM qualification prior to entering the education sector, up slightly from 35% in the previous wave. Exploring these results in further detail, men were more likely than women to have obtained a STEM qualification prior to teaching (60% of men vs 36% of women). Prior STEM qualifications were also more commonly found in secondary school teachers (51%) compared to primary school teachers (30%). The gap in qualifications attained was even wider when comparing to secondary teachers who are currently teaching STEM, with 69% reporting to have prior STEM qualifications compared to 26% of teachers who do not teach STEM. This is consistent with the previous wave.

STEM awareness and understanding

A question used to gauge the understanding of STEM across all audience groups was to ask if respondents could identify the four subjects of the STEM acronym. Awareness was high among educators, with nine in ten (88%) correctly identifying all subjects. A further 9% were able to correctly identify three out of the four subjects, with engineering being the subject that was incorrect most often. Only three percent got the acronym completely wrong or were unsure.

Secondary STEM teachers recorded the highest score of correct responses (93%), followed by other secondary non-STEM teachers (90%), primary teachers (86%) and lastly the tertiary educators (79%).

The survey also found that Aboriginal and / or Torres Strait Islander teachers were less likely to be able to correctly define the full acronym compared to other teachers surveyed (70% vs 88%).

When asked what jobs they think people with a STEM-related qualification can achieve, three out of the top four responses focused directly on the attributes of STEM. Jobs related to working in education topped the list (14%) passing scientist to the top spot this wave (12%). In fact, significantly more teachers said that you could work in teaching or education with STEM education than last wave (10%).

Confidence in connecting STEM content with real-world applications and careers

The educators' confidence in their ability to connect STEM content with real-world applications was also investigated. Three quarters (75%) feel somewhat or very confident connecting STEM content with real-world applications, in line with the previous wave (72%). However, this is strongly driven by teachers with prior qualifications, who are nearly four times as likely to feel very confident compared to those who do not have prior STEM qualifications (35% vs 11%).

With a higher proportion of men having obtained STEM qualifications prior to teaching, it is understandable that men feel more confident to connect STEM content with relevant, real-world applications and career examples compared to women (84% vs 74%).

These results may also be attributed to the finding that men are also more likely to undertake further STEM education and training than women, such as attending a STEM-related event, watching a STEM documentary, reading a STEM book or having a subscription to a STEM-related magazine.

Feelings of qualification and confidence in teaching STEM

Beyond formal qualifications, all educators were also asked to rate how qualified they *feel* to teach STEM subjects. Feelings of qualification to teach mathematics and technology were the highest followed by science and STEM as an integrative set of skills. Feelings of qualification to teach engineering were the lowest, with only a third of all educators feeling qualified to teach this subject.

Educator's feelings of being qualified to teach STEM followed much the same pattern as prior STEM education, with 90% of men selecting at least one STEM topic area in which they feel qualified to teach compared with 83% of women. In terms of specific skills, men are significantly more likely to feel qualified to teach all four STEM subjects than women. This is a change from the previous wave, where women were just as likely to feel qualified in teaching technology and engineering as men.

Overall, teachers did not report having high levels of confidence in teaching STEM-related subjects. Confidence was highest in mathematics (72%), followed by technology (63%), the integration of STEM as a set of skills (63%) and science (61%). Confidence in teaching engineering was significantly lower compared to all other subject areas, with only 30% saying they feel confident. This is consistent with the previous wave.

The survey found major differences in confidence levels between men and women teachers in teaching STEM-related subjects, with men significantly more confident across all STEM subjects. Prior qualifications in a STEM field also had a strong positive impact on how confident teachers are at teaching STEM skills.

Relevance of STEM to teaching practice

Most educators surveyed identified the teaching of STEM skills as being relevant to their role, consistent wave on wave. STEM as an integrative set of skills, technology and mathematics skills were all selected as relevant to the role of 78% or more of respondents. This speaks to the universal nature of these topics, irrespective of the type of teacher or the year levels they teach.

Relevance was slightly lower for science skills (69%) and significantly lower for engineering skills, which was only relevant to 56% of respondents. This follows a trend seen throughout the survey results with mathematics and technology potentially seen as more familiar concepts given their broader relevance, while science and engineering skills are potentially viewed as more niche and therefore less relevant at a general level.

Life skills associated with STEM education

To further investigate educators' understanding of STEM, they were asked about the life skills which are developed through the study of STEM. In an open-ended question, the most common skills mentioned by respondents were collaboration, co-operation and teamwork (12%), creativity and lateral thinking (8%), critical thinking (6%) and problem solving (6%).

When asked to select from a list, almost all (99%) could identify at least one of the core STEM skills (science, technology, engineering and mathematics), while between 83% and 92% correctly identified other life skills such as problem solving and critical thinking, which closely aligned to their open-ended responses.

Perceived importance of STEM

Overall, there was a broad recognition among educators that STEM education is important, irrespective of whether a teacher is actively teaching STEM subjects or not. Almost all educators agree that STEM skills are important for the Australian economy and 95% agreed that STEM skills are applied in everyday life.

Regarding employment prospects, there was a consensus among educators that STEM subjects are important to acquire a good job in the future. While engineering again ranked last, three quarters of educators still recognised it as somewhat or very important. Perceptions did not differ significantly by gender of teacher. This differs to the previous wave, where male teachers were more likely to perceive that science and engineering are very important.

Gender bias

The majority of educators recognise that a gender bias towards men in STEM exists in the media, with high levels of agreement that the media portrays more men as STEM role models and that there is a lack of role models in STEM who are women. These perceptions have remained consistent since the previous wave in 2020.

Educators also acknowledged that there is a gender bias within STEM that needs to be addressed, however the nuances of educators' own biases are apparent. The survey found that advisors do not provide the same STEM career suggestions to girls as they do to boys. While the top recommended roles are similar for boys and girls, advisors are more likely to recommend engineering and trades to boys, and research roles to girls. This wave we did not see significant differences in likelihood to recommend IT or health careers to boys or girls.

While gender biases are evident, it is also clear that there is a large cohort of educators who are focused on being as gender neutral as possible. When asked about student confidence and ability across different subjects, the statement that boys and girls are equally confident was the most common answer for most subjects, ranging from 56% for technology up to 64% for science. However, this leaves a sizeable proportion of educators who do see gendered differences in students. These educators see boys as more confident than girls in engineering, sport, technology, mathematics and science. Conversely, they see girls as more confident in social science, arts and English.

Impact of COVID-19

For the first time since the tracker started, we asked educators questions regarding the impact of COVID-19; on likelihood to encourage students to study or work in STEM, students' interest in STEM and learning of STEM topics.

Survey respondents were asked to rate their likelihood to encourage students to study or work in STEM as a result of COVID-19. COVID-19 had the greatest impact on likelihood to encourage students to study or work in technology, followed by science. COVID-19 seems to also have had a small to moderate impact on students' interest in STEM and STEM careers, according to their educators. Again, educators reported the greatest uplift in interest for technology and science.

Finally, in relation to COVID-19, educators were asked about the impact of COVID-19 and associated lockdowns and online learning on students' learning about STEM.

The majority of educators said the situation had no impact on students' learning about STEM subjects. While the situation had a somewhat positive impact on learning about technology, some educators reported it had more of a negative impact on learning about science, mathematics and engineering. More research could be conducted to understand why this is the case.

Career advice

The final section of the survey explored the topic of career advice given to students. In wave 2 we spoke with 248 respondents who were classed as mentors, who provided advice at least monthly, however, only 15 of these were career advisors. This sample is significantly lower than the previous wave, where we spoke to 57 career advisors.

Most secondary school teachers claim to provide some level of career advice to students throughout the school year. When providing STEM advice to students, advisors place the greatest emphasis on

local STEM employers, the scholarships and financial support specially for women studying STEM at university, the abundance of job opportunities and the opportunities and pathways specially for women in STEM.

A critical insight uncovered around career advice was the inconsistency in STEM career suggestions given to boys and girls. The survey found that advisors do not provide the same STEM career suggestions to girls as they do to boys. While the top recommended roles are similar for boys and girls, advisors are significantly more likely to recommend engineering and trades to boys and research roles to girls. Although not significant, girls are slightly more likely to receive recommendations for health, teaching and design careers.

Continuing this trend, career advisors' estimation of the proportion of girls and boys who are likely to enter STEM careers also differ, with teachers and career advisors estimating 34% of boys will enter a STEM career, compared to 29% of girls. This is a significant increase for girls, up from 24% in wave 1.

The barriers for students entering into a STEM career are also strongly gendered, with girls more likely to present the barrier that they do not feel confident in their abilities in these subjects.

When asked what educators believe would help improve the girls' attitudes towards STEM, the most common suggestion, in line with the previous wave, was to have more women role models visible, followed by a greater focus on positioning STEM in a more relevant manner that aligns with their interests. This wave, we saw an increased desire for more / improved STEM resources, information and content for girls.

In conclusion

The insights presented in this report have established critical benchmarks for the future tracking of this key influencer group. The research provides the necessary information for policy makers to take a data driven approach in addressing the gender imbalance existent in STEM education and related careers. This research, along with the *Parents 2022/23* research, complements the insights uncovered through the *Youth in STEM 2020/21* research, providing much-needed context around young people's perceptions of STEM.

Moving forward, DISR will continue tracking key measures around STEM from both young people and their key influencers. The next round of research will be conducted in 2023 and will be the fourth wave of the *Youth in STEM* research.

Project background

Background

Building on from the [Youth in STEM Research](#), the Department of Industry, Science and Resources (DISR) has continued the collection and reporting of attitudes and perceptions of young Australians towards STEM. The objective of the research is to understand more about the perceptions of young Australians (12 to 25-year-olds) towards STEM skills and careers, particularly those of girls (women).

With the previous *Youth 2019/20* research showing that girls' perceptions of, and engagement with, STEM are strongly influenced by parents, teachers and career advisors, DISR made the decision to expand the research to provide insights into the attitudes and perceptions of these key influencer groups. From 2020 onwards, the Youth in STEM research will track both the 12- to 25-year-old group of young people and the influencer groups of parents and educators. Each survey is conducted biennially as below, with results released early the following year:

- 2018: People aged 12-25
- 2019: People aged 12-25
- 2020: Parents
- 2020: Teachers & Career Advisors
- 2021: People aged 12-25
- 2022: Parents (separate report)
- 2022: Teachers & Career Advisors (current report)

The research focuses on any differences and similarities in data outcomes based on gender, as well as investigating the intersection of other demographics which may further influence STEM engagement and participation.

Given the substantial differences between the experiences and perspectives of parents and educators, the research was split into two surveys to enable more customisation of the questionnaire and to establish the key metrics by which to track these influencer cohorts.

This is the second wave of the Teachers & Career Advisors report. Key differences between the insights from this report and the Teachers & Career Advisors 2020 report have been noted.

Objectives

This study establishes the STEM related awareness and perceptions of teachers and career advisors who engage with students in primary and secondary schools across the country. The study aims to understand how they influence the decision-making process of students' future education and career paths. The underlying theme of the research is to uncover key gender differences and biases. There is also a small component of educators from vocational education and training (VET) and higher education institutions included in the study.

More specifically, the study aims to:

- Understand levels of awareness and understanding of STEM and associated skills among educators
- Evaluate key metrics such as interest, confidence to teach STEM and the perceived importance of STEM for future employment
- Understand educators' general attitudes towards STEM education and careers

- Assess differences in perceptions of STEM among a range of educator groups
- Understand behaviours which impact student disposition towards STEM
- Uncover gender biases in teachers' perceptions about STEM.
- Impact of COVID-19 on learning and encouragement of STEM study and careers.

Methodology

YouthInsight conducted a 20-minute online survey among a representative sample of teachers and career advisors of students in primary and secondary schools. Teachers and career advisors completed the survey via computer, tablet or mobile phone.

Sampling

The total unweighted sample for the teacher and career advisor survey was 730. The sample was sourced via a combination of online panel providers and partnerships among organisations with robust educator databases. Respondents were sourced from an online panel (Octopus Group) and through direct partnerships with Education Services Australia and Career Development Association Australia.

Sample quotas were placed on state to ensure the research captures representation of teachers across all states and territories in Australia.

To determine socioeconomic status, the survey uses Socio-Economic Indexes for Areas (SEIFA) developed by the Australian Bureau of Statistics (ABS). SEIFA ranks areas in Australia into ten equally sized groups according to relative socioeconomic advantage and disadvantage. These are known as socioeconomic deciles. The indexes are based on information from the five-yearly Census of Population and Housing. The data captured in the survey has been mapped to the Index of Education and Occupation (IEO).

To ensure survey results represent the educator population as closely as possible, weighting has been applied for any under or over representation within the sample. The weighting was based on socioeconomic deciles of the school/institution the respondent works at, school jurisdiction to match the ABS (government, Catholic and independent schools) and geographic representation that aligns to the population of each state/territory in Australia.

Below are the summary tables of the unweighted sample and weighted population with applied weighting factors.

Table 2: Total unweighted sample and weighted population.

EDUCATOR PROFILE	UNWEIGHTED SAMPLE	UNWEIGHTED SAMPLE %	WEIGHTED POPULATION	WEIGHTED POPULATION %
Total	730	100%	730	100%
Gender				
Man	96	13%	105	14%
Woman	625	86%	616	84%
Other / non-binary	9	1%	9	1%
Main role				
Classroom teacher	512	70%	502	69%
Career advisor (LOW BASE)	24	3%	21	3%
Other	145	20%	146	20%
VET or higher education educators	49	7%	60	8%
Time in role				
Under 4 years	146	20%	150	20%
4 – 7 years	186	25%	184	25%
8 – 11 years	136	19%	138	19%
12 – 19 years	147	20%	144	20%
20 or more years	115	16%	114	16%
Employment type				
Relief	25	3%	24	3%
Casual	53	7%	53	7%
Part-time	171	23%	175	24%
Full-time	475	65%	472	65%
Other	6	1%	6	1%
Aboriginal and / or Torres Strait Islander status				
Yes	20	3%	21	3%
No	699	96%	698	95%
Prefer not to say	11	2%	11	2%

*Where weighted sample or proportions do not add up to 100%, this is due to rounding of decimal places up or down to the nearest whole number.

SCHOOL PROFILE	UNWEIGHTED SAMPLE	UNWEIGHTED SAMPLE %	WEIGHTED POPULATION	WEIGHTED POPULATION %
School type				
Government	442	65%	433	65%
Catholic	114	17%	128	19%
Independent	114	17%	97	15%
Other	9	1%	9	1%
School level*				
Primary	312	44%	305	42%
Secondary	211	30%	212	29%
Combined (P-12)	96	14%	94	13%
Special school	20	3%	19	3%
Other	20	3%	38	5%
Tertiary / higher education	49	7%	60	8%
Single sex or co-ed				
Co-ed	636	94%	627	94%
Single sex (girls)	20	3%	19	2%
Single sex (boys)	23	3%	23	3%

*Within the survey sample, 92% work within a primary or secondary school while 8% work in the VET / tertiary sector.

LOCATION AND SOCIOECONOMIC STATUS	UNWEIGHTED SAMPLE	UNWEIGHTED SAMPLE %	WEIGHTED POPULATION	WEIGHTED POPULATION %
State				
NSW	239	33%	234	32%
VIC	214	29%	190	26%
QLD	119	16%	146	20%
WA	59	8%	51	7%
SA	45	6%	73	10%
ACT	17	2%	15	2%
TAS	25	3%	7	1%
NT	11	2%	15	2%
Location of school				

LOCATION AND SOCIOECONOMIC STATUS	UNWEIGHTED SAMPLE	UNWEIGHTED SAMPLE %	WEIGHTED POPULATION	WEIGHTED POPULATION %
Capital city / major metropolitan area	465	64%	437	60%
Regional or remote / rural	265	36%	293	40%
Socioeconomic status of teachers' school (SES)				
Lower SES (Decile 1 - 5)	291	40%	358	50%
Higher SES (Decile 6 - 10)	429	60%	358	50%

Educator profile & specialisation

Educator role

Around two thirds of the survey sample (69%) are employed as classroom teachers in their main role, while 29% work in other roles such as teacher support / aides (12%), career advisors (3%), school coordinators (6%) and assistant / deputy principals and principals (2%). The survey also included 8% of educators who worked in the tertiary sector (university and / or TAFE / VET).

People who work in the education sector but have purely administrative roles or other roles determined to have no influence on student decision making were not included in the research.

Among classroom teachers, two in five (38%) reported to also have a secondary role as either a school coordinator, teacher support / aide, career advisor or an unspecified educator role.

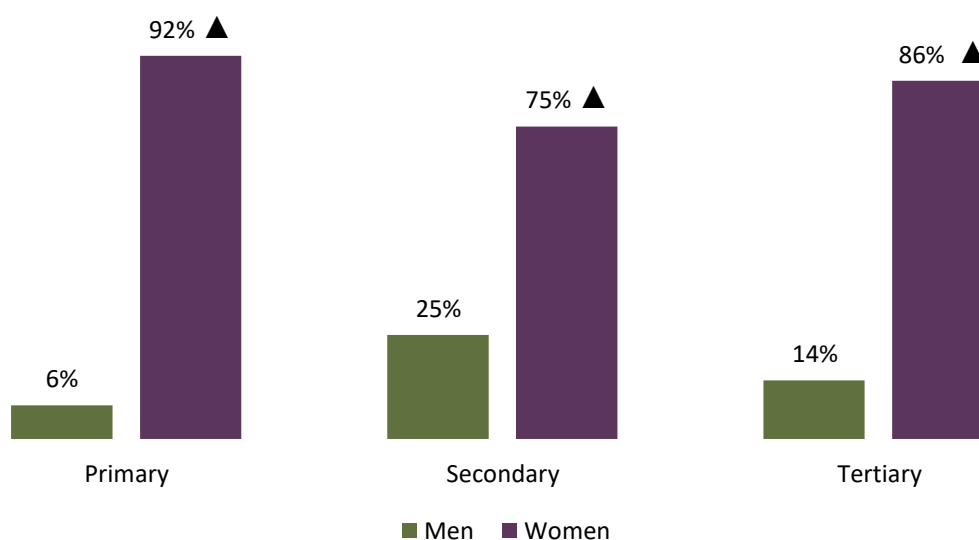
Educator gender

Among all educators surveyed, 84% were women and 14% were men. This gender imbalance is reflective of Australia’s school education sector, which recorded 74% women (compared to 26% men) in full-time equivalent (FTE) roles according to the 2019 National Report on Schooling data portal, produced by the Australian Curriculum, Assessment and Reporting Authority (ACARA)¹.

In line with the National Report on Schooling data portal, the survey data shows that the proportion of men among teachers differs along with the schooling year levels, with men making up 8% of primary school teachers, 26% of secondary school teachers and 15% of tertiary educators.

Figure 1: Gender balance among teachers within education levels.

Q. Which year level(s) do you currently teach? (MC).

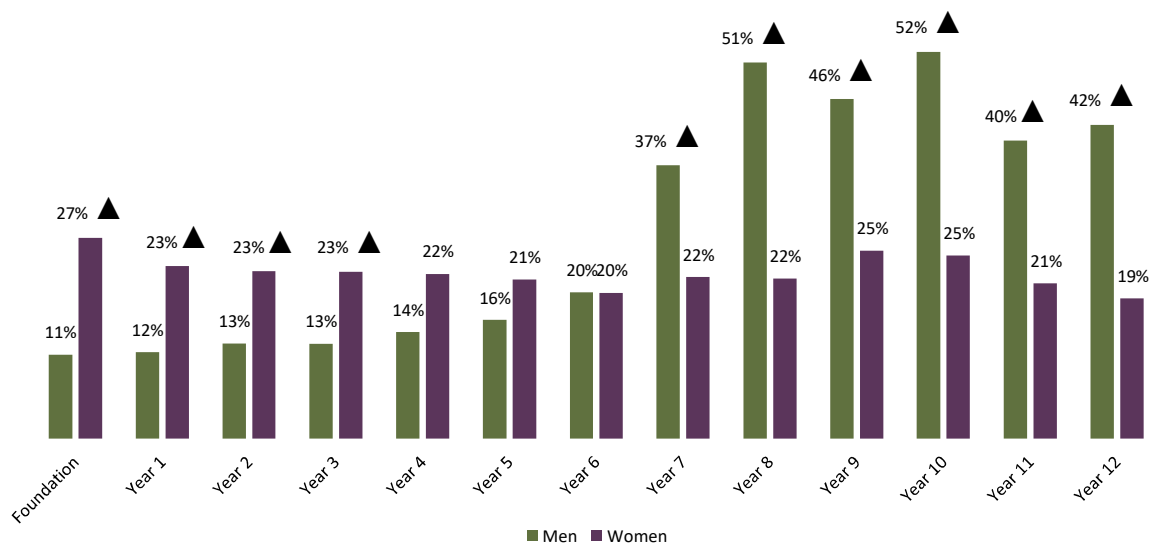


Base: unweighted men – 96, women – 625 (not shown due to low base size: non-binary teachers – 9).

¹ <https://www.acara.edu.au/reporting/national-report-on-schooling-in-australia/national-report-on-schooling-in-australia-data-portal/staff-numbers#View1>

Figure 2: Teacher gender distribution by year level taught.

Q. Which year level(s) do you currently teach in your school? (MC).



Base: unweighted men – 96, women – 625 (not shown due to low base size: non-binary teachers – 9).

The survey found that men that teach secondary school subjects are more likely to teach STEM subjects compared to non-STEM subjects (66% vs 56%). The opposite is true of women, of which 59% teach STEM while 77% teach non-STEM subjects.

Biology was the subject most taught by men (22% vs 17% for women), followed by physics (21% vs 11% for women) and chemistry (21% vs 19% for women).

Mainstream vs specialist education settings

Of the educators surveyed, 88% work within a mainstream education setting, and 12% at a school with a specialised or singular focus.

Within the mainstream education setting, specific support programs or assistance are common. Of the institutions/schools where the surveyed educators work, 80% provide disability / special needs support services, 56% provide English as Secondary Language (ESL) programs and 53% provide Indigenous programs.

Eighteen percent of educators are at schools / institutions where the Aboriginal and / or Torres Strait Islander student population is 20% or more.

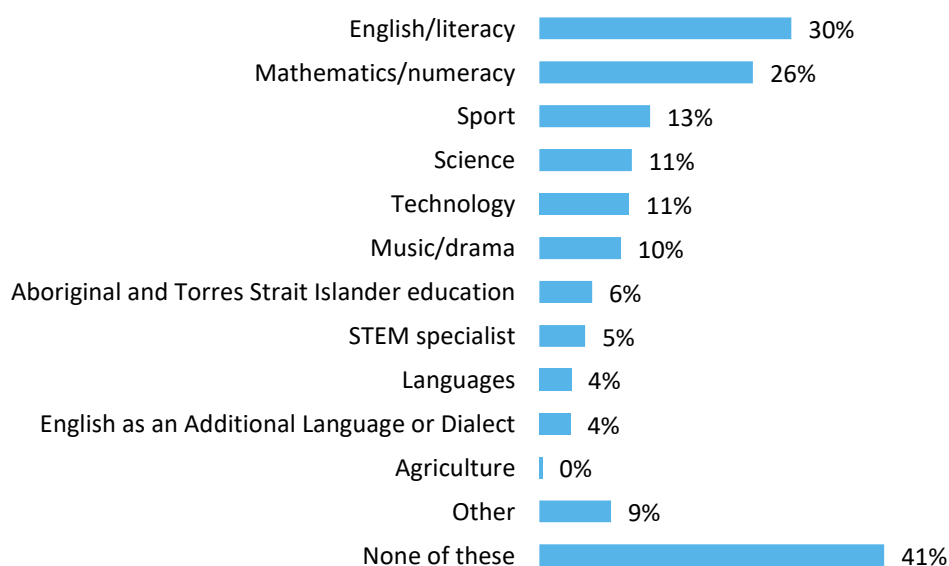
Primary teachers

When asked about their specialisations, three in five primary school teachers (59%) reported to have a specialisation in at least one subject area. This is a significant increase from 47% in the previous wave.

Focusing specifically on STEM subjects, 31% of primary teachers have a STEM specialisation, up from 26% in wave 1 (not significant). Mathematics ranked as most common (26%), followed by science (11%). Five percent reported to be STEM specialists.

Figure 3: Primary teacher specialisation.

Q. In your role(s) as a primary school teacher, do you specialise in any of the below subject areas? (MC)



Base: unweighted primary school teachers – 350.

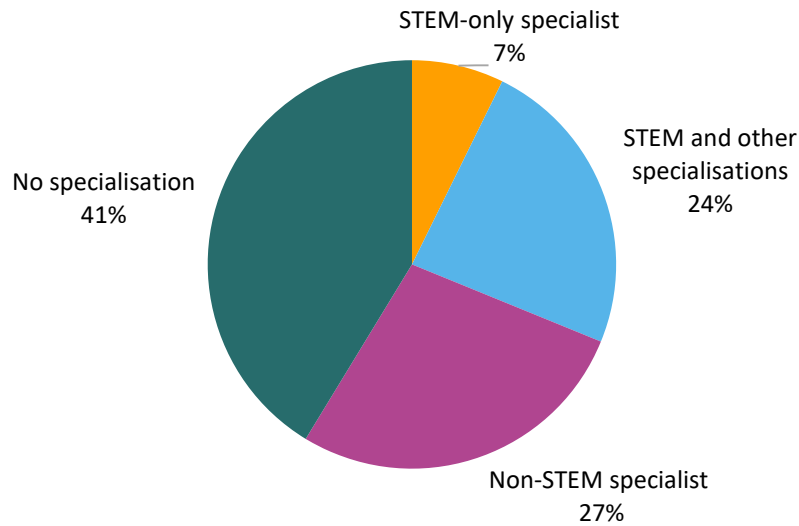
Last wave we observed that teachers in metropolitan areas were more likely to have a specialisation, but this wave this is not a case, with 59% of metro teachers having a specialisation compared to 58% of those in regional, rural or remote areas.

Unfortunately, this wave the sample size of primary teachers who are men is too low to report on gender differences in specialisms, but indicatively we see no difference.

The need for primary teachers to be across a wide range of different subject areas within the curriculum is reflected in the number of teachers who have multiple specialisations. The survey found that among teachers who have a STEM specialisation, 77% of those also have a specialisation in a non-STEM subject area. This is an increase from 69% in wave 1.

Figure 4: Primary teacher specialisation (segments).

Q. In your role(s) as a primary school teacher, do you specialise in any of the below subject areas? (MC)



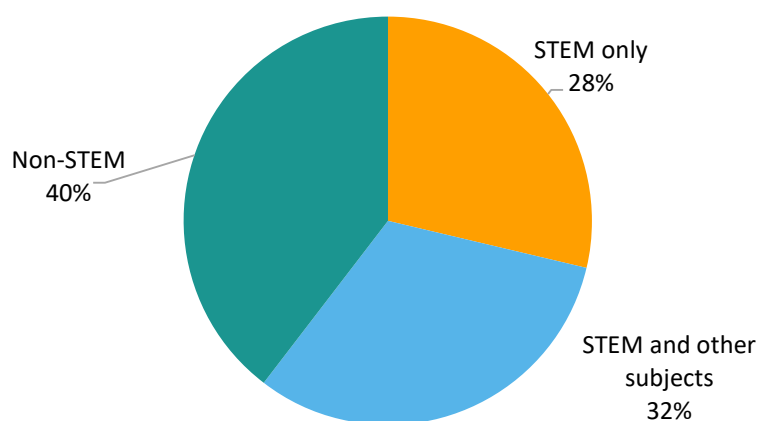
Base: unweighted primary school teachers – 350. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

Secondary teachers

Reflecting the multiple roles that teachers have, it was evident from the data that a significant overlap exists between secondary teachers who specialise in STEM and those who do not. Among the secondary teachers surveyed, 60% teach STEM: 28% teach only STEM subjects, 32% teach STEM subjects and non-STEM subjects. Only 40% do not teach STEM at all.

Figure 5: Secondary subjects currently taught.

Q. Which of the below subjects do you currently teach in your main role? Subjects listed from the Australian Curriculum. Please select the subjects that most closely describe the subjects you teach. (MC)



Base: unweighted secondary teachers – 271. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

Within each of these teaching segments there is a diversity of experience and behaviour with regards to previous STEM qualifications, engagement with ongoing STEM-focused professional development and / or previous teaching experience in STEM areas. This diversity reinforces the finding that there are no clear distinctions between STEM and non-STEM teachers (i.e., there are teachers who do not currently teach STEM, who have STEM qualifications (26%) or have taught STEM in the past (49%). Inversely, there are teachers currently teaching STEM who do not have STEM qualifications or training (31%).

Based on teachers' entire career, the survey found that 60% of secondary teachers currently teach at least one STEM class, 20% have taught at least one STEM class in the past and 20% have never taught STEM.

With eight in ten (80%) secondary teachers teaching a STEM class at least once in their career, it is important they are equipped and supported to be able to do this confidently.

When looking closely at each of these teaching segments, the survey found that STEM-only teachers are more likely to be men (44% vs 23% of women). From the student perspective, this means they are more likely to see men STEM teachers, which can potentially influence their gender associations with STEM careers.

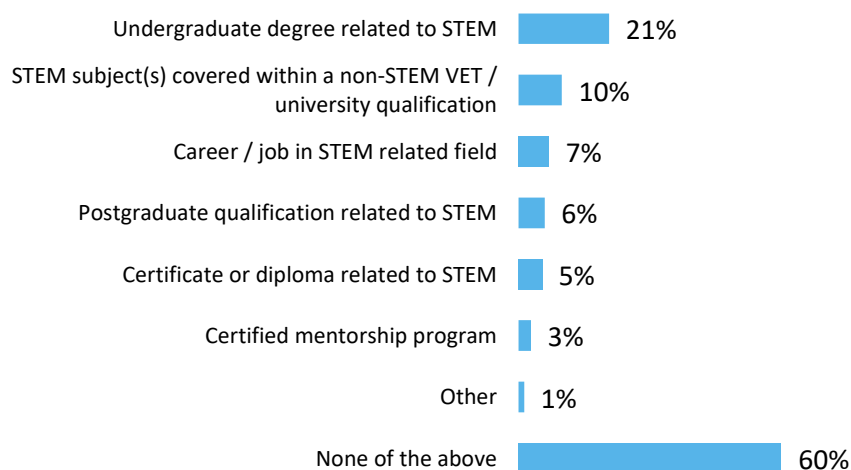
However, the opposite can be said for those who teach STEM along with other subjects, with 36% of women reporting this compared to 21% of men.

Prior STEM qualifications

Forty percent of survey respondents had obtained a STEM qualification before entering the education sector, the most common being an undergraduate degree (21%). One in ten (10%) had covered a STEM subject within a non-STEM VET or university qualification, and 7% previously had a job in a STEM related field. There were no significant differences in reported prior qualifications since last wave, but we have seen a slight increase from 35% to 40%.

Figure 6: STEM qualifications / experience obtained prior to entering the education sector.

Q. Which of the following qualifications or experiences related to STEM did you have prior to working in the education sector? (MC)



Qualification	Wave 1	Wave 2
Net: Had prior STEM qualification(s)	35%	40%
Did not have a STEM qualification	65%	60%

Base: unweighted total wave 1 – 844, wave 2 – 730.

Exploring these results in further detail, men were more likely than women to have obtained a STEM qualification prior to teaching (60% of men vs 36% of women). Prior STEM qualifications were also more commonly found in secondary school teachers (51%) compared to primary school teachers (30%). When comparing secondary teachers who are currently teaching STEM to those who do not teach STEM, those teaching STEM are more likely to have STEM qualifications than those who do not teach STEM (69% vs 26%). This is consistent with the previous wave.

While in wave 1 we observed the highest proportion of teachers with STEM qualifications at independent schools (44%), this wave those teaching at Catholic schools were most likely to have STEM qualifications (45%, 39% for independent and 36% for government schools).

These prior STEM qualifications and experience are particularly impactful in the context of bringing relevant, real-world applications and career examples into the classroom. Among secondary school teachers currently teaching STEM, 17% have prior career experience in a STEM-related field. This is slightly (but not significantly) lower than last wave (23%).

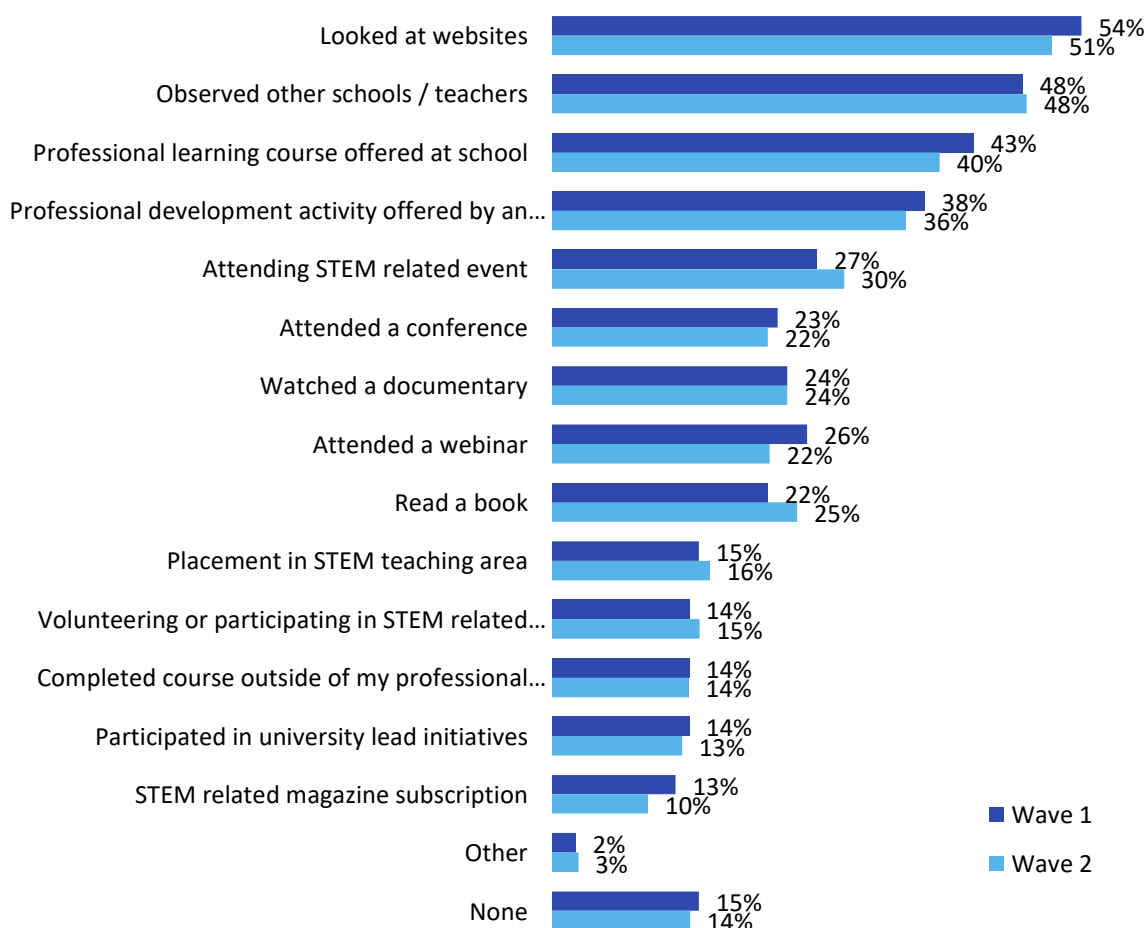
Further STEM education

Among educators where STEM is relevant to their teaching, 86% have undertaken some level of further education to improve their knowledge of STEM. This includes a wide range of activities, from formal courses through to less formalised professional development such as reading books, magazines, websites or watching documentaries. There has been no change in overall undertaking since the previous wave (85%).

Regarding formalised training, 61% of teachers have undertaken further STEM education in a formalised setting (completed a course outside of my professional learning time, professional learning course offered at school, professional development activity offered by an external provider or participated in university lead initiatives). This is in line with the previous wave (62%).

Figure 7: Engagement with further education to improve STEM knowledge.

Q. Which of the following further education have you undertaken to improve your knowledge of STEM since you started working in the education sector? (MC)



Further education	Wave 1	Wave 2
Net: Undertaken further STEM education	85%	86%
Undertaken formalised training in STEM	62%	61%
Have not undertaken further STEM education	15%	14%

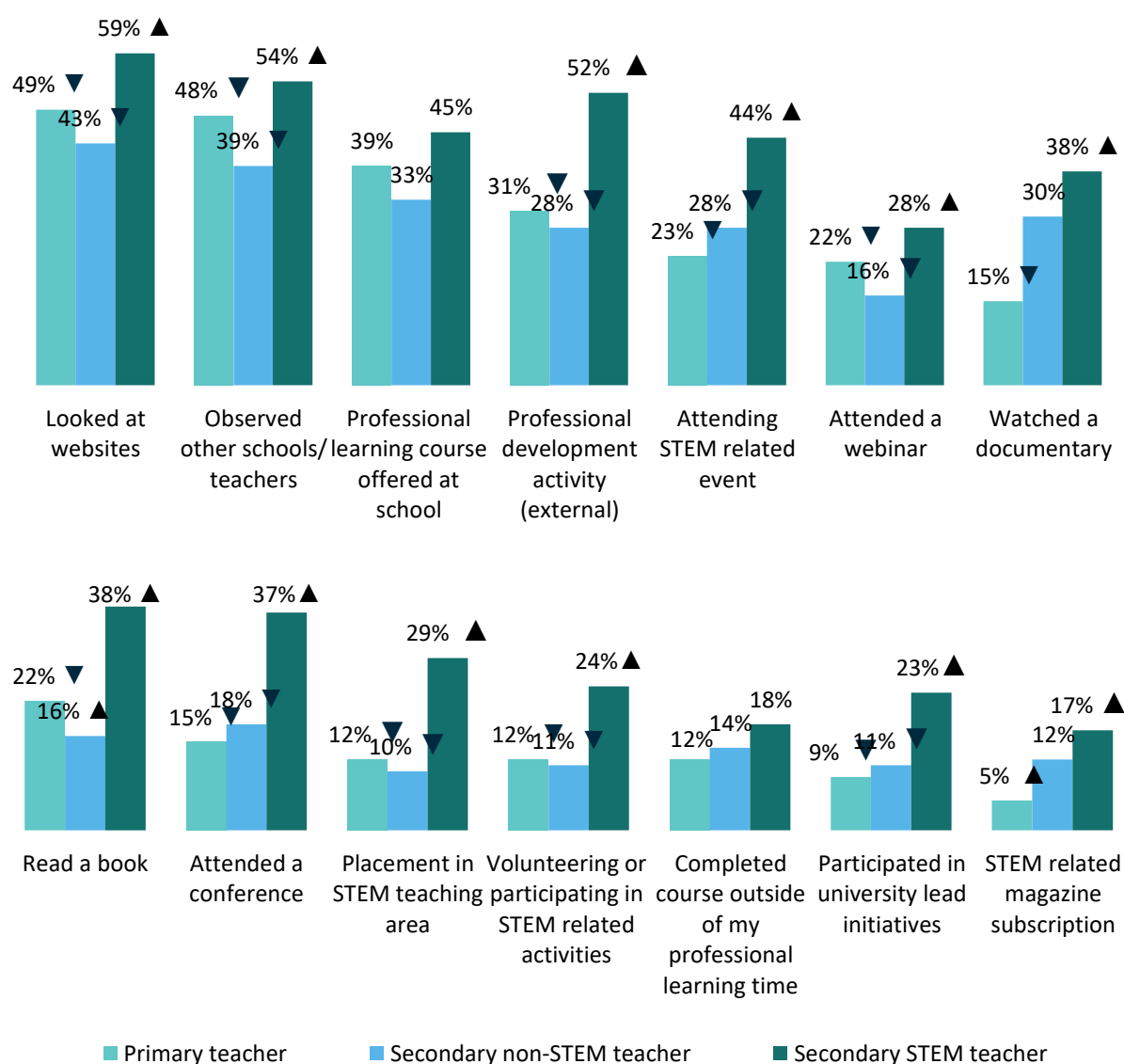
Base: unweighted Those who said that STEM skills are relevant to their role – wave 1 – 692, wave 2 - 629. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

Differences in gender were observed in the undertaking of further STEM education, with 41% of men reporting to have attended a STEM-related event, compared to 28% of women. Men were also more likely to have watched a STEM documentary (41% vs 20%), read a book related to STEM (36% vs 24%) and have a subscription to a STEM-related magazine (18% vs 8%).

As shown in Figure 8 below, the survey also found that there was little difference overall among primary teachers and non-STEM secondary educators in terms of the further education they had engaged with to improve their STEM knowledge. However, as expected, there was a clear difference in the level of further STEM education when comparing STEM secondary teachers compared to other teachers, with 92% having undertaken at least some form of further STEM education and 70% having undertaken formal STEM training.

Figure 8: Engagement with further education to improve STEM knowledge.

Q. Which of the following further education have you undertaken to improve your knowledge of STEM since you started working in the education sector? (MC)



Further education	Primary teachers	Secondary non-STEM teachers	Secondary STEM teachers
Net: Undertaken further STEM education	85%	80%	▲ 92%
Undertaken formalised training in STEM	60%	50%	▲ 70%
Have not undertaken further STEM education	15%	▲ 20%	8%

Base: unweighted primary teachers – 350, secondary non-STEM teachers – 115, secondary STEM teachers – 164.

The survey also revealed some other distinct differences between teacher cohorts. Firstly, those teaching in higher socioeconomic areas were more likely to have taken part in formalised training than those in lower socioeconomic areas (66% vs 55%). Specifically, teachers from higher SES schools were more likely to take part in a professional learning course offered by their school (46% vs 32%).

We also saw that those with longer teaching tenures were more likely to have taken part in formalised training (70% of those with 12+ years of experience, compared to 56% of those with shorter tenures). This was driven by those with longer tenures being more likely to attend most types of training / education, except observation, placement and reading a book.

Educator attitudes towards STEM

Awareness and understanding

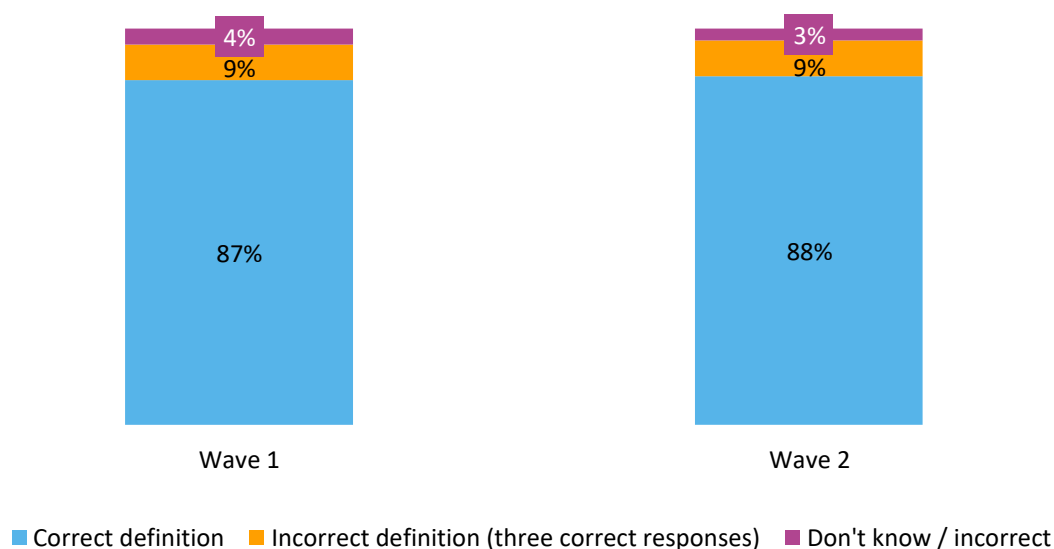
To get an indication of their understanding of STEM, educators were asked to write what they believe STEM stands for. Nine in ten (88%) correctly answered with science, technology, engineering and mathematics (although not necessarily in that order). We have not recorded any changes in awareness since the previous wave.

A further 9% were only able to correctly identify three out of the four subjects, with engineering proving to be the subject that most got confused with (57% among those who got only three correct).

Only 3% of respondents were incorrect in their definition of all four subjects or acknowledged they didn't know. No differences were recorded between men and women.

Figure 9: Understanding of the term 'STEM' (coded).

Q. Please write below what you believe the term STEM stands for.

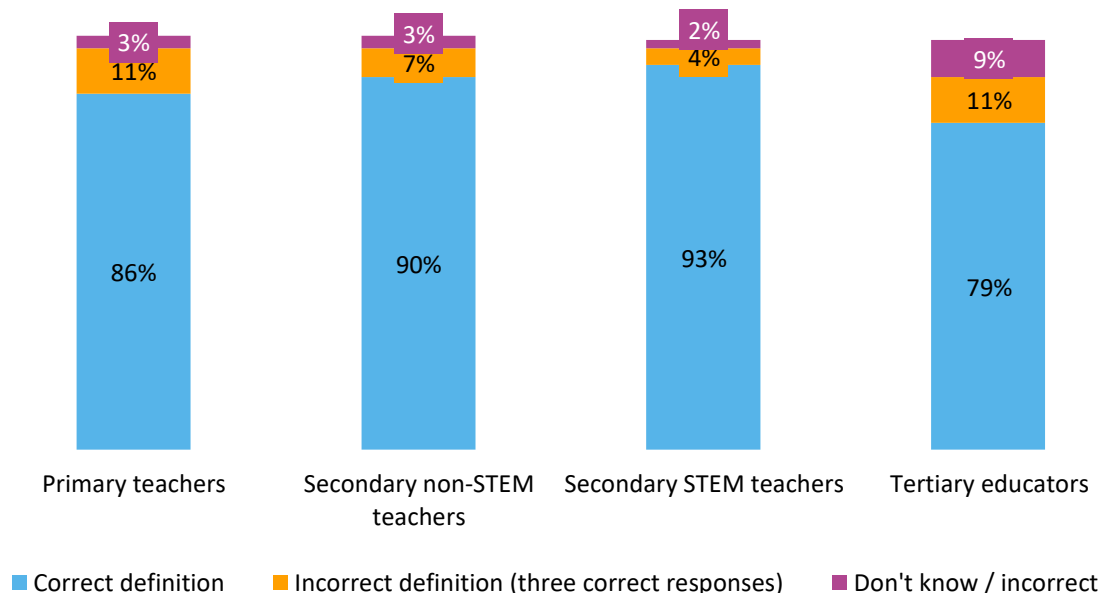


Base: unweighted total educators – wave 1 – 844, wave 2 – 730. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

Secondary STEM teachers recorded the highest score of correct responses (93%), followed by other secondary non-STEM teachers (90%), primary teachers (86%) and lastly the tertiary educators (79%).

Figure 10: Understanding of the term ‘STEM’ (coded) by teacher type.

Q. Please write below what you believe the term STEM stands for.



Base: unweighted wave 2 primary teachers – 350, secondary non-STEM teachers – 115, secondary STEM teachers – 164, tertiary educators – 49. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

While not significant, those in Catholic schools (91%) were slightly more likely to give a correct definition compared to government (88%) and independent (87%) schools. This is inconsistent with the previous wave, where we saw the lowest awareness among Catholic school teachers.

The survey also found that Aboriginal and / or Torres Strait Islander teachers were less likely to be able to correctly define the full acronym compared to other teachers surveyed (70% vs 88%), consistent with the previous wave. However, this is based on a sample size of only 20 Aboriginal and / or Torres Strait Islander secondary teachers.

Perceived importance of STEM skills for future work

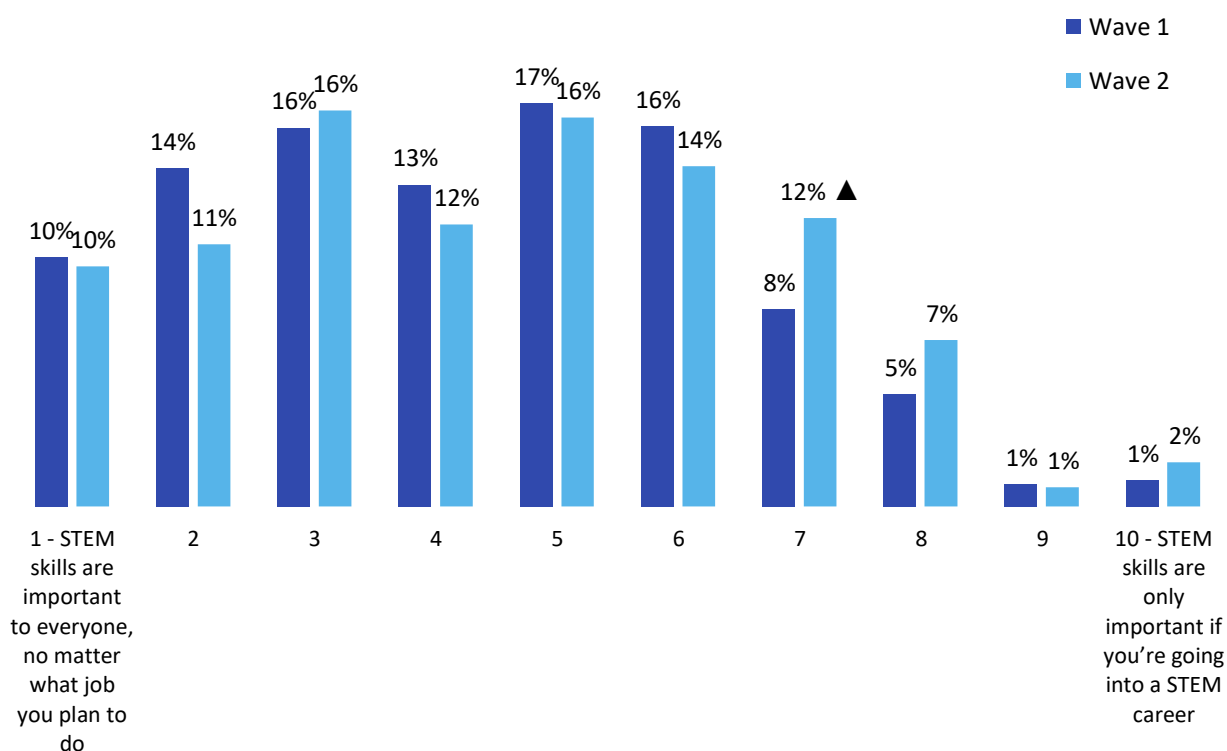
Educators were asked to place themselves on a 10-point scale with two opposing statements about STEM skills: STEM skills are important to everyone, no matter what job you plan to do, and STEM skills are only important if you're going into a STEM career. The scale purposefully did not have a midpoint to force respondents to pick a side.

Two thirds (64%) selected a position on the left side of the scale, agreeing that STEM skills are important to all. This was down significantly from 70% last wave. The strength of this agreement was varied with a relatively even spread of positions. One third (36%) took the opposing view, that STEM skills are only important if you are going into a STEM career, up from 30% last wave.

Last wave we observed secondary teachers skewing towards the left of the scale, while this wave we see no difference between primary and secondary educators. However, we do see a difference based on tenure, with a higher proportion of teachers with 12+ years of experience selecting a position on the left side of the scale (believing STEM is important to everyone) compared to those with less than 12 years' experience (73% vs 60%).

Figure 11: Distribution of perceived importance of STEM skills for future work.

Q. When discussing skills and careers opportunities with students, where do you place yourself on the scale below?



Base: unweighted total – wave 1 – 844, wave 2 – 713. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

Two in three educators believe that STEM skills are important for everyone, regardless of career path, but this has declined significantly since 2020 and is a less common perception among newer teachers.

The average score out of ten for all respondents was 4.5 (where 1 = totally agree with the left statement and 10 = totally agree with the right statement), compared to 4.3 last wave. The below table shows the average scores among groups of educators who most strongly agreed that STEM skills are important to all, compared to the average for all teachers.

The average score has increased (perceived importance has decreased) slightly for secondary STEM teachers and those with prior STEM qualifications.

Table 3: Average scores of perceived importance of STEM skills for future work by teacher type.

Q. When discussing skills and careers opportunities with students, where do you place yourself on the scale below?

Teacher type	Average Wave 1	Average Wave 2
All teachers (n=704)	4.3	4.5
Secondary STEM teachers (n=154)	3.6	4.2
Teachers with STEM qualification (n=275)	3.9	4.1
Teachers at independent schools (n=107)	4.4	4.3

Base: unweighted See table.

Life skills associated with STEM education

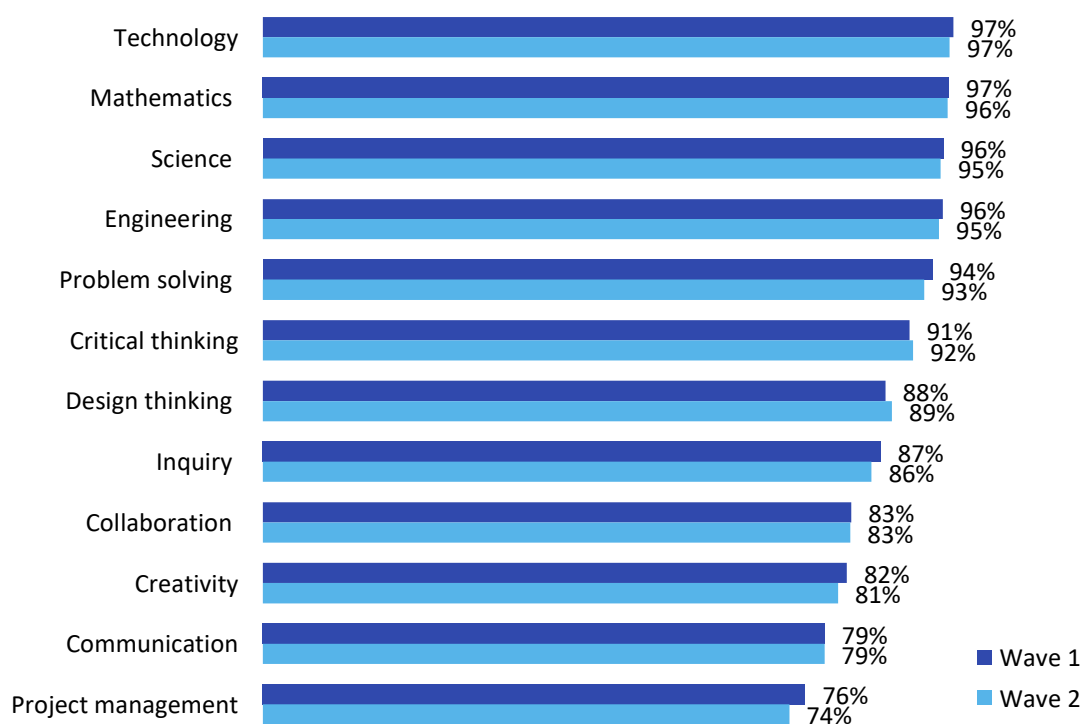
When asked in an open-ended question, what broader life skills does STEM education provide students, the most common skills mentioned by respondents were collaboration, co-operation and teamwork (12%), creativity and lateral thinking (8%), critical thinking (6%) and problem solving (6%).

Respondents were then provided with a list of skills and asked to identify which ones they believe are STEM skills. Almost all (99%) could identify at least one of the core STEM skills (science, technology, engineering and mathematics), while between 83% and 92% correctly identified other life skills such as problem solving and critical thinking, which closely aligned to their open-ended responses.

More than half of respondents also identified skills unrelated to STEM, such as communication (79%), project management (74%) and hand-eye coordination (55%). Despite these skills ranking lowest compared to all others, these results suggest there is a wide interpretation of the skills derived from STEM education.

Figure 12: Skills that educators associate with STEM.

Q. Which of the below are STEM skills? (MC)



Base: unweighted total – wave 1 – 844, wave 2 – 728.

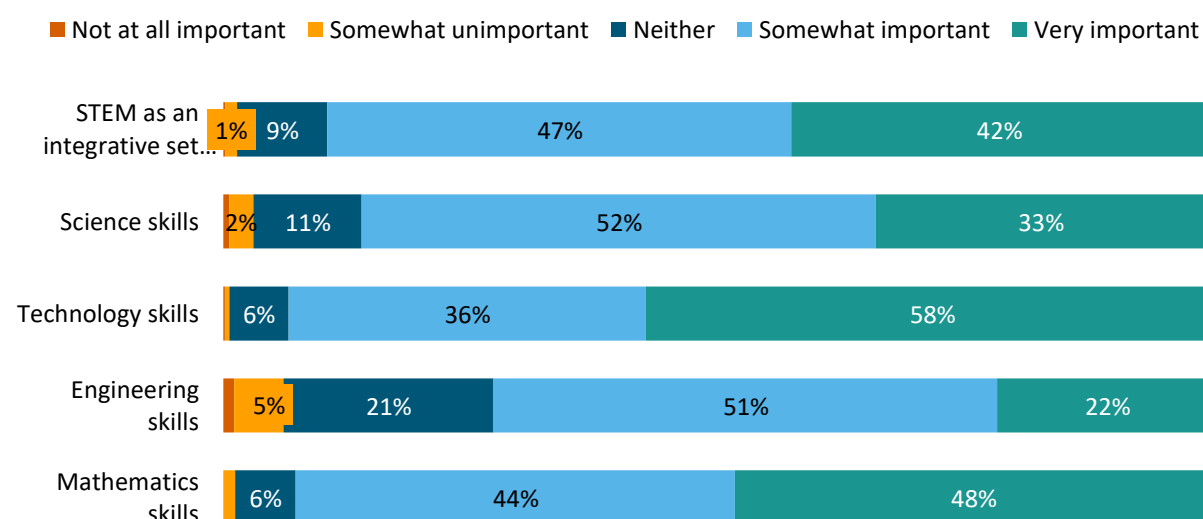
STEM careers and opportunities

Importance of STEM skills for employment

Most educators saw all four individual STEM skills and STEM as an integrative set of skills as being important to acquire a good job in the future. The greatest importance was placed on technology with three in five (58%) saying these skills are very important, followed by mathematics skills (48% said these skills are very important). In contrast, only 22% of educators said that engineering skills are very important.

Figure 13: Importance of STEM skills in relation to future job opportunities.

Q. In your opinion, how important is it for your students to have STEM skills in order to acquire a good job in the future?



STEM subjects	STEM as an integrative set of skills	Science skills	Technology skills	Engineering skills	Mathematics skills
Net: somewhat / very important	89%	85%	94%	73%	93%
Net: somewhat / very unimportant	1%	3%	1%	6%	1%

STEM subjects	STEM as an integrative set of skills	Science skills	Technology skills	Engineering skills	Mathematics skills
Net: somewhat / very important – Wave 1	89%	89%	95%	75%	93%
Net: somewhat / very important – Wave 2	89%	85%	94%	73%	93%

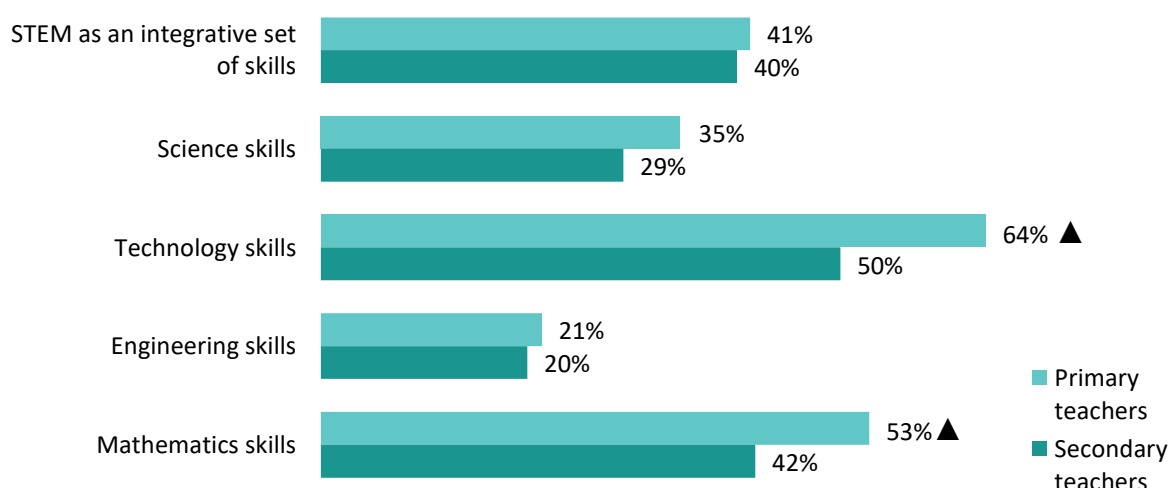
Base: unweighted total – wave 1 – 844, wave 2 – 728. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

Perceptions did not differ significantly by gender of teacher. This differs to the previous wave, where male teachers were more likely to perceive that science and engineering are very important.

However, there were some differences by school type. The survey found that primary teachers place significantly greater importance on technology skills compared to secondary teachers (64% vs 50%). The same pattern was found for mathematics skills (53% vs 42%). These findings are consistent with the previous wave.

Figure 14: Importance of STEM skills for future job opportunities (% very important).

Q. In your opinion, how important is it for your students to have STEM skills in order to acquire a good job in the future?

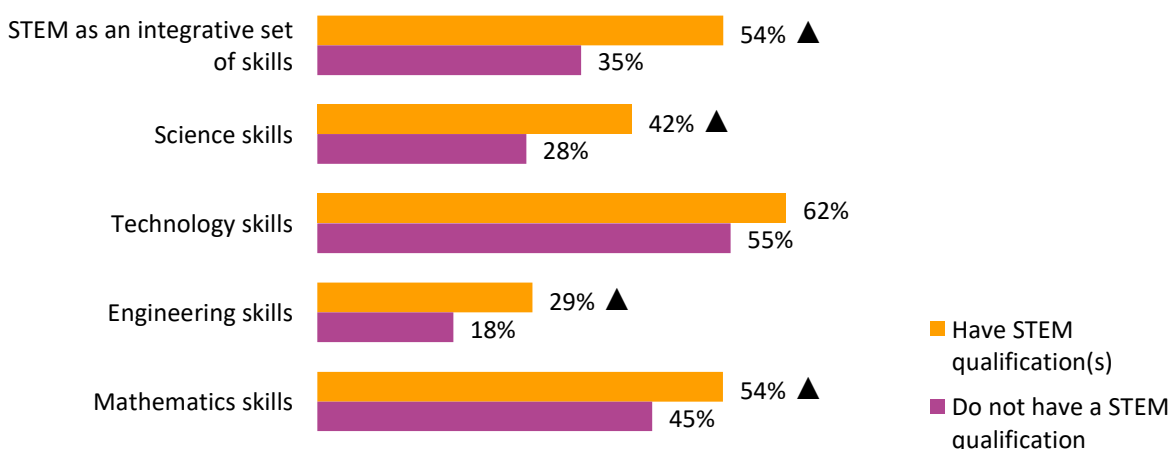


Base: unweighted primary school teachers – 350; secondary school teachers – 277.

Those with prior STEM qualifications were also significantly more likely to identify STEM skills as very important to acquire a good job in the future (54% say integrative STEM skills are very important, compared to 35% of those without STEM qualifications). The only skill which was seen as equally important was technology (62% for those with STEM qualifications vs 55% for those without STEM qualifications).

Figure 15: Importance of STEM skills for future job opportunities (% very important).

Q. In your opinion, how important is it for your students to have STEM skills in order to acquire a good job in the future?



Base: unweighted those with prior STEM qualification(s) – 288, those without – 440.

Those who teach STEM were more likely to perceive all STEM skills, including STEM as an integrative set of skills, as very important, than those who do not teach STEM.

Educators who disagreed that STEM skills are important to acquire a good job in the future were asked why they held this opinion. Consistent with the previous wave, the open-ended responses can be grouped into the following main themes:

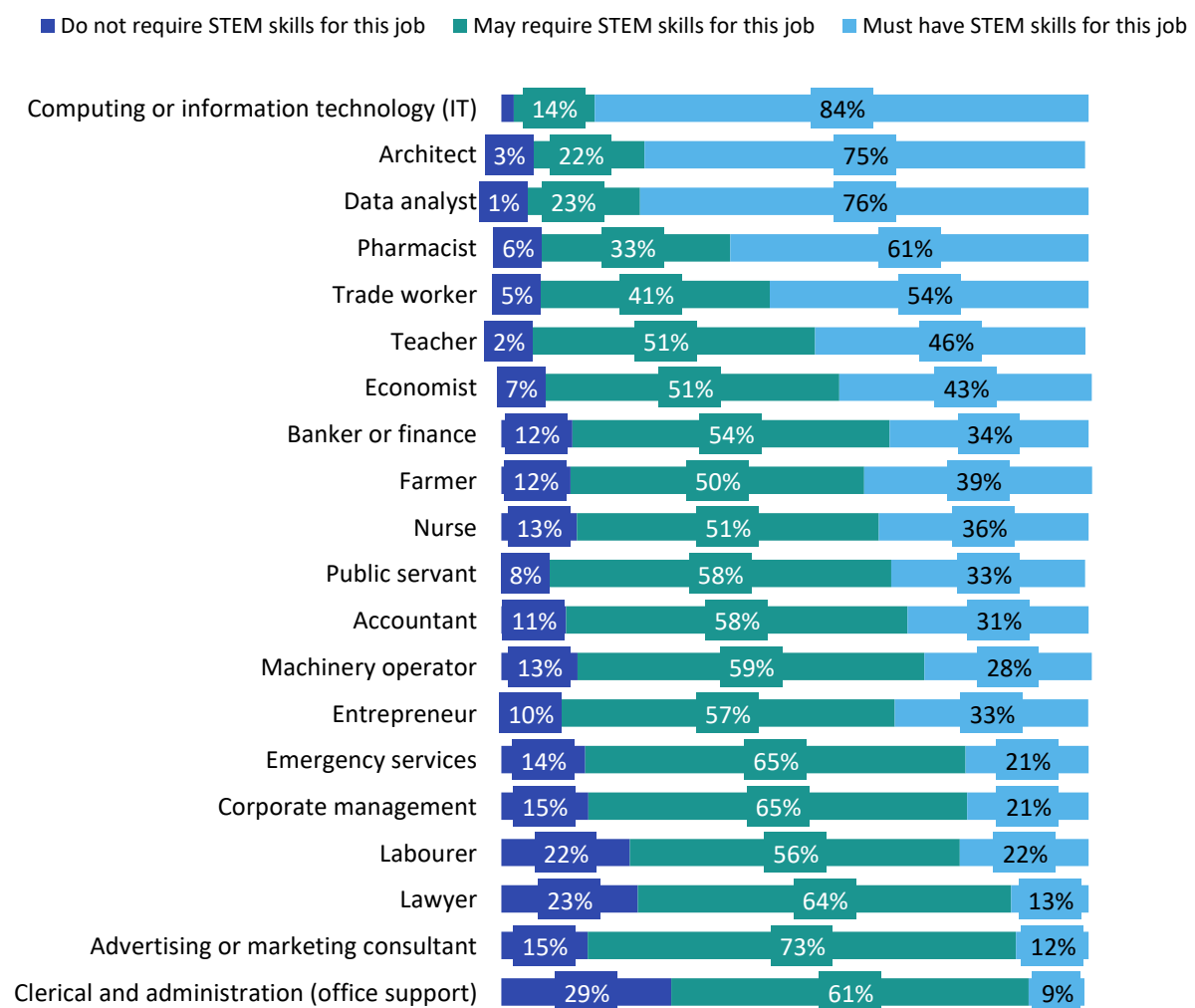
- STEM isn't required for all jobs
- There are lots of other industries that require a different set of skills
- Not all students have the skills / interest / aptitude for STEM but can excel in other subject areas and careers instead
- Most jobs require on the job learning so what you study isn't overly important as long as you study something
- Technology skills are important as they apply to all roles, but the other STEM topics are specific so only apply to those entering those fields
- Their students are unlikely to enter into highly skilled STEM careers (i.e., teachers in special needs schools)
- Questioning the definition of a "good job" and its use within the question
- The lack of science career opportunities in Australia compared with other countries.

To further understand educators' association of STEM skills and importance for certain jobs, respondents were presented with a list of jobs and were asked to evaluate whether STEM skills were required for each role. The list was purposefully developed to include jobs with varying degrees of STEM skill involvement. The survey found that most educators believe many common jobs may or must require STEM skills and only a small proportion assessed some jobs as not requiring STEM skills at all.

The results suggest that educators have a good understanding of the breadth of the value that STEM skills can provide in any occupation. Even a role such as a clerical and administrative worker had at least seven out of ten (70%) educators acknowledging that it may or must require STEM skills.

Figure 16: Perceptions of how essential STEM skills are for specific careers.

Q. How essential do you think STEM skills are to the following careers?



Base: unweighted total – 728. Sample was split in half to reduce survey fatigue (a maximum of 344 saw each answer option). Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

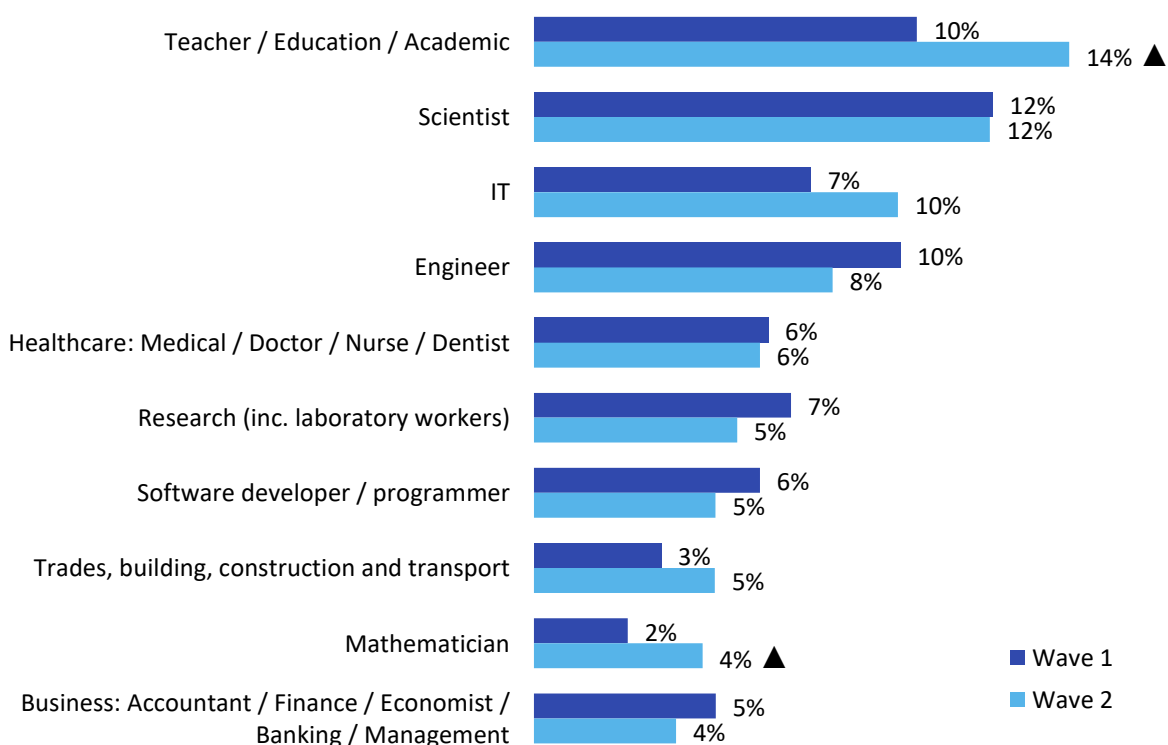
Jobs associated with STEM qualifications

When asked what jobs they think people with a STEM-related qualification can achieve, three out of the top four responses focused directly on the attributes of STEM. Jobs related to working in education topped the list (14%) passing scientist to the top spot this wave (12%). In fact, significantly more teachers said that you could work in teaching or education with STEM education than last wave (10%).

One in ten (10%) said IT jobs, eight percent said jobs related to engineering and six percent said healthcare.

Figure 17: Jobs associated with STEM qualifications (coded).

Q. What type of jobs do you think people would be able to get if they have a STEM related degree or certificate? Please place a single job in each box. Please enter as many as you can think of.



Base: unweighted total – wave 1 – 844, wave 2 – 730.

Other roles educators associated with STEM among smaller proportions of educations were:

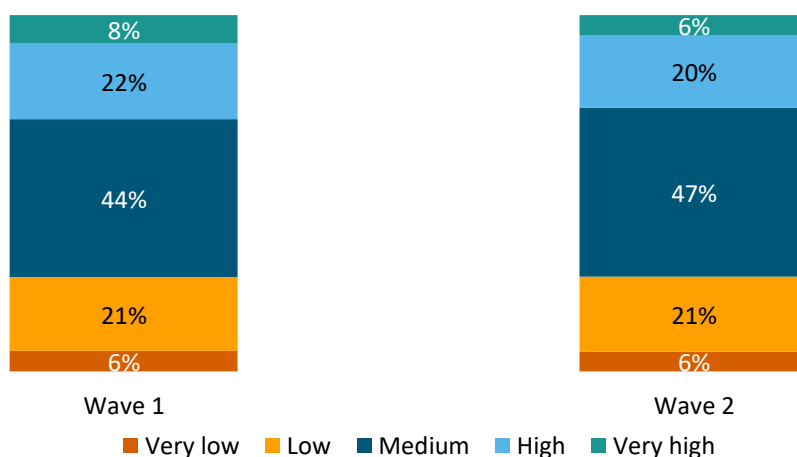
- **STEM-related:** robotics, automation, manufacturing, aviation, space, rockets, drones, chemist, pharmacy, pharmaceuticals, technology, sustainability and climate, agriculture, mining, energy, environmentalist, conservationist
- **Not typically STEM-related:** receptionist, professional, socialisation, hairdresser, cooking, community help, project management, leaders.

As part of the survey, educators were asked to self-assess their ability to explain what different STEM careers involve. Only one quarter (26%) would rate their ability as high or very high, slightly lower than the previous wave (29%).

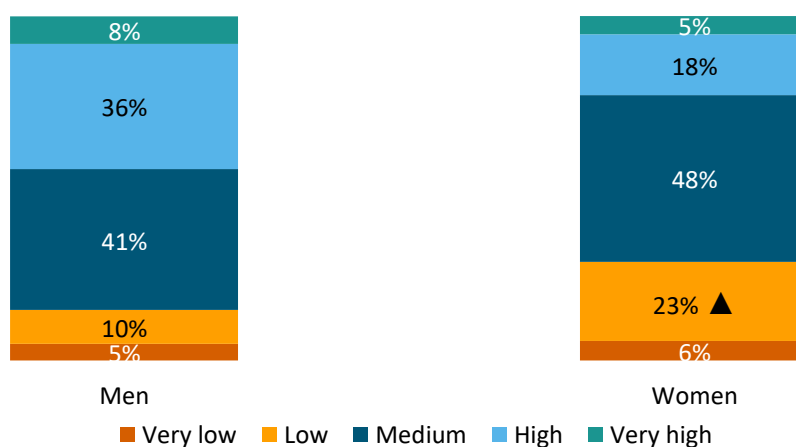
Higher self-assessments were driven more by men (44%) compared to women (23%), although this may be related to a higher proportion of men who have STEM qualifications compared to women.

Figure 18: Educators' self-rated ability to explain what different STEM careers involve.

Q. How would you rate your ability to explain what different STEM careers involve / what the people in those careers do?



	Wave 1	Wave 2
High – Very high	29%	26%
Low – Very low	26%	27%



	Men	Women
High – Very high	▲ 44%	23%
Low – Very low	15%	▲ 29%

Base: unweighted total – wave 1 – 844, wave 2 - 713, men – 93, women – 612. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

Below are other significant differences among key demographic groups.

Table 4: Educators’ self-rated ability to explain what different STEM careers involve (net: high / very high)

Audience	WEIGHTED %
School level	
Primary	20%
Secondary	▲ 32%
Teaches STEM at secondary	
Teaches at least one STEM subject	▲ 39%
Does not teach STEM	23%
Prior STEM qualifications	
Has prior STEM qualifications	▲ 42%
Does not have prior STEM qualifications	16%
Socioeconomic status	
Higher SES (6-10)	▲ 31%
Lower SES (1-5)	20%

The STEM teaching experience

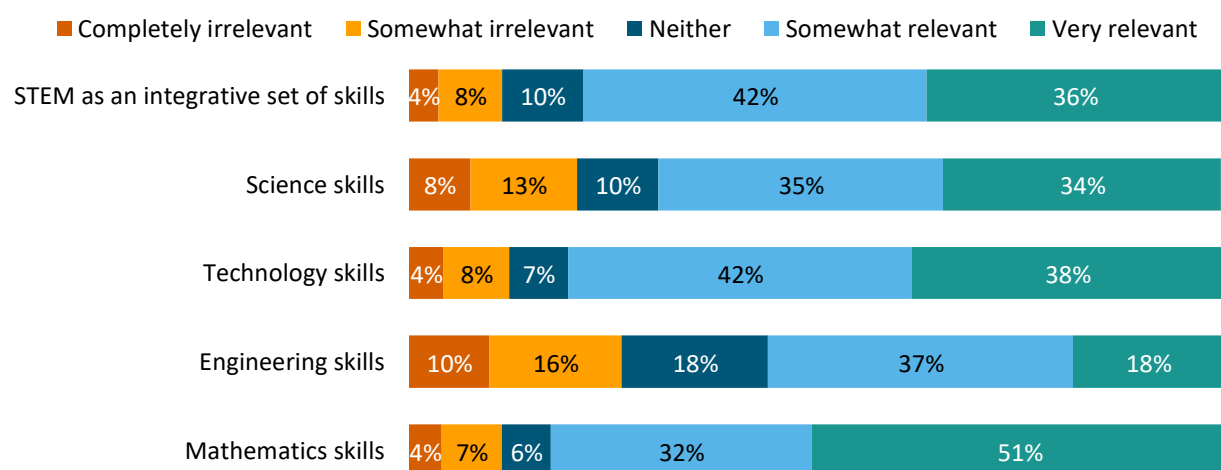
Relevance of STEM to teaching practice

Most educators surveyed identified the teaching of STEM skills as being relevant to their role, consistent wave on wave. STEM as an integrative set of skills, technology and mathematics skills were all selected as relevant to the role of 79% or more of respondents. This speaks to the universal nature of these topics, irrespective of the type of teacher or the year levels they teach.

Relevance was slightly lower for science skills (70%) and significantly lower for engineering skills, which was only relevant to 56% of respondents. This follows a trend seen throughout the survey results with mathematics and technology potentially seen as more familiar concepts given their broader relevance, while science and engineering skills are potentially viewed as more niche and therefore less relevant at a general level.

Figure 19: Relevance of teaching STEM skills.

Q. In your main role, how relevant is the teaching of STEM skills?



STEM subjects	STEM as an integrative set of skills	Science skills	Technology skills	Engineering skills	Mathematics skills
Net: somewhat / very relevant	78%	69%	81%	56%	83%
Net: somewhat / completely irrelevant	11%	21%	12%	26%	11%

STEM subjects	STEM as an integrative set of skills	Science skills	Technology skills	Engineering skills	Mathematics skills
Net: somewhat / very relevant – Wave 1	81%	74%	83%	60%	84%
Net: somewhat / very relevant – Wave 2	78%	69%	81%	56%	83%

Base: unweighted total – wave 1 – 844, wave 2 – 730. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

In addition to their individual answers shown above, respondents were grouped based on their answers to the relevance of the four STEM subject areas (science, technology, engineering, mathematics) and STEM as an integrated set of skills.

These groupings created the following segments:

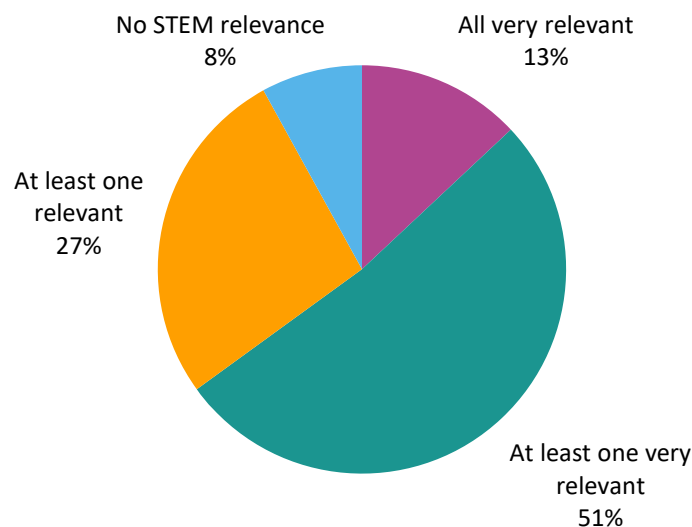
- Those who find all five topics very relevant to their teaching
- Those who find at least one topic very relevant to their teaching
- Those who have at least one topic relevant to their teaching, but none are very relevant
- Those whose teaching has no relevance to any STEM topics.

These segments show that two in ten educators are in a teaching role that is fully STEM integrated (13%), half find at least one STEM subject highly relevant to their teaching (51%), while a quarter have some connection to STEM in their teaching (27%) and only 8% see no relevance with STEM in their main role.

The proportion who said that teaching skills in all four STEM areas is relevant to them has declined significantly from 18% to 13%.

Figure 20: Relevance of teaching STEM skills (segments).

Q. In your main role, how relevant is the teaching of STEM skills?

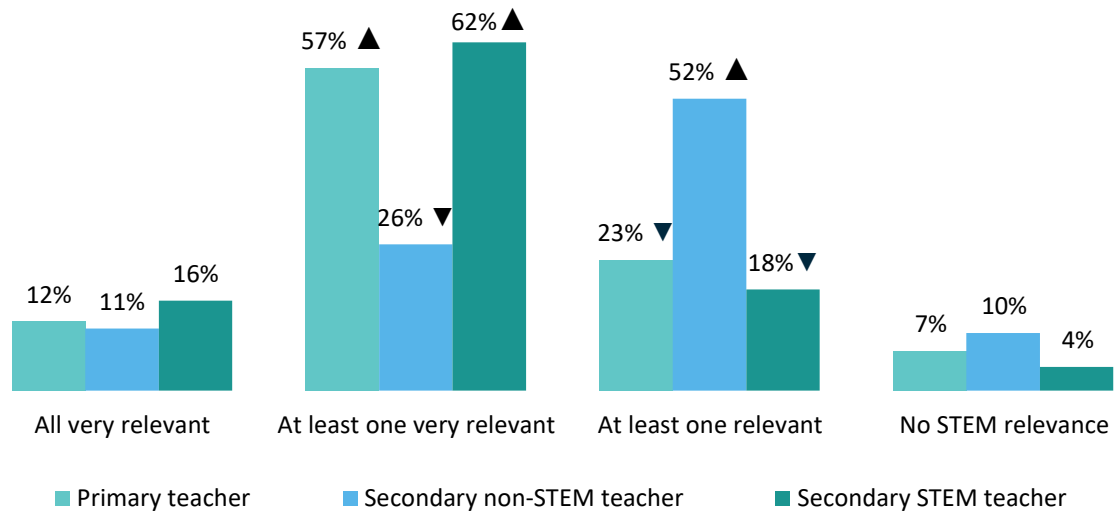


Base: unweighted total – wave 1 – 844, wave 2 – 730. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

Exploring these segments further, it can be seen that primary and secondary STEM teachers have similar relevance scores to one another. While relevance is equal, secondary STEM teachers can focus purely on this topic, while primary teachers need to address STEM alongside all other aspects of the curriculum.

Figure 21: Relevance of teaching STEM skills.

Q. In your main role, how relevant is the teaching of STEM skills?



Base: unweighted primary school teachers – 350, secondary non-STEM teachers – 115, secondary STEM teachers – 164.

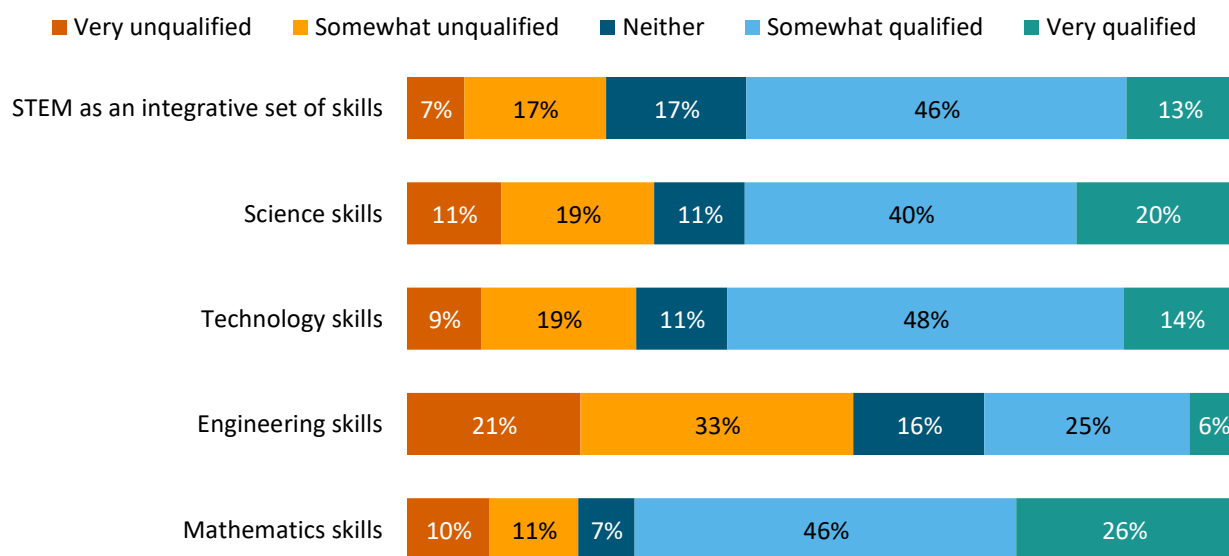
Feelings of qualification to teach STEM

When asked which STEM subjects they feel qualified to teach, mathematics was the clear winner with 73% feeling qualified to teach it. In fact, this increased significantly from 67% last wave.

Next was technology (62%), followed by science (59%), and STEM as an integrative set of skills (59%). Feelings of qualification to teach engineering skills was significantly lower, with only three in ten who feel they are qualified to teach this (30%).

Figure 22: How qualified educators feel about teaching each STEM subject.

Q. How qualified do you feel to teach STEM subjects?



STEM subjects	STEM as an integrative set of skills	Science skills	Technology skills	Engineering skills	Mathematics skills
Net: somewhat / very qualified	59%	59%	62%	30%	73%
Net: somewhat / very unqualified	24%	30%	28%	54%	21%

STEM subjects	STEM as an integrative set of skills	Science skills	Technology skills	Engineering skills	Mathematics skills
Net: somewhat / very qualified – Wave 1	58%	56%	60%	30%	67%
Net: somewhat / very qualified – Wave 2	59%	59%	62%	30%	▲73%

Base: unweighted those who are primary teachers, or who currently teach or previously taught STEM, or if STEM is relevant to their main role – wave 1 – 812, wave 2 – 709. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

Looking at the data at a more detailed level, men generally feel they are more qualified to teach STEM, with 90% selecting at least one topic area in which they feel qualified compared with 83% of women.

In terms of specific skills, men are significantly more likely to feel qualified to teach all four STEM subjects than women. This is a change from the previous wave, where women were just as likely to feel qualified in teaching technology and engineering as men.

There were also significant differences in feelings of qualification to teach STEM between primary teachers, secondary STEM teachers and secondary non-STEM teachers, with secondary STEM teachers generally feeling the most qualified. The exception to this rule was for mathematics, where primary teachers feel slightly (although not significantly) more qualified.

Table 5: Proportions of teachers who feel qualified to teach STEM by teacher type (net: somewhat / very qualified).

Q. How qualified do you feel to teach STEM subjects?

STEM subject	Primary teachers	Secondary non-STEM teachers	Secondary STEM teachers
STEM as an integrative set of skills	60%	42%	▲ 69%
Science	61%	31%	▲ 73%
Technology	66%	43%	▲ 66%
Engineering	30%	15%	▲ 43%
Mathematics	83%	40%	76%

Base: unweighted primary school teachers – 350, secondary non-STEM teachers – 115, secondary STEM teachers – 164. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

Within secondary schools, most teachers feel qualified to teach the STEM skills that align to the subjects they currently teach. For example, 94% of biology teachers feel they are qualified to teach science, 87% of design or digital technology teachers feel qualified to teach technology skills.

Table 6: Proportions of teachers who feel qualified to teach STEM by subject taught (net: somewhat / very qualified).

Q. How qualified do you feel to teach STEM subjects? / Which of the below subjects do you currently teach in your main role?

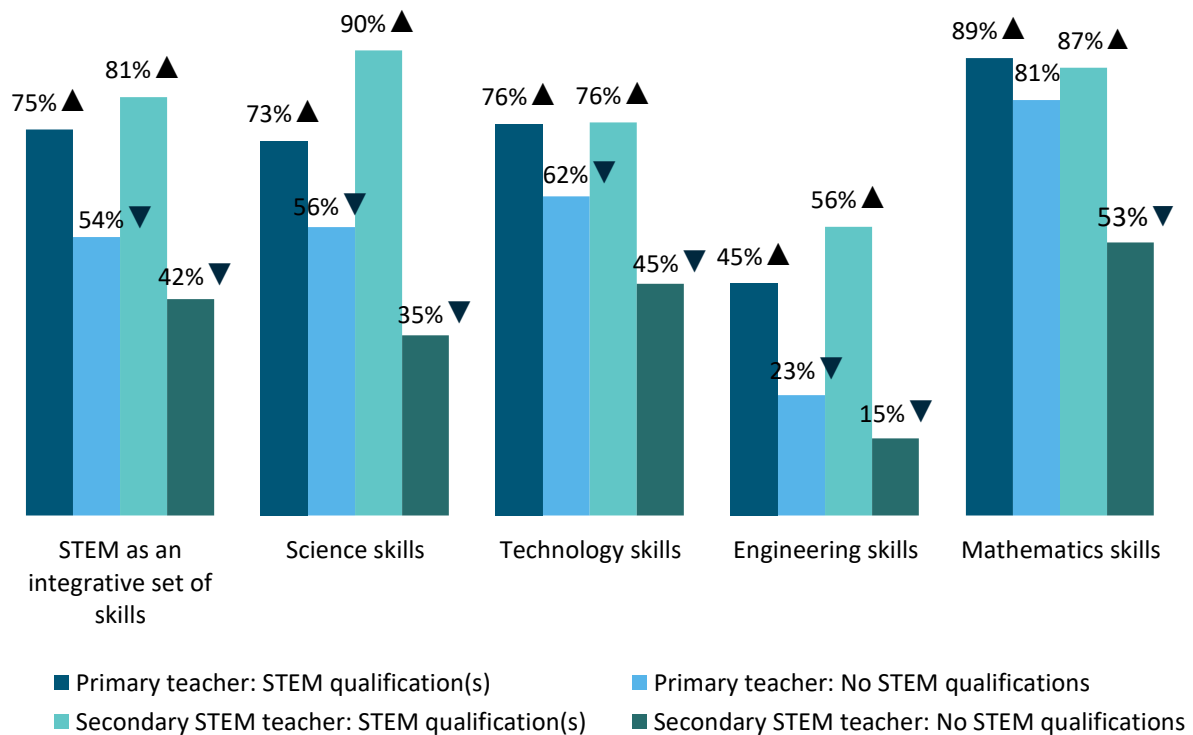
STEM subject	Subject taught									
	General Mathematics	Mathematics Methods	Specialist Mathematics	Biology	Chemistry	Env. Science	Physics	Geography	Design & Tech	Digital Technology
STEM as an integrative set of skills	63%	94%	100%	83%	75%	81%	85%	35%	97%	75%
Science	64%	94%	100%	94%	94%	82%	92%	31%	88%	78%
Technology	59%	94%	100%	74%	74%	75%	78%	39%	95%	78%
Engineering	31%	75%	78%	56%	61%	60%	66%	10%	70%	51%
Mathematics	86%	100%	100%	92%	99%	90%	94%	35%	79%	62%
Base	56	10*	4*	53	53	25*	35	36	24*	21*

*Note: small base size.

As expected, qualifications in STEM prior to entering the education sector positively impact educators’ feelings of being qualified to teach STEM skills. The impact of prior STEM education is most noticeable in the areas of engineering, science, and STEM as an integrative set of skills. The gap between those with and without prior STEM education narrows for mathematics and technology (however, a gap still exists).

Figure 23: Proportions of teachers who feel qualified to teach STEM (net: somewhat / very qualified).

Q. How qualified do you feel to teach STEM subjects?



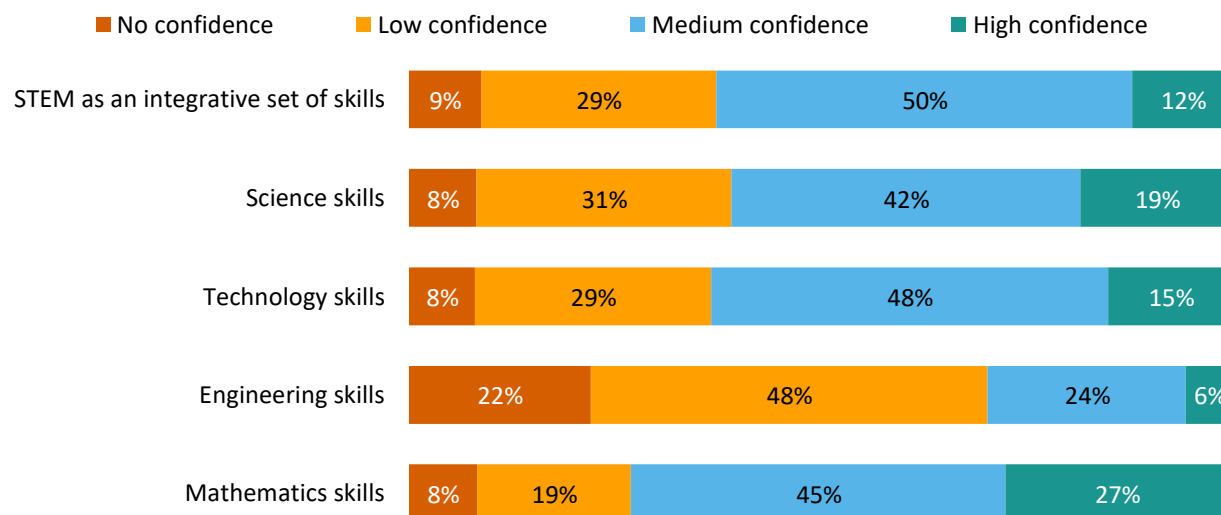
Base: unweighted Primary teachers with prior STEM qualifications - 104; Primary teachers with no prior STEM qualifications - 246; Secondary STEM teachers with prior STEM qualifications - 114; Secondary STEM teachers with no prior STEM qualifications - 50.

Confidence in teaching STEM

Overall, teachers did not report having high levels of confidence in teaching STEM-related subjects. Confidence was highest in mathematics (72%), followed by technology (63%), the integration of STEM as a set of skills (63%) and science (61%). Confidence in teaching engineering was significantly lower compared to all other subject areas, with only 30% saying they feel confident. This is consistent with the previous wave.

Figure 24: Confidence in teaching STEM.

Q. What is your confidence in teaching STEM-related subjects?



STEM subjects	STEM as an integrative set of skills	Science skills	Technology skills	Engineering skills	Mathematics skills
Net: medium / high confidence	63%	61%	63%	30%	72%
Net: low / no confidence	37%	39%	37%	70%	28%

STEM subjects	STEM as an integrative set of skills	Science skills	Technology skills	Engineering skills	Mathematics skills
Net: medium / high confidence – Wave 1	61%	61%	64%	32%	69%
Net: medium / high confidence – Wave 2	63%	61%	63%	30%	72%

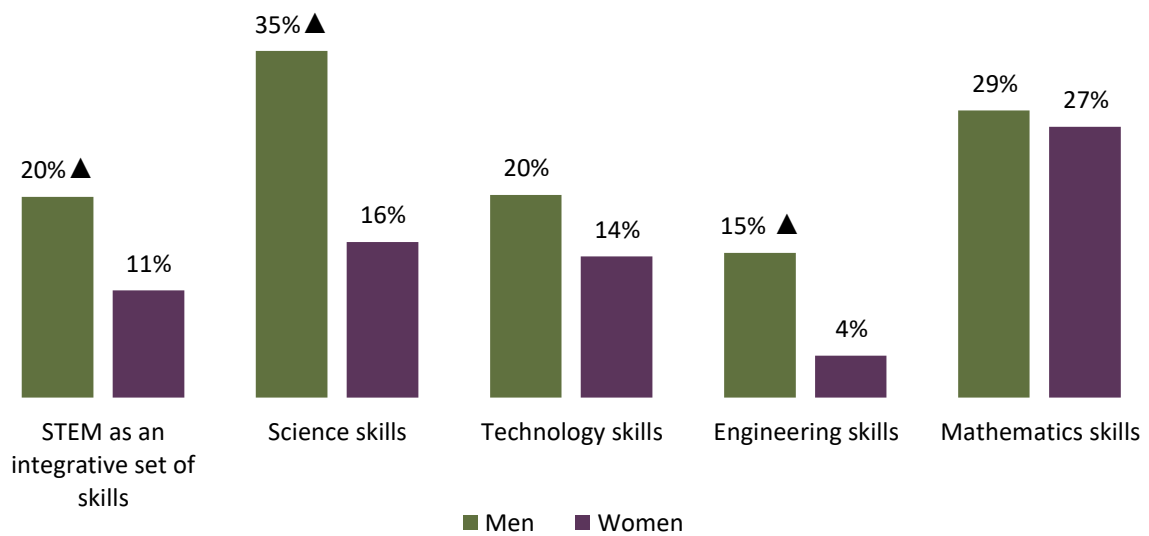
Base: unweighted Base: unweighted those who currently teach or previously taught STEM subjects, those who say STEM is relevant to their role, or primary teachers, wave 1 – 812, wave 2 – 708. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

Reflecting some of the earlier results, the survey found major differences in confidence levels between men and women teachers in teaching STEM-related subjects, with men significantly more confident across all STEM subjects.

Over half of male teachers (55%) were confident with at least one STEM subject, compared to 39% of women. This potentially reflects the larger proportion of men teaching STEM subjects, the larger proportion of men with STEM qualifications and / or a greater tendency for men to claim confidence than women.

Figure 25: Confidence in teaching STEM (% high confidence).

Q. What is your confidence in teaching STEM-related subjects?

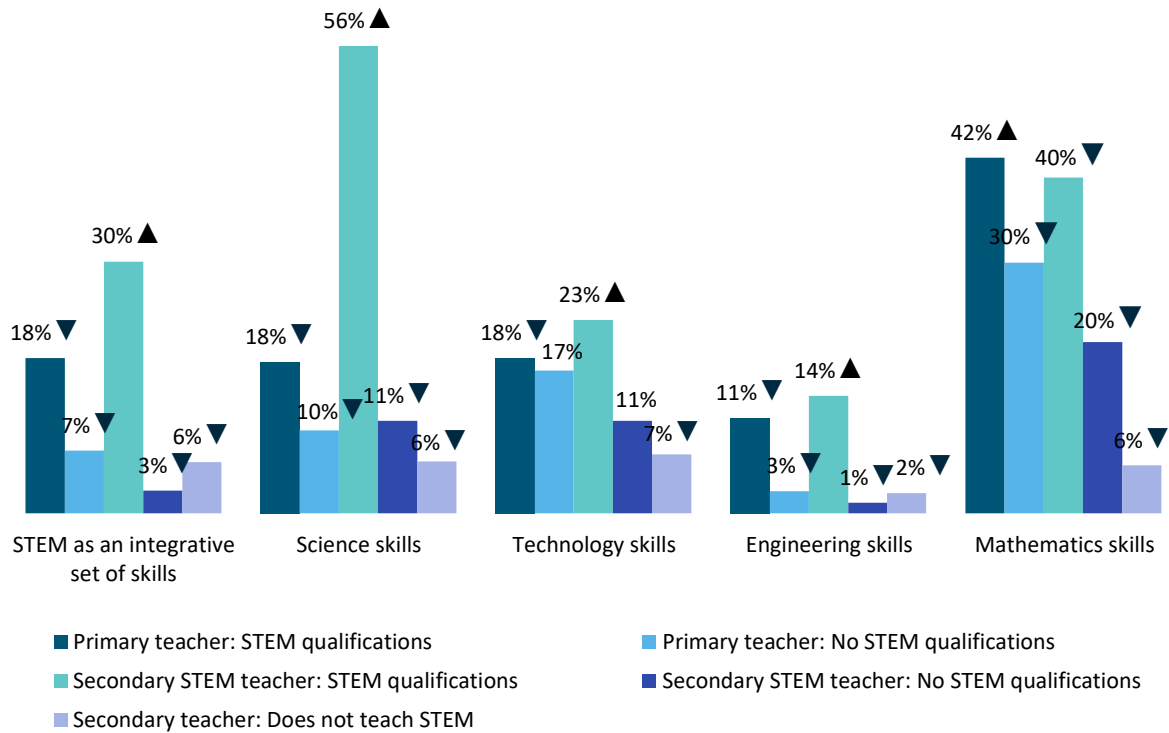


Base: unweighted those who currently teach or previously taught STEM subjects, those who say STEM is relevant to their role, or primary teachers, men – 91, women – 608.

Prior qualifications in a STEM field also had a strong positive impact on how confident teachers are at teaching STEM skills.

Figure 26: Confidence in teaching STEM (% high confidence).

Q. What is your confidence in teaching STEM-related subjects?



Base: unweighted Primary teachers with prior STEM qualifications - 104; Primary teachers with no prior STEM qualifications - 246; Secondary STEM teachers with prior STEM qualifications - 114; Secondary STEM teachers with no prior STEM qualifications - 50, Secondary teachers who do not teach STEM - 108.

Similar to the previous results regarding feeling qualified to teach STEM, those teaching specialist high school subjects have greater confidence in their ability to teach STEM than those teaching more generalised subjects. Outside of their specialisations, teachers are significantly less confident in their ability to teach STEM as an integrative set of skills.

Table 7: Confidence in teaching STEM (% high confidence).

Q. What is your confidence in teaching STEM-related subjects?

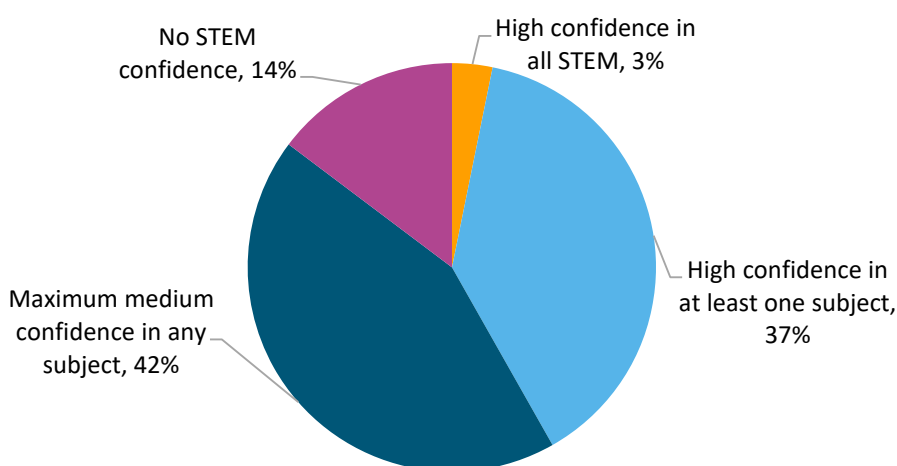
STEM subject	Subject taught									
	General Mathematics	Mathematics Methods	Specialist Mathematics	Biology	Chemistry	Env. Science	Physics	Geography	Design & Tech	Digital Technology
STEM as an integrative set of skills	21%	34%	46%	35%	29%	39%	34%	7%	26%	27%
Science	23%	35%	22%	74%	80%	64%	84%	8%	36%	42%
Technology	12%	8%	22%	24%	21%	22%	24%	15%	48%	40%
Engineering	9%	27%	24%	15%	18%	18%	19%	0%	13%	4%
Mathematics	53%	81%	100%	38%	48%	29%	55%	5%	25%	12%
<i>Base</i>	<i>56</i>	<i>10*</i>	<i>4*</i>	<i>52</i>	<i>52</i>	<i>25*</i>	<i>35</i>	<i>36</i>	<i>24*</i>	<i>21*</i>

Base: unweighted secondary school teachers, see table for base sizes. *Note: small base size.

To get an overall view of educators’ confidence levels across all STEM subject areas, respondents were grouped together based on their confidence in the four STEM subject areas as well as STEM as an integrated set of skills. The segments created are those who are highly confident in all subjects (3%), those who are highly confident in at least one subject (37%), those whose highest level of confidence in any subject was medium (42%) and finally those without confidence in any area (14%). The results show us that very few educators are confident across the entire STEM curriculum. This is consistent with what was found in 2020.

Figure 27: Confidence in teaching STEM (segments).

Q. What is your confidence in teaching STEM-related subjects?



Base: unweighted those in STEM-relevant roles; total – 70. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

Men were significantly more likely to feel confident with at least one STEM subject than women (48% vs 36%).

Other statistically significant differences between these segments are found below:

Table 8: Confidence in teaching STEM (net: high confidence in at least one subject): significant differences by audience.

Q. What is your confidence in teaching STEM-related subjects?

Audience	WEIGHTED %
Secondary level - teaches STEM	
Teaches at least one STEM subject	▲ 58%
Does not teach STEM	10%
Prior STEM qualifications	
Has prior STEM qualifications	▲ 53%
Does not have prior STEM qualifications	27%

Audience	WEIGHTED %
Location	
City / metropolitan area	▲ 41%
Regional, rural or remote area	32%

Secondary school STEM teachers have the highest confidence of any teachers: six in ten are highly confident in at least one area (58%), likely reflecting the classes they teach and their specialisations. However, we have seen a decline in the proportion of secondary STEM teachers who are highly confident in at least one area since 2020 (58%, down from 64%). There remains three in ten (27%) high school STEM teachers who have only medium confidence in the classes they are teaching and nine percent who say they have no STEM confidence.

In the primary school setting, the 10% of teachers who have no confidence with any of the STEM subjects also raises a certain level of concern.

Educators who were not confident teaching STEM were given the opportunity to explain why they feel this way in an open-ended text box. The question was asked of anyone who indicated that STEM education was relevant to their teaching and if they said they lacked confidence teaching any of the STEM topic areas.

As per the previous wave, many clarified that that the reason they are not confident is because they do not teach STEM subjects or are in non-teaching / support roles. This highlights that even teachers who do not teach STEM subjects still find it has some relevance to their role.

However, the cohort that do teach STEM revealed that a lack of formal training and practical teaching experience in STEM topics contributed to their lack of confidence teaching STEM concepts, as well as feeling unsure about how to best integrate STEM into the curriculum in line with the school's pedagogy.

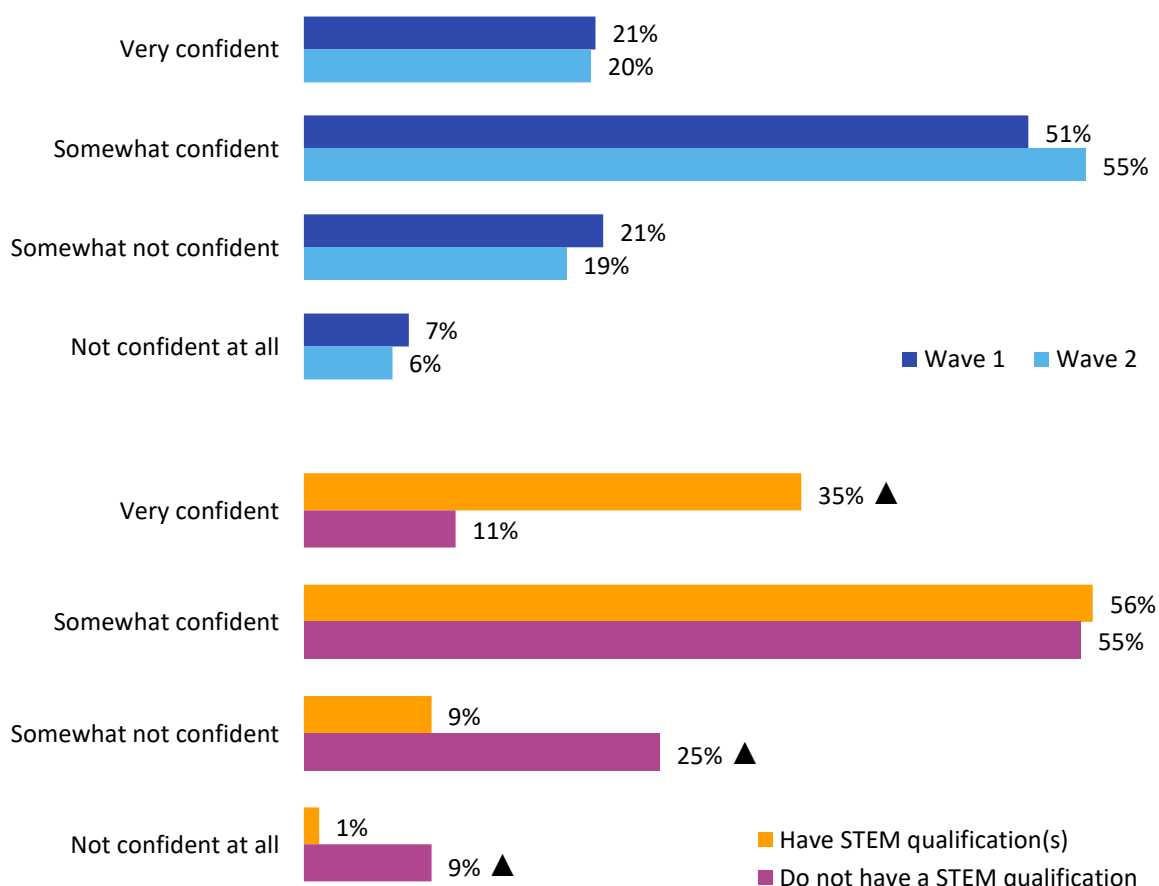
Confidence in connecting STEM content with real-world applications

Three quarters (75%) feel somewhat or very confident connecting STEM content with real-world applications, in line with the previous wave (72%).

As seen in the chart below, one in five (20%) teachers feel very confident doing this. However, this is strongly driven by teachers with prior qualifications, who are nearly four times as likely to feel very confident compared to those who do not have prior STEM qualifications (35% vs 11%).

Figure 28: Confidence in connecting STEM content with real-world applications.

Q. How confident are you to connect STEM content with relevant, real-world applications and career examples?



Base: unweighted wave 1 – 844, wave 2 – 715, those with STEM qualifications – 280, those without – 435. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

With a higher proportion of men having obtained STEM qualifications prior to teaching, it is understandable that men feel more confident to connect STEM content with relevant, real-world applications and career examples compared to women (84% vs 74%).

A similar pattern can be observed among primary and secondary school teachers, with a higher proportion of secondary teachers (81%) feeling confident with making STEM connections compared to primary teachers (71%).

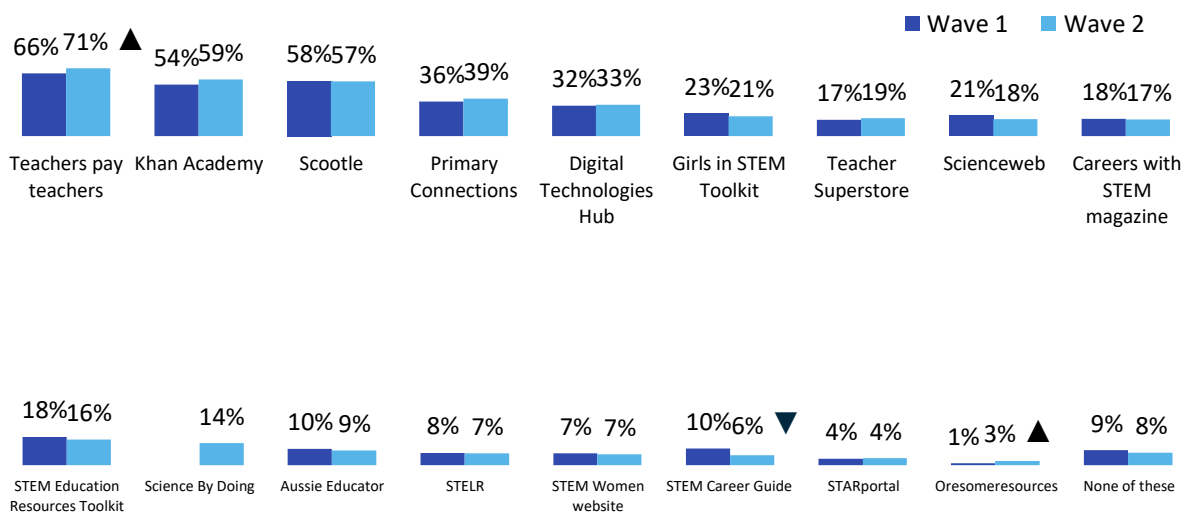
STEM teaching resources

To support in the teaching and learning of STEM, educators have access to a wide range of resources. As part of this research, educators were asked about their awareness, usage and the perceived usefulness across a list of different teaching resources.

The survey found that Teachers Pay Teachers, Khan Academy and Scootle are the most popular online resources for teachers. These sites had much higher awareness than others and a large proportion of users within those who are aware of the respective sites.

Figure 29: Awareness of STEM teaching resources.

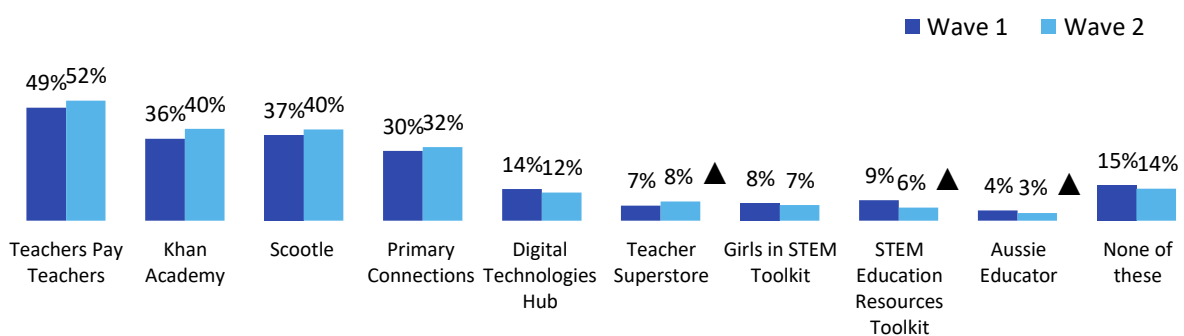
Q. Below is a list of STEM resources. Please select which of the following you've heard of before.



Base: unweighted total – wave 1 – 844, wave 2 – 714.

Figure 30: Usage of STEM teaching resources.

Q. And which of the following STEM resources have you used before?

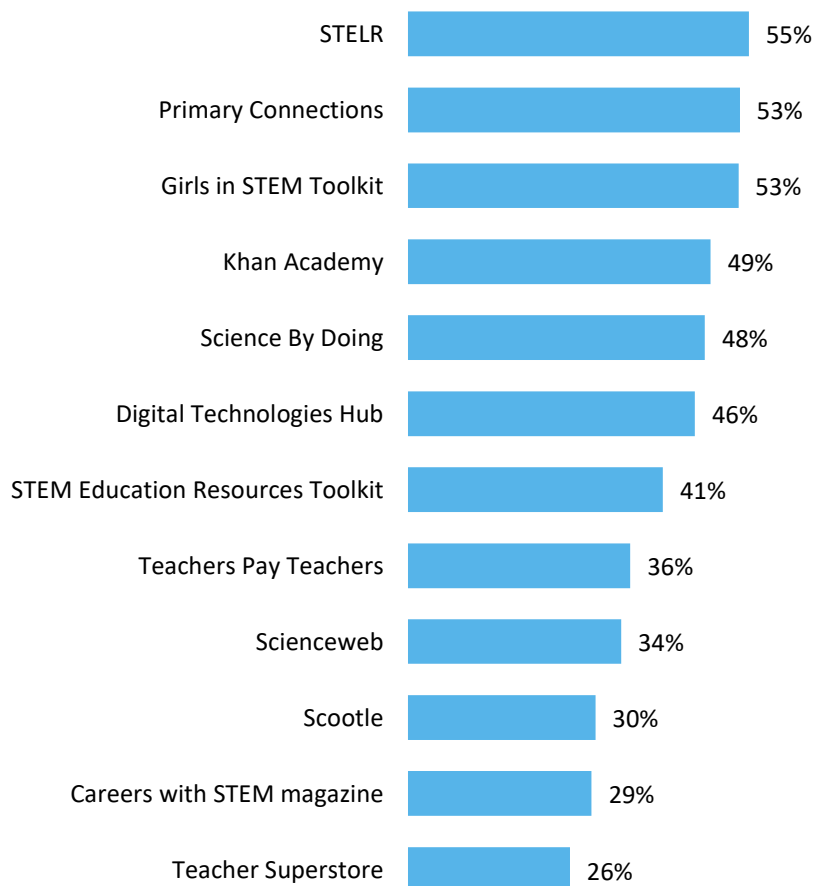


Base: unweighted those aware of resource, varies by resource, from 20 to 714. Resources with a base size of less than 20 have been removed from the chart.

While based on a small group of users (35), STELR was ranked as the most useful resource, with 55% of users declaring it to be very useful. The next most popular resources based on 'very useful' scores were Primary Connections, Girls in STEM Toolkit and Khan Academy.

Figure 31: Usefulness of STEM teaching resources.

Q. How useful did you find the STEM resources that you have used? (Net: very useful)



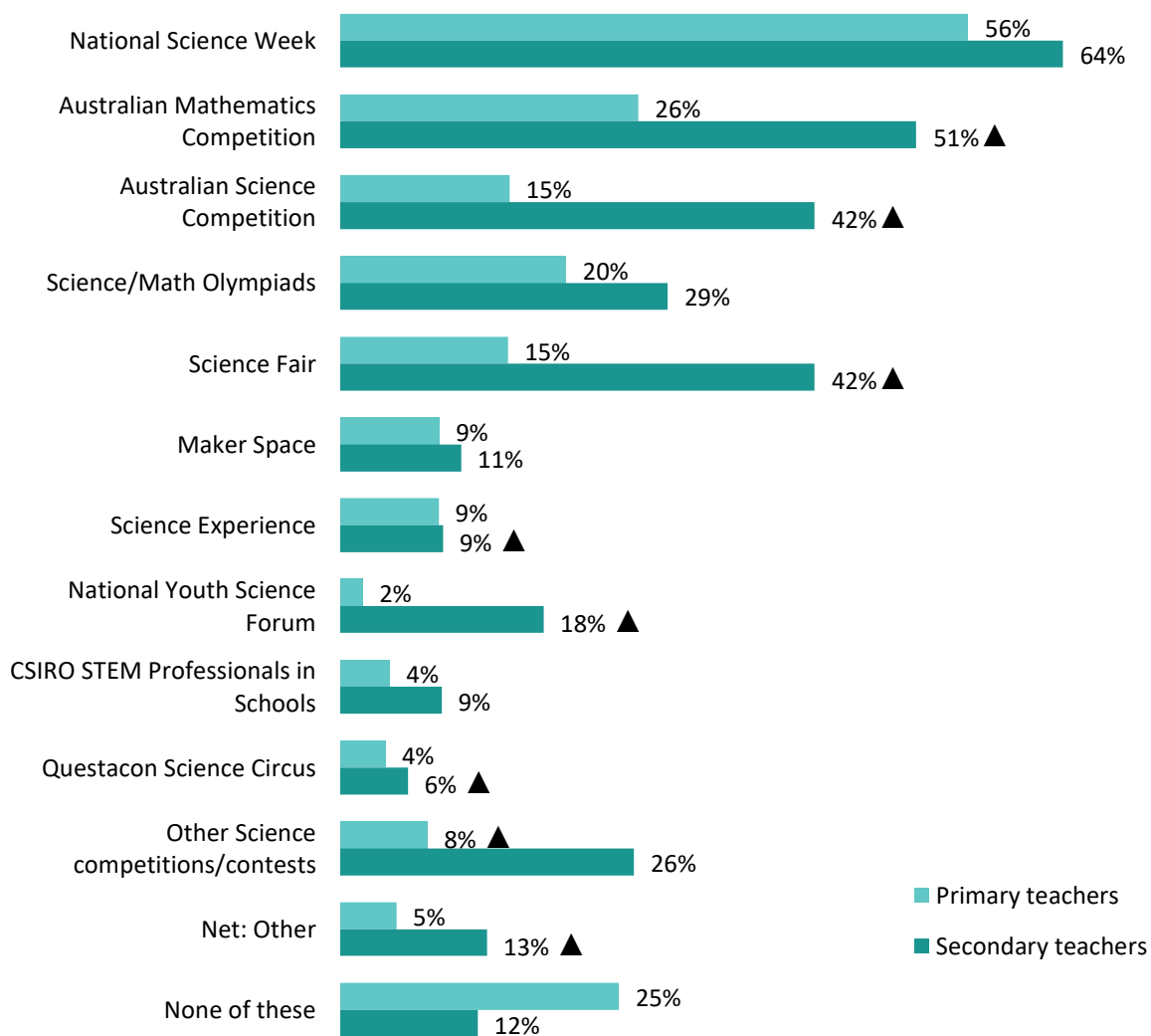
Base: unweighted those who had used a resource. Base varies by resource, from 25 to 342. Resources with a base size of less than 25 have been removed from the chart.

The survey also investigated which STEM related activities and events schools participate in. This wave we have seen a significant increase in the proportion of schools taking part in National Science Week (from 52% to 58%), but a decline in those taking part in Australian Mathematics and Science Competitions (43% to 33% and 31% to 24%, respectively).

The survey found that STEM focused events are more popular among secondary schools (driven by secondary STEM teachers), such as the Australian Mathematics and Science Competitions and science fairs, among others.

Figure 32: School / institution participation in STEM events.

Q. Which of the following activities / events does your school / institution participate in? (MC)



Base: unweighted primary teachers – 350, secondary teachers – 265.

Gender bias

Gender bias in the media

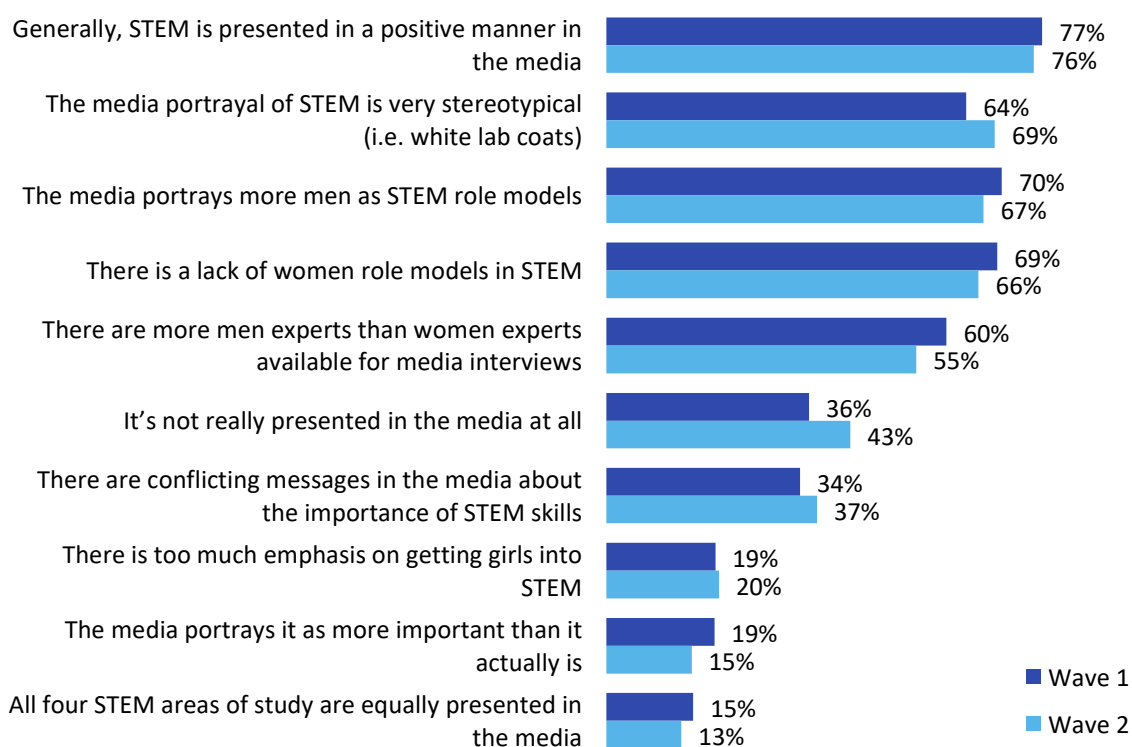
Respondents were asked how strongly they agree or disagree with a range of statements relating to how STEM is currently presented to young people in the media. The survey found that although educators generally agree that STEM is presented in a positive manner (76%), one in seven (67%) agree that the media portrays more men as STEM role models. Possible explanations for this are that the majority of educators agree (66%) there is a lack of women role models in STEM or that 56% agree that there are more men experts available for media interviews. These perceptions have remained consistent since the previous wave in 2020.

With most educators acknowledging this gender bias in the media, it is understandable that only one in five (19%) agree that there is too much emphasis on getting girls into STEM.

However, while most agree STEM is presented positively, seven in ten (69%) agree that the portrayal of STEM in the media is very stereotypical (i.e. white lab coats) and only 13% agree that all four STEM areas of study are equally presented in the media.

Figure 33: Agreement with statements about STEM portrayals in the media (net: slightly / strongly agree).

Q. Below is a list of statements of how STEM is currently presented to young people in the media. Please indicate how much you agree or disagree with these statements.



Base: unweighted wave 1 – 844, wave 2 - 730. Sample was split in half to reduce survey fatigue (a maximum of 414 saw each answer option).

There were very few demographic differences in attitudes towards media presentation of STEM this wave, similar to the previous wave. Women were more likely to agree that the media portrays more men as STEM role models than women (70% vs 47%), and those who teach STEM at a secondary level were also most likely to agree with this (76%) than other teachers (52%).

Bias in careers

To attain educators' perspectives on the relationship between STEM skills and future career opportunities, respondents were presented with a list of statements and asked how much they agreed or disagreed with each one.

The results revealed a general consensus that STEM skills are important for the Australian economy (98% agree). Similarly, more than 90% agreed that STEM skills are applied in everyday life, that there is an increasing number of jobs requiring these skills and that STEM is cultivated from a young age. However, one in ten (11%) disagreed that these skills will provide job security in the future and two in ten (19%) disagreed that there are many STEM graduate roles available.

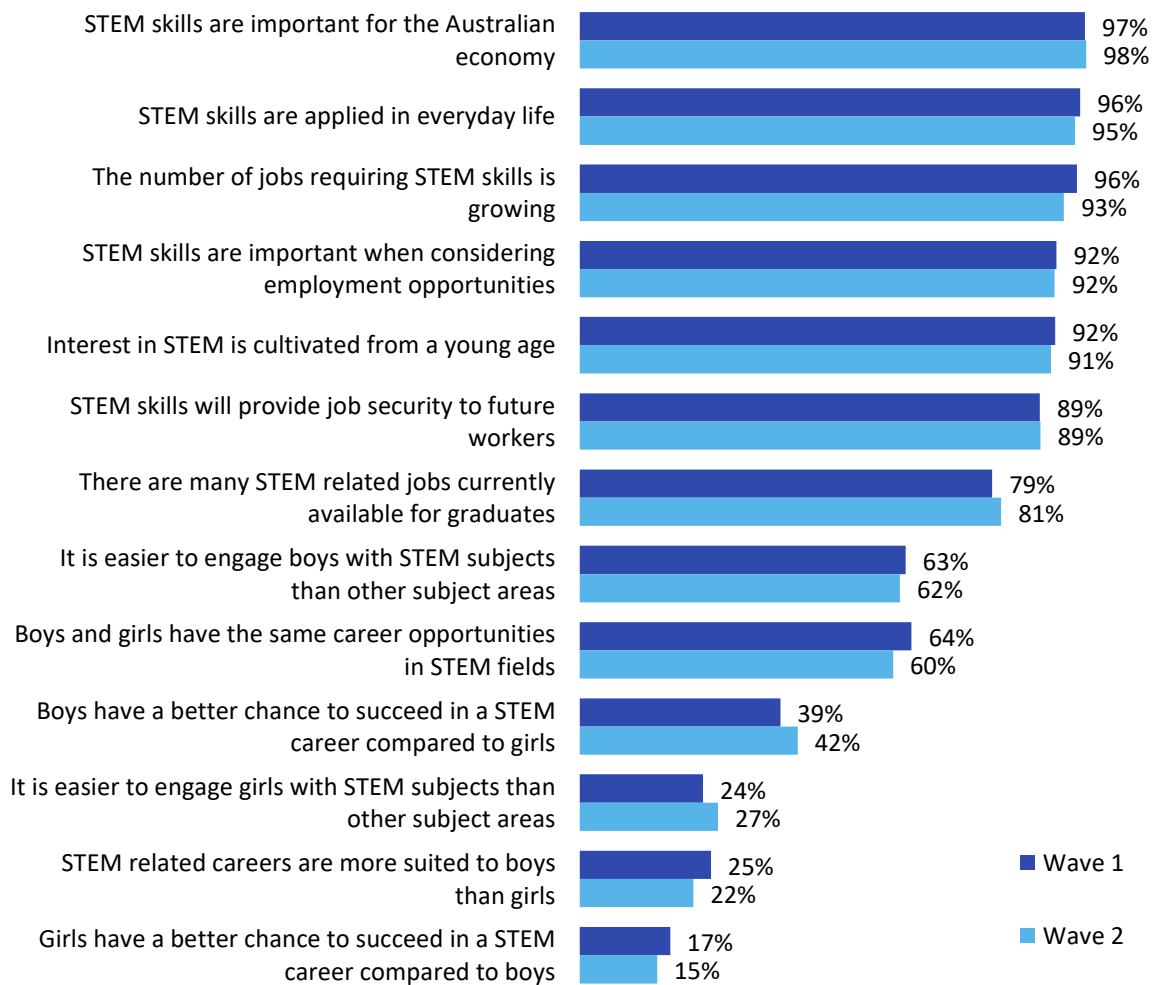
When it came to understanding the role that gender plays in STEM careers, three in five educators (60%) agreed that boys and girls have the same career opportunities in STEM fields, with men being more likely to agree with this statement (74% compared to 58% of women). However, a higher proportion of educators (62%) acknowledged that it is easier to engage boys with STEM than other subjects compared to only 24% who believe the same for girls. Women were more likely to agree that it is easier to engage boys with STEM subjects than other subject areas, than men (64% vs 48%).

The majority of educators disagreed that either gender has a better chance to succeed in a STEM career (58% disagree for boys and 83% for girls). Furthermore, three quarters of all educators surveyed (85%) disagree that STEM related careers are more suited to boys than girls.

These perceptions were consistent with the previous wave; there have been no significant changes.

Figure 34: Agreement with statements about STEM skills and future careers (net: slightly/strongly agree).

Q. Below is a list of statements about STEM skills and how they translate into future jobs / careers. How much do you agree with each of these statements?



Base: unweighted total wave 1 – 844, wave 2 - 730. Sample was split in half to reduce survey fatigue (a maximum of 376 saw each answer option).

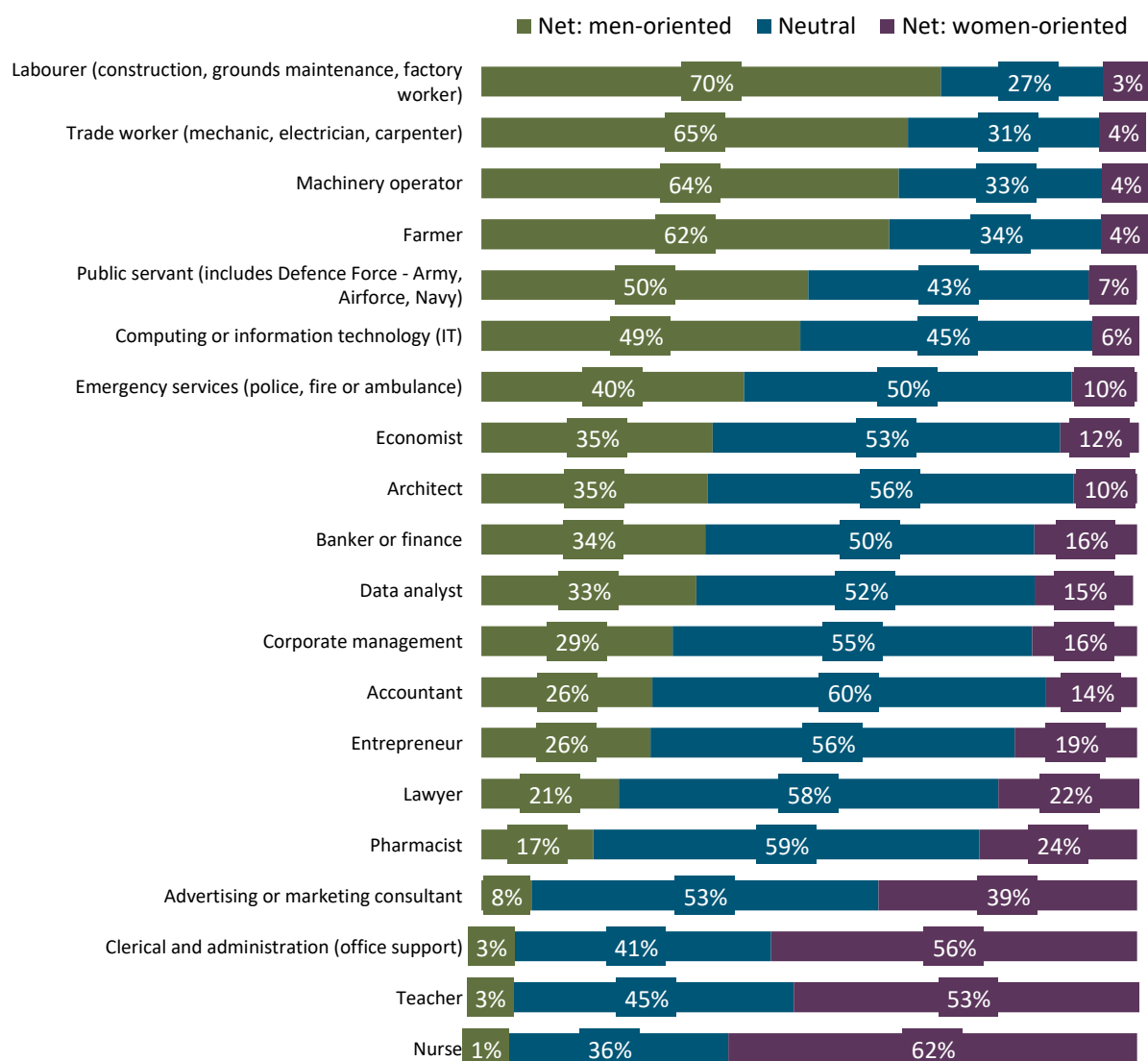
To further investigate gender bias related to STEM careers respondents were asked the degree to which they felt each of a range of occupations were oriented towards men or women. The sliding scale they were presented with displayed “very male” on the left (score of -10), “neutral” in the centre (score of 0) and “very female” on the right (score of 10).

As we found in the previous wave, the survey results indicate that there are very strong gender associations with occupations. This inherent bias in how occupations are perceived and positioned, is likely to inform students’ perceptions of these careers, the opportunities that are available to them and which careers are most suitable to their skillset.

Accountant, lawyer and pharmacist were the professions with the least gender bias (consistent with the previous wave). The top three roles most skewed towards women were nurse, office support and teacher, while labourer, trade worker and machinery operator topped the list for being most skewed towards men.

Figure 35: Educators’ gender associations with occupations.

Q. Of these jobs, where would you place them on the scale below?



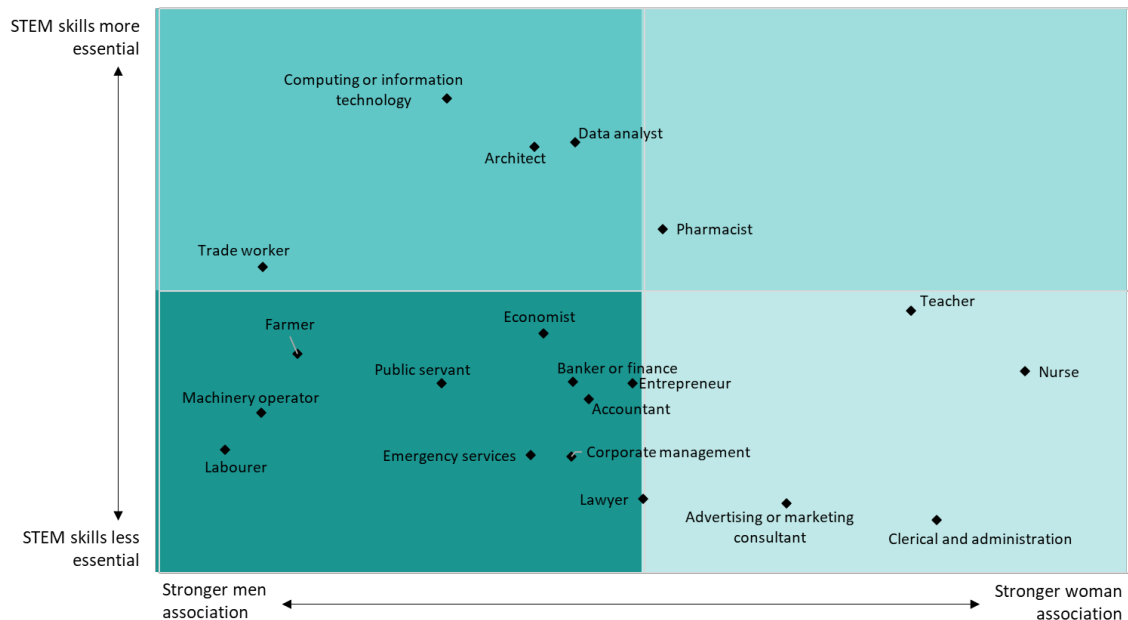
Base: unweighted wave 2 total - 730. Sample was split in half to reduce survey fatigue (a maximum of 428 saw each answer option). Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

Despite three in five educators agreeing that boys and girls have the same career opportunities in STEM fields, these survey results indicate that there is still an unconscious or inherent bias in how occupations are perceived.

By cross tabulating educators’ perceptions of how essential STEM skills are for careers and gender occupation associations, most jobs where STEM skills are deemed a necessity are also more skewed to men. Conversely, the most gendered roles, particularly those for women, are roles where STEM skills are deemed not important. Pharmacist was the only occupation where STEM skills are seen as more essential and skewed towards women. Last wave teacher fit into this category, but this wave the survey takers thought STEM skills were less essential for this role. These findings are similar to the associations among educators in the Teachers & Career Advisors research.

Figure 36: Matrix of occupations plotted by gender association and perceived requirement of STEM skills.

Q. Thinking about what you know, do you think these jobs are more for boys, more for girls or for both? / Q. How essential do you think STEM skills are to the following careers?



Base: unweighted total wave 2 – 730.

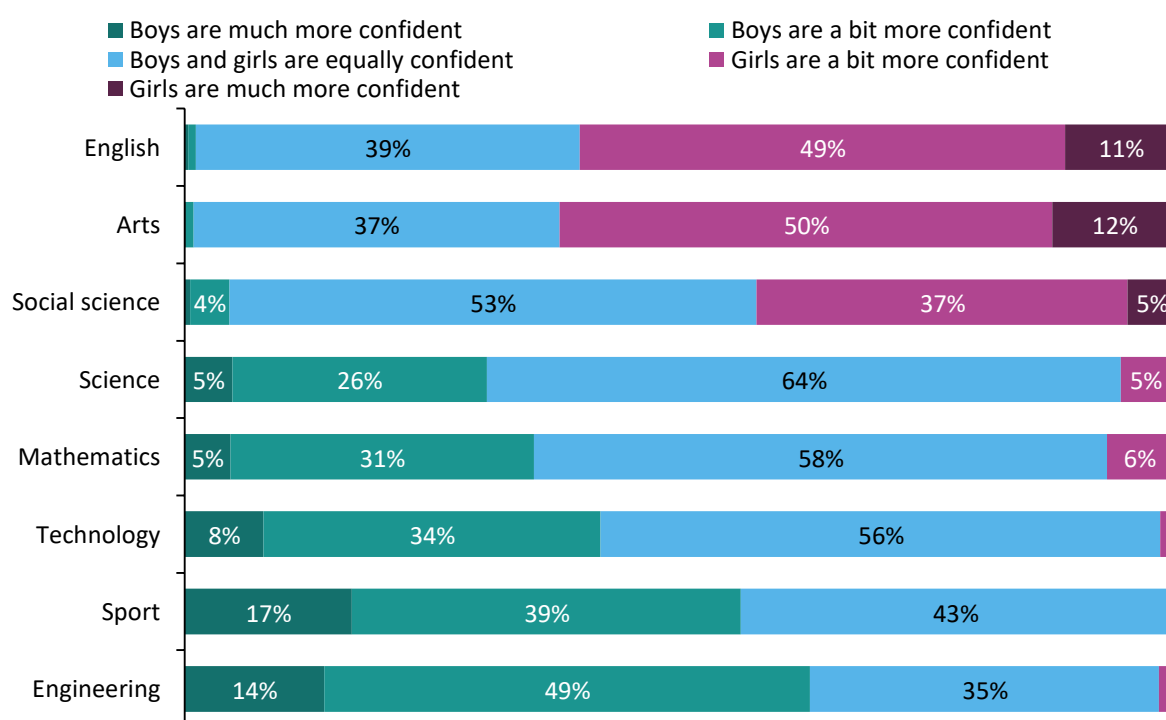
Student ability and engagement

Educators report large differences in the confidence of girls and boys in different subject areas. Girls are perceived to be more confident in English, arts and social science while boys are more confident in science, mathematics, technology, engineering and sport. This is consistent with the previous wave. The skew towards boys was less prominent for science and mathematics with the majority of educators feeling that girls and boys are equally confident in science (64%) and mathematics (58%).

While last wave we observed that men were more likely than women to say that girls are more confident in mathematics and science, this was no longer the case in 2022. The 2020 survey also found that a higher proportion of secondary teachers compared to primary teachers believe boys are more confident in technology and engineering, but again this was not the case.

Figure 37: Perceived gender differences in student confidence.

Q. Who do you believe are more confident in the following subjects?



Subjects	Net: boys are more confident	Net: girls are more confident
English	1%	60%
Arts	1%	62%
Social science	5%	42%
Mathematics	35%	7%
Science	30%	6%
Engineering	63%	2%
Technology	42%	2%
Sport	56%	1%

Base: unweighted total wave 2 – 730. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

Gender disparity in university research roles

In addition to the more explicit questions regarding gendered differences in students, the survey also included a customised version of a question taken from Harvard's implicit association test for gender bias. For this question respondents were presented with the statement, "women currently hold a smaller proportion of the science and engineering faculty positions at top research universities than men". They were then provided with a list of reasons as to why this disparity exists.

Respondents could select the degree to which they believe each reason was valid or invalid. The scale options were purposefully unbalanced, with three varying options of classifying statements as valid and only a single option to classify them as invalid. The objective was to measure levels of unconscious gender bias among educators.

Over half of all educators (52%) reject the notion that there is a greater proportion of men with the highest levels of mathematics ability. A further 43% disagree that men and women differ naturally in their scientific interest and 46% saw no validity in the statement that men and women differ in their willingness to devote the time required by such high-powered positions.

However, it should be noted that more than half of respondents still see at least some validity to these statements. Therefore, a bias towards men's ability, interest and availability to dedicate time to a career exists for a proportion of educators.

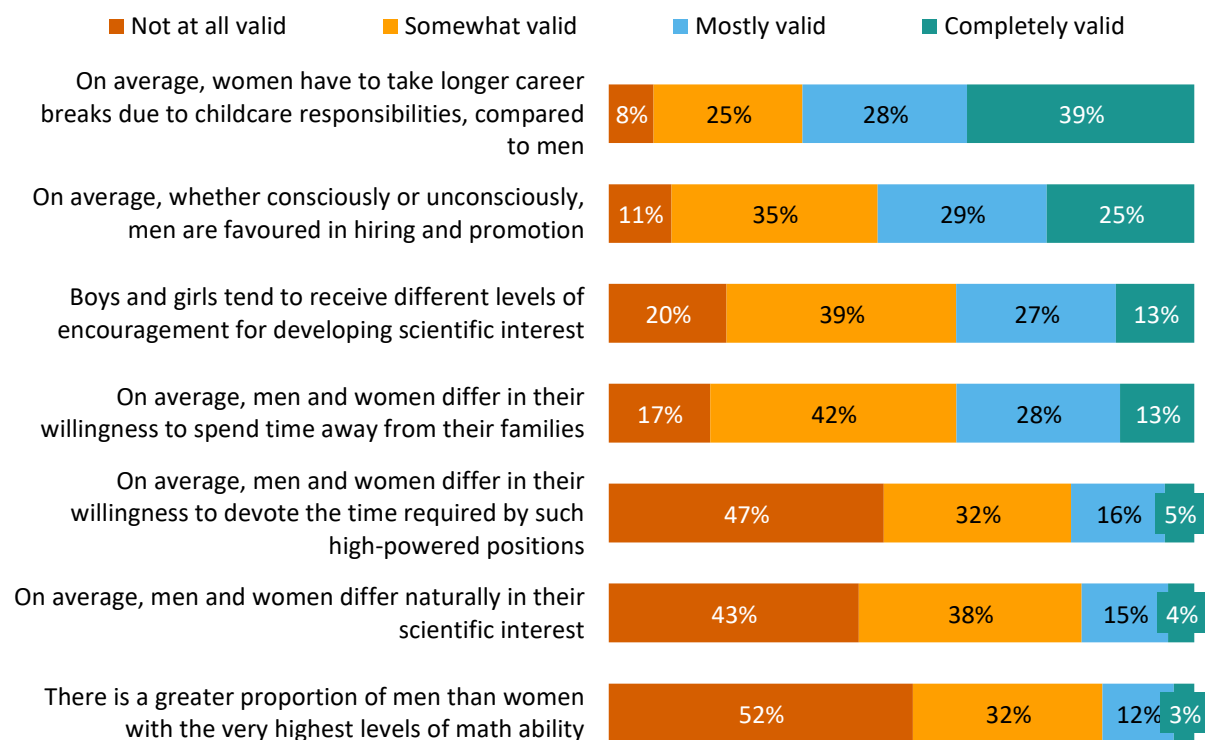
The statement perceived to be the most valid was that on average, women have to take longer career breaks due to childcare responsibilities, compared to men (a new statement this wave, 67% said this was mostly or completely valid).

Other reasons most validated by educators were that men are favoured in hiring and promotion (54% mostly or completely valid), boys and girls tend to receive different levels of encouragement for developing scientific interest (41% mostly or completely valid) and because they differ in their willingness to spend time away from their families (41% mostly or completely valid).

Conversely, there were significantly lower levels of validation of statements which question men's and women's inherent abilities to engage with STEM.

Figure 38: Perceptions of validity of reasons for gender differences at top research universities.

Q. Women currently hold a smaller proportion of the science and engineering faculty positions at top research universities than men. The following factors are sometimes given as a reason for this difference. How valid do you think each of these reasons are?



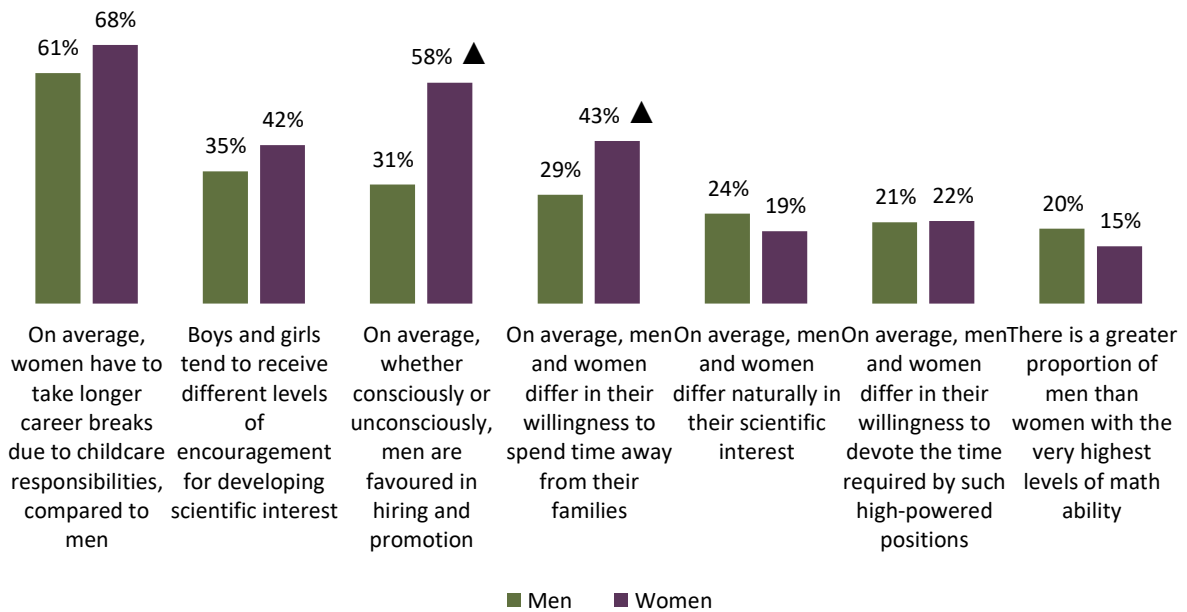
Statements (Net: mostly / completely valid)	Wave 1	Wave 2
On average, women have to take longer career breaks due to childcare responsibilities, compared to men	<i>Not asked</i>	67%
Boys and girls tend to receive different levels of encouragement for developing scientific interest	35%	41%
On average, whether consciously or unconsciously, men are favoured in hiring and promotion	31%	54%
On average, men and women differ in their willingness to spend time away from their families	29%	41%
On average, men and women differ naturally in their scientific interest	24%	19%
On average, men and women differ in their willingness to devote the time required by such high-powered positions	21%	21%
There is a greater proportion of men than women with the very highest levels of math ability	20%	16%

Base: unweighted total wave 1 – 844, wave 2 – 730. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

When looking at these results by the gender, women were more likely to agree that the gender disparity is impacted by men being favoured in hiring and promotion (58% vs 31% of men) and that they differ in their willingness to spend time away from their families (43% vs 29% of men).

Figure 39: Validity of reasons for gender differences at top research universities, split by gender of teacher (net: mostly / completely valid).

Q. Women currently hold a smaller proportion of the science and engineering faculty positions at top research universities than men. The following factors are sometimes given as a reason for this difference. How valid do you think each of these reasons are?



Base: unweighted wave 2 – men – 93, women – 617.

More than half of surveyed educators see at least some validity towards differences in men’s ability, interest and availability to dedicate time to a career.

Perceptions of what would help improve the attitudes of girls towards STEM

The survey asked all educators in an open-ended format what they believe would help them improve the attitudes of students who are girls towards STEM. While there was a wide range of responses, the most common improvement (as per last wave) was to have more women role models visible, followed by greater focus on positioning STEM in a more relevant manner that aligns with their interests.

Role models and visibility (141 mentions)

“More examples of capable female STEM workers.”
“Seeing more successful women working in STEM.”
“Watching women work in the industries may encourage and inspire them to work harder in STEM classes.”

Interest and relevance (66 mentions)

“More engaging lessons with real life experiences.”
“Providing more interesting and engaging stem lessons or programs. When they are involved in things like this I have mostly seen a huge growth in them loving it.”
“Provide a variety of opportunities for female students to engage in a variety of STEM activities that link with interests also suited to their ability so they can feel confident and success in the area and come back for more.”

Improved resources / information / content (59 mentions)

“More resources and trained teachers to help get students more enthusiastic.”
“Professional development for teachers so they feel more confident to teach STEM. More resources at school to teach STEM, make it exciting and engaging for all students. Support from STEM teachers to teach/plan lessons.”
“I think more ideas and resources that focus on females that they can relate to. Or different manners of engagement for my female students.”

More activities / better range of activities (36 mentions)

“Keep activities engaging and hands on for all students.”
“A larger range of stem activities to engage the female students. It is very male focused.”
“Hands on experiences, excursions, interactive displays.”

Careers pathways / opportunities (33 mentions)

“Increased awareness of job pathways and breaking down any stigma of male dominated work fields.”
“Letting them know of the roles and careers available for them.”
“Clearer end goal opportunities that are more appealing to females.”

Encouragement and enthusiasm (27 mentions)

“Encouragement and enthusiasm when teaching or talking about the subject. Showing videos or bringing guests that are in the field. Giving examples and talking about the endless possibilities of where STEM can take you in life.”
“Early encouragement with female students in Primary school.”

“Encouragement and building their self-confidence as they are more sensitive and don't like to make mistakes.”

More teachers who are women (13 mentions)

“Have more female teachers involved and more support from the leadership team and the parents.”

“More female teachers and seeing women in the industry.”

“More female teachers, or girls only groups... it's perceived as a nerdy boy thing by many.”

Impact of COVID-19

For the first time since the tracker started we asked educators questions regarding the impact of COVID-19; on likelihood to encourage students to study or work in STEM, students' interest in STEM and learning of STEM topics.

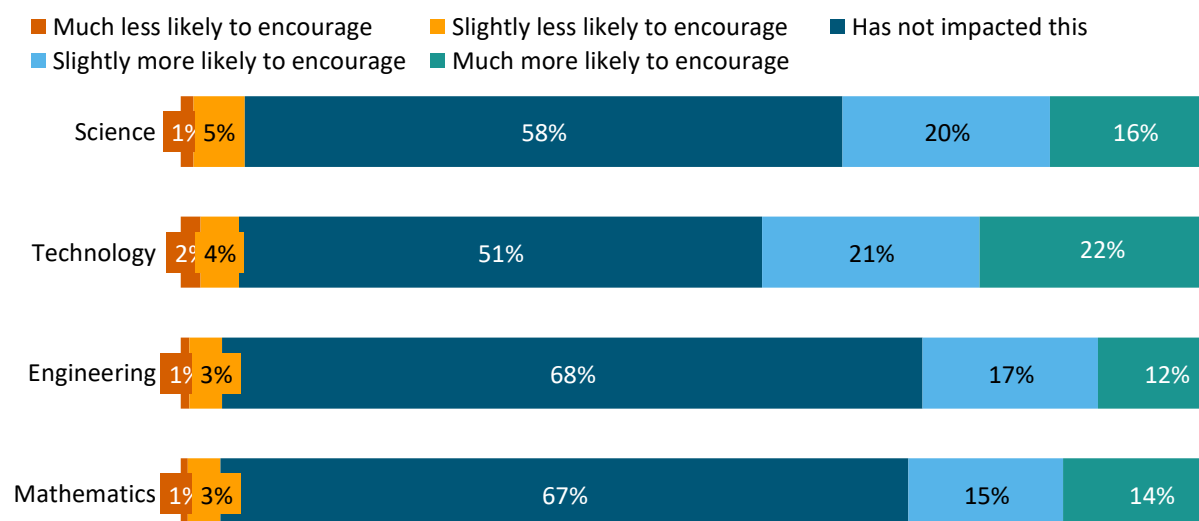
Impact on likelihood to encourage students into STEM

Survey respondents were asked to rate their likelihood to encourage students to study or work in STEM as a result of COVID-19, on a scale from much more likely to encourage to much less likely to encourage. COVID-19 had the greatest impact on likelihood to encourage students to study or work in technology (43%), followed by science (36%). It had the lowest impact on engineering and mathematics (both 29%).

Those who teach STEM at secondary were the most likely to say it had an influence, especially for technology, engineering and mathematics (more so than primary teachers and secondary teachers who do not teach STEM).

Figure 40: Likelihood to encourage students to study or work in STEM due to COVID-19.

Q. How, if at all, has COVID-19 influenced how likely you would be to encourage students to study or work in the following STEM areas in the future?



STEM subjects	Science	Technology	Engineering	Mathematics
Slightly – much more likely to encourage – Wave 2	36%	43%	29%	29%

Base: unweighted total wave 2 – 727. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

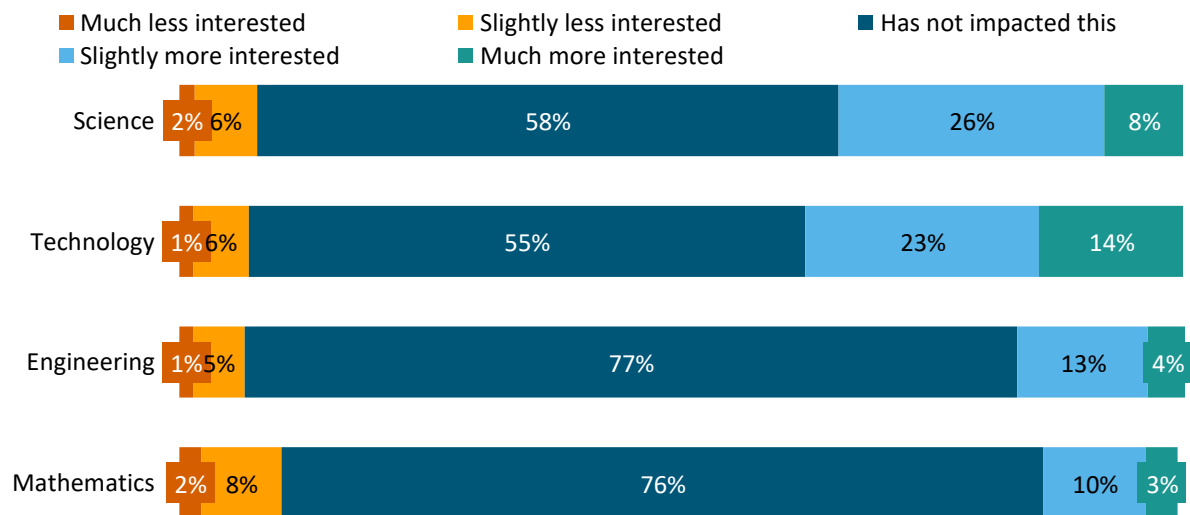
Impact on students' interest in STEM

COVID-19 seems to have had a small to moderate impact on students' interest in STEM and STEM careers, according to their educators. Again, educators reported the greatest uplift in interest for technology (38%) and science (34%) and the lowest interest for engineering (17%) and mathematics (14%).

Primary teachers were more likely than secondary teachers to report an increase in interest in technology as a result of COVID-19 (42% vs 31%). Those with prior STEM qualifications were also more likely than those without to report an increase in interest in science, engineering and mathematics.

Figure 41: Impact of COVID-19 on interest in STEM and STEM careers.

Q. How, if at all, has COVID-19 influenced how interested your students are in STEM and STEM careers?



STEM subjects	Science	Technology	Engineering	Mathematics
Slightly – much more interested – Wave 2	34%	38%	17%	14%

Base: unweighted total wave 2 – 727. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

Impact on STEM learning

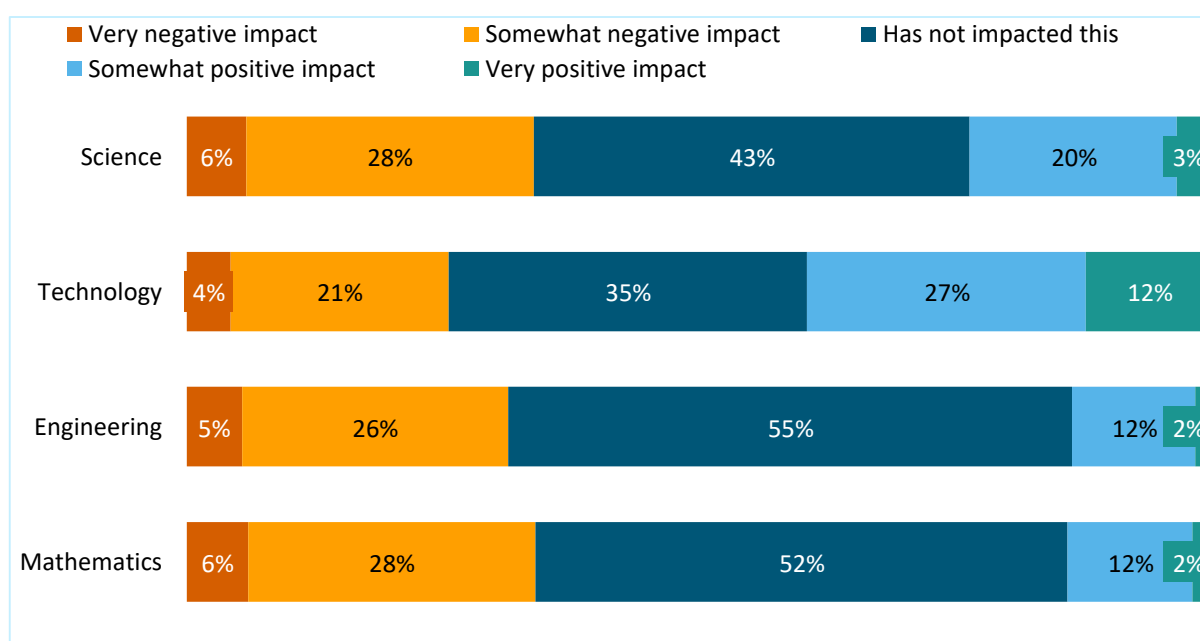
Finally, in relation to COVID-19, educators were asked about the impact of COVID-19 and associated lockdowns and online learning on students' learning about STEM.

The majority of educators said the situation had no impact on students' learning about STEM subjects. While the situation had a somewhat positive impact on learning about technology (39%), some educators reported it had more of a negative impact on learning about science (34%), mathematics (34%) and engineering (31%).

Men, secondary teachers and those with prior STEM qualifications were more likely to report a negative impact on students' learning about STEM.

Figure 42: Impact of COVID-19, lockdown and online learning modes on STEM learning.

Q. To what extent, if at all, has COVID-19 and the associated lockdowns and online learning modes impacted students' learning on the following STEM topics?



STEM subjects	Science	Technology	Engineering	Mathematics
Somewhat – very positive impact – Wave 2	24%	39%	14%	14%
Somewhat – very negative impact – Wave 2	34%	25%	31%	34%

Base: unweighted total wave 2 – 727. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

Career advice

The final section of the survey explored the topic of career advice given to students. While some questions were directed at all respondents, most were answered only by career advisors and teachers who regularly provided career advice to their students (i.e. those who provide advice at least monthly).

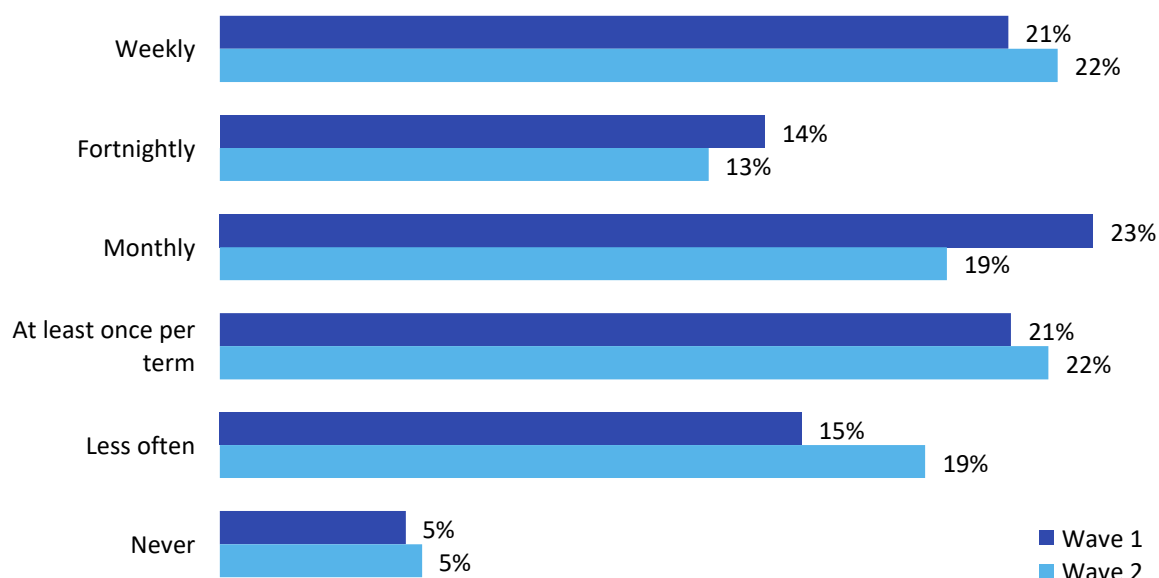
In wave 2 we spoke with 248 respondents who were classed as mentors, who provided advice at least monthly, however, only 15 of these were career advisors. This sample is significantly lower than the previous wave, where we spoke to 57 career advisors. Despite using the same sampling methods this wave, the research team believe it is due to the time of the year (towards the end of the year and close to school holidays) and the length of the survey which led to a low response rate from this audience. Because of this, we have only reported figures from questions where we achieved a robust base size of mentors and career advisors. While we have reported on the story, we have not reported on the figures from the audience of career advisors. In future waves greater steps will be taken to ensure we achieve a robust sample of this audience.

Providing career advice

Almost all (95%) secondary teachers said that they provide career advice to students throughout the school year. Over half (55%) provide career advice at least monthly, with 35% providing advice at least once a fortnight.

Figure 43: Frequency of secondary school teachers providing career advice.

Q. In your experience as an educator, how often do you provide career advice to your students?



Base: unweighted high school teachers – wave 1 – 282, wave 2 - 248.

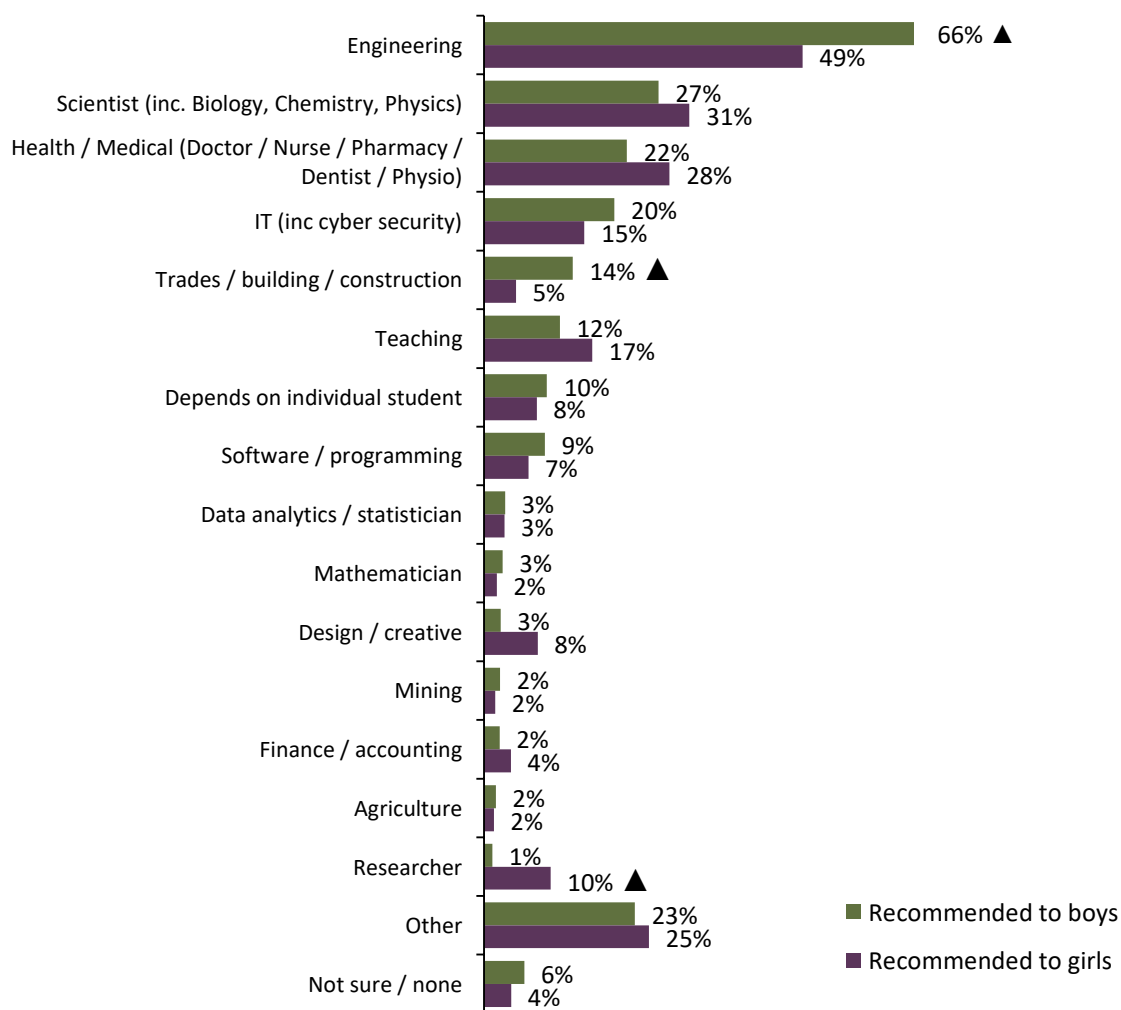
When providing STEM advice to students, advisors place the greatest emphasis on local STEM employers, the scholarships and financial support specially for women studying STEM at university, the abundance of job opportunities and the opportunities and pathways specially for women in STEM.

Advisors place less emphasis on talking about STEM related careers that pay well or that STEM-related careers provide higher levels of job security. The majority of advisors don't talk about STEM-related jobs being for people with above average intelligence.

The survey found that advisors do not provide the same STEM career suggestions to girls as they do to boys. While the top recommended roles are similar for boys and girls, advisors are more likely to recommend engineering and trades to boys, and more likely to recommend researcher to girls. This wave, inconsistent with last wave, we did not observe any significant difference in likelihood to recommend IT to boys, or health to girls, although this may be explained by the smaller base size of career advisors this wave.

Figure 44: STEM careers recommended to students.

Q. What are the top 3 STEM careers you recommend to students? (MC)



Base: unweighted wave 2 - career advisors and teachers who regularly provide career advice to girls – 83, to boys – 143.

Advisors do not provide the same STEM career suggestions to girls as they do to boys; advisors are more likely to recommend engineering and trades to boys, and research careers to girls.

Advisors' use of resources

In addition to general STEM resources, advisors were asked about their awareness and usage of five STEM websites, which specifically aim to provide information about STEM related careers. The survey found that, although the base size is low, advisors are most aware of Foundation for Young Australians, consistent with wave 1, and followed by careerswithstem. Regarding frequency of use of career-related websites, usage is directly related to awareness.

Expectations of students' future intentions

Educators expect that 43% of their senior students (years 10 to 12) will continue to university upon completion of secondary school. This has declined significantly from wave 1, where 50% expected this.

Secondly, 23% are expected to extend their studies through TAFE or other vocational education, up from 14% in wave 1. A further 23% are expected to go straight into the workforce (14% through apprenticeships), down from 27%.

There were significant differences in expectations between government schools compared with independent schools. Within government schools, the average estimate was for 50% of students to continue to university with 19% completing an apprenticeship. For independent schools, the average expectation for university as a next step was 88%, with 17% taking up an apprenticeship. In comparison, educators from Catholic schools expected 58% of their students to study TAFE / VET and only 18% to attend university.

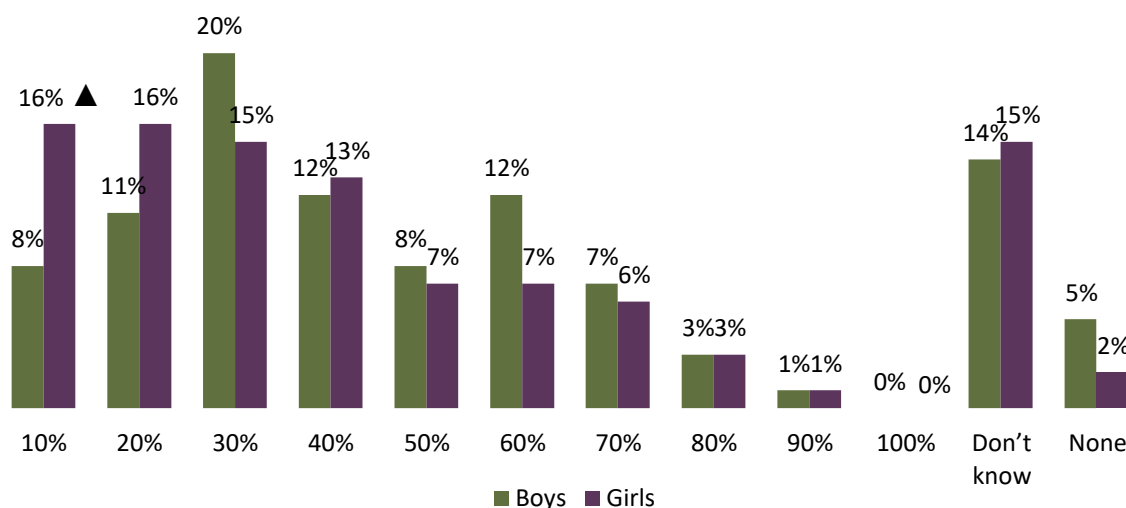
Regional differences were also evident with those outside of metropolitan areas expecting a larger proportion of their students (28%) to enter directly into the workforce or complete an apprenticeship compared with metropolitan school advisors who expect 19% of their students to go straight into employment. However, this difference is not significant.

It was also found that teachers from higher socioeconomic areas expect larger proportion of their students to go to university (50%) compared to teachers from lower socioeconomic areas (29%). On the other hand, teachers from lower socioeconomic areas expect a higher proportion of their students to attend TAFE / VET (47% vs 12%). Again, these differences are not statistically significant but indicative only.

Advisors were also asked what proportion of their students they believe are seriously considering a career in STEM. The question was asked separately of boys and girls to understand gender differences. On average, teachers and career advisors estimated that 34% of boys are considering a STEM career, compared to an average estimation of 29% for girls. This is a significant increase for girls, up from 24% in wave 1.

Figure 45: Proportion of students who are considering a STEM career.

Q. What proportion of students at your school / institution are seriously considering a career in STEM?



Average proportion of students who are considering a STEM career		
Gender	Wave 1	Wave 2
Boys	34%	33%
Girls	24%	▲ 29%

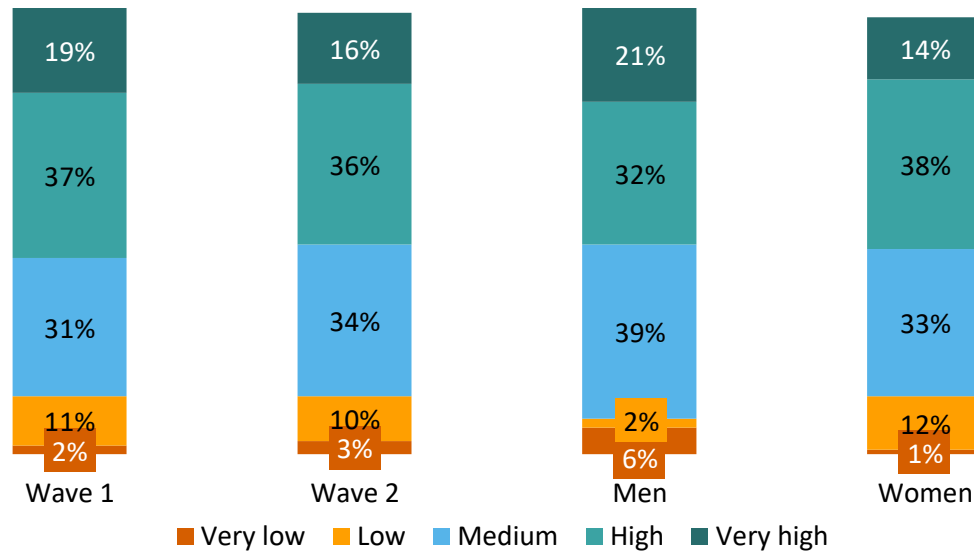
Base: unweighted career advisors and teachers who regularly provide career advice; wave 1 - advisors of boys – 207, advisors of girls – 216, wave 2 – advisors of boys – 148, advisors of girls – 142.

Advisors' ability to discuss STEM careers

Among those who provide career advice to students, 53% rate their ability to provide students with STEM pathways as high or very high, with a further 34% rating their ability as medium. Only 12% rate their ability as low or very low.

Figure 46: Self-rated ability to recommend STEM pathways to students showing an interest.

Q. How would you rate your ability to recommend STEM pathways to students showing an interest in this area?



Self-rated ability to recommend STEM pathways	Wave 1 Total	Wave 2 Total	Men	Women
Net: high / very high	55%	53%	53%	52%
Net: low / very low	12%	12%	8%	14%

Base: unweighted mentors – wave 1 – 220, wave 2 – 151, men – 38, women - 110. Weighted percentages may not add up to 100% due to rounding of decimal places to the nearest whole number.

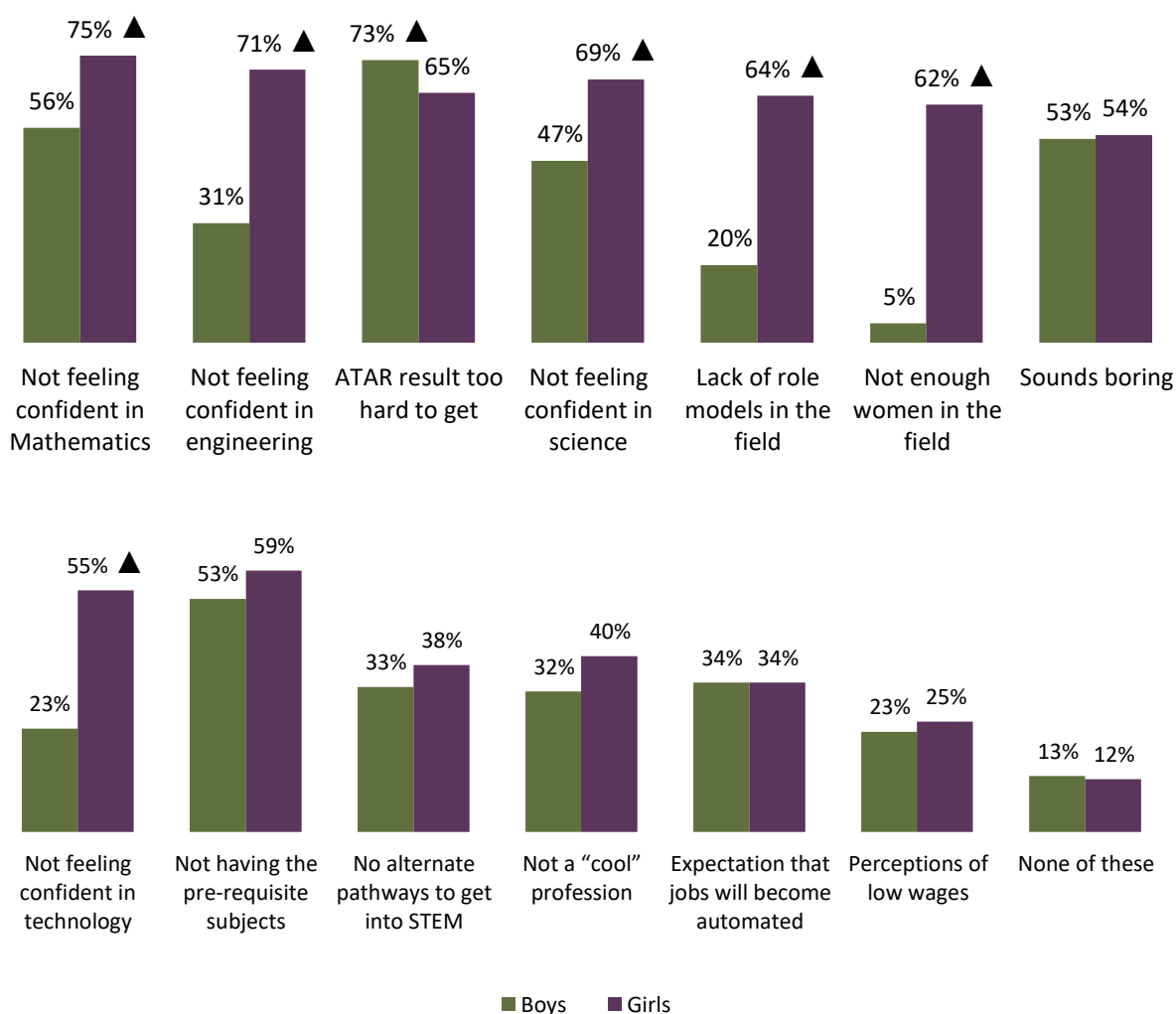
Advisors' perceptions of barriers to STEM careers

When discussing STEM careers with students, the top barriers raised by students were not feeling confident in mathematics, not feeling confident in engineering and ATAR results being too hard to get.

There are clear differences between boys and girls in the perceived barriers to a STEM career, as shown below. The most common reason for boys was that ATAR results are too hard to get, while girls are more conscious of their confidence in mathematics, engineering, science and technology.

Figure 47: Barriers to STEM careers raised by students.

Q. When having career conversations with students about a STEM career, what are some of the barriers students raise?



Base: unweighted career advisors and teachers who regularly provide career advice; wave 1 - advisors of boys – 203, advisors of girls – 215, wave 2 – advisors of boys – 141, advisors of girls – 146.

Appendix: Questionnaire

Note on accessibility: The following questionnaire is presented in the format we use online and includes programming instructions in square brackets. It also contains tables listing questionnaire items. Tables don't have header rows or alt text, and some have blank cells. Questionnaire items appear in the left column with response options in the right column/s. If you have difficulty navigating the information in this questionnaire, please contact YouthInsight at support@youthinsight.com.au

[PROGRAMMING INSTRUCTIONS PROVIDED IN RED]

[SC = Single choice question | MC = Multi choice question | OE = Open ended response required]

SECTION 1: SCREENER & VERIFICATION

Thank you for your participation in this important research. Prior to our interview, we would like you to please complete a survey about STEM education.

Your feedback to this survey, while confidential, will be used as part of our interview and we may discuss some of your answers with you to help us better understand your responses. Please tick the box below to authorise the interviewer to view your survey responses.

[] I consent to the research team viewing my individual survey responses

1. Captcha Question
2. Which of the following best describes the industry where you work in?

[ASK ALL.SC.]

Administration & Office Support	1
Advertising, Arts & Media	2
Banking & Financial Services	3
Community Services & Development	4
Design & Architecture	5
Education	6
Engineering	7
Government & Defence	8
Healthcare & Medical	9
Hospitality & Tourism	10
Human Resources & Recruitment	11
Information & Communication Technology	12
Legal	13
Manufacturing, Transport & Logistics	14
Marketing & Communications	15
Mining, Resources & Energy	16
Real Estate & Property	17
Retail & Consumer Products	18
Trades and services	19
Other	20
Unemployed	21

[SCREEN OUT IF CODE 6 NOT SELECTED.]

3. You mentioned you work in education, which of the following best describes your **main role**?

*We are aware that many teachers wear multiple hats! For this question please just nominate your **main** role.*

[ASK IF CODE 6 AT Q2.SC.]

		Soft Quota
TAFE/VET teacher/educator	1	N=50
University professor/lecturer/tutor	2	
Classroom teacher	3	N=650
Teacher support / teacher aid	4	
Career advisor	5	
Learning Support Coordinator	6	
Curriculum Coordinator	7	
Year level Coordinator	8	
Principal	9	
Assistant/Deputy principal	10	
Administration staff	11	Screen out
Other	99	Screen out

4. Which of the following are related to the education sector in Australia?

Select all that apply

[ASK ALL. MC. SCREEN OUT IF CODES 3 OR 4 SELECTED]

ACARA	1	
AITSL	2	
IB	3	
BHP	4	Screen out
ACCC	5	Screen out
ATAR	5	

SECTION 2: INTRODUCTION

Thank you. This is a research project commissioned by the federal government, to better understand teacher, school leaders and career advisors' opinions and experiences around STEM education in Australia. All data is confidential.

SECTION 3: ABOUT YOUR SCHOOL OR INSTITUTION

The first set of questions are about the school or institution where you are employed. If you work at more than one school or institution, please respond for the one you work at most regularly.

5. Please enter your school or institution's postcode

[ASK ALL. OE.]

POSTCODES WILL DETERMINE SES AREAS AND METRO/REGIONAL/REMOTE AREAS.

PUNCH LOCATION AUTOMATICALLY FROM POSTCODE DATA]

		Soft quotas
Sydney – City / Suburbs	1	32%
NSW – Regional	2	
Melbourne – City / Suburbs	3	26%
VIC – Regional	4	
Brisbane – City / Suburbs	5	20%
QLD – Regional	6	
Perth – City / Suburbs	7	11%

WA – Regional	8	
Adelaide – City Suburbs	9	7%
SA – Regional	10	
ACT	11	2%
Hobart – City/Suburbs	12	2%
TAS - Regional	13	
Darwin – City/Suburbs	14	1%
NT – Regional	15	

6. Where is your school/institution located?

[ASK ALL. SC.]

Capital city / metropolitan area	1
Regional area	2
Rural / remote area	3

7. What sector does your school operate in?

[ASK PRIMARY AND SECONDARY EDUCATORS (Q3=3-10). SC.]

		Quotas
Government	1	66%
Catholic	2	17%
Independent	3	10%
Other (specify)	98	

8. Is your school?

[ASK PRIMARY AND SECONDARY EDUCATORS. (Q3=3-10). SC]

		Quotas
Primary	1	61%
Secondary	2	14%
Combined (P-12)	3	13%
Special school	4	5%
Other (specify)	98	

9. Is your school co-ed or single sex school

[ASK PRIMARY AND SECONDARY EDUCATORS (Q3=3-10). SC]

Co-ed	1
Single sex (girls)	2
Single sex (boys)	3

10. How many students are there at your school?

[ASK PRIMARY AND SECONDARY EDUCATORS (Q3=3-10). SC]

Under 100	1
100-249	2
250-499	3
500-749	4
750 - 999	5
1,000 – 1,499	6
1,500 or more	7

11. Would you describe the education setting at your school as?

[ASK PRIMARY AND SECONDARY EDUCATORS (Q3=3-10). SC]

Mainstream	1
Specialised – School of special needs	2
Specialised – Aboriginal and Torres Strait Islander Focus	3
Specialised – Creative and performing arts	4
Specialised – Selective entry / High academic performance	5
Specialised – Sport	6
Specialised – Science and technology	7
Specialised – Agriculture	8
Other (specify)	98

12. Now, thinking about the student population at your school or institution, does your school or institution have specific support programs or assistance for any of the following
[ASK IF CODE 1 SELECTED ABOVE. MC.]

Students with disability/special needs	1
Students from Indigenous communities	2
Students with English as secondary language	3
None of these	4

13. What is the proportion of Aboriginal and/or Torres Strait Islander students within your school?

[ASK PRIMARY AND SECONDARY EDUCATORS. (Q3=3-10). SC]

Under 5%	1
5 – 10%	2
11-25%	3
26-50%	4
Over 50%	5
Don't know	99

SECTION 4: ABOUT YOU...

And now, just a few questions about you, your background and experience...

14. Which of the following do you identify as?

[ASK ALL. SC.]

Man	1
Woman	2
Non-binary	3
Prefer not to specify	4
Other (specify)	98

15. Are you of Aboriginal and/or Torres Strait Islander origin?

[ASK ALL. SC.]

Yes	1
No	2
Prefer not to specify	3

16. How long have you been working as an education professional (regardless of school or institution)?

[ASK ALL.SC.]

Less than 1 year	1
------------------	---

1 – 3 years	2
4 – 7 years	3
8 – 11 years	4
11 – 15 years	5
15 – 19 years	6
20 or more years	7

17. You mentioned that your main role as an educator is [INSERT ANSWER FROM Q3]. On what basis are you currently employed in your **main** role...?

[ASK ALL. SC]

Full-time	1
Part-time	2
Relief	3
Casual	4
Other (specify)	98

18. And what **other roles** do you also fulfil at your school or institution?

[ASK ALL TEACHERS. (Q3=3-10). EXCLUDE ROLE SELECTED EARLIER. MC]

Classroom teacher	1
Learning Support Coordinator	2
Teacher support / teacher aid	3
Career advisor	4
Curriculum Coordinator	5
Year level Coordinator	6
Principal	7
Assistant/Deputy principal	8
Other (specify)	98

19. Which year level(s) do you currently teach in your school?

[ASK ALL TEACHERS (Q3=3,4 OR Q18:1,3). MC]

Foundation	1
Year 1	2
Year 2	3
Year 3	4
Year 4	5
Year 5	6
Year 6	7
Year 7	8
Year 8	9
Year 9	10
Year 10	11
Year 11	12
Year 12	13
Other (specify)	98

[HIDDEN QUESTION:

PUNCH PRIMARY VS SECONDARY TEACHER BASED ON Q19 AND POSTCODE (DEALS WITH STATE DIFFERENCES IN YEAR LEVELS) FOR USE IN FILTERING IN LATER QUESTIONS.]

20. Which of the below subjects do you **currently teach** in your main role?

Subjects listed from the Australian Curriculum. Please select the subjects that most closely describe the subjects you teach.

[ASK SECONDARY SCHOOL TEACHERS ONLY. MC]

English as an Additional Language or Dialect	1
Essential English	2
Literature	3
General Mathematics	4 - STEM
Mathematical Methods	5- STEM
Specialist Mathematics	6- STEM
Biology	7- STEM
Chemistry	8- STEM
Earth and Environmental Science	9- STEM
Physics	10- STEM
F-6/7 HASS	11
7-10 Civics and Citizenship	12
7-10 Economics and Business	13
7-10 Geography	14 - STEM
7-10 History	15
Dance	16
Drama	17
Media arts	18
Music	19
Visual arts	20
Design and Technologies	21- STEM
Digital Technologies	22 - STEM
Personal, Social and Community Health	23
Movement and Physical Activity	24
Other (specify)	98

21. Which of these subjects have you taught in the past?

Subjects listed from the Australian Curriculum. Please select the subjects that most closely describe the subjects you teach.

[ASK SECONDARY SCHOOL TEACHERS ONLY (Q19=8-13).

EXCLUDE SUBJECTS SELECTED AT Q20. MC]

English as an Additional Language or Dialect	1
Essential English	2
Literature	3
General Mathematics	4 - STEM
Mathematical Methods	5- STEM
Specialist Mathematics	6- STEM
Biology	7- STEM
Chemistry	8- STEM
Earth and Environmental Science	9- STEM
Physics	10- STEM
F-6/7 HASS	11
7-10 Civics and Citizenship	12
7-10 Economics and Business	13
7-10 Geography	14 - STEM
7-10 History	15
Dance	16

Drama	17
Media arts	18
Music	19
Visual arts	20
Design and Technologies	21- STEM
Digital Technologies	22 - STEM
Personal, Social and Community Health	23
Movement and Physical Activity	24
Other (specify)	98

22. In your role(s) as a primary school teacher, do you specialise in any of the below subject areas?

[ASK PRIMARY SCHOOL TEACHERS ONLY. MC]

Aboriginal and Torres Strait Islander education	1
Agriculture	2
English as an Additional Language or Dialect	3
English/literacy	4
Languages	5
Mathematics/numeracy	6 - STEM
Sport	7
Science	8 - STEM
Technology	9 - STEM
Music/drama	10
STEM specialist	11 -STEM
Other (specify)	98
None of these	99

SECTION 5: UNDERSTANDING AND PERCEPTIONS ABOUT STEM & QUALIFICATIONS

Now in this next section we would like to ask you some questions about your general views around STEM. Please remember that there are no right or wrong answers and all your answers are confidential.

23. Please write below what you believe the term 'STEM' stands for.
[ASK ALL. OE]
24. In your opinion, what broader life skills does STEM education provide students?
[ASK ALL. OE. DISPLAY AS 5 INDIVIDUAL TEXT BOXES]
25. What type of jobs do you think people would be able to get if they have a STEM related degree or certificate?
[ASK ALL. OE. DISPLAY AS 5 INDIVIDUAL TEXT BOXES]

[Explanation to show on page after the above 3 questions are answered]

STEM stands for science, technology, engineering and mathematics.

In this survey, science means things like biology, chemistry, physics, and earth and environmental sciences. It doesn't include medicine, nursing, psychology or health sciences. Technology means things like information technology and programming, mechanics, electronics, and all other types of technology. Some technology courses could also be called engineering. There are many types of engineering, like aerospace and environmental engineering, and many types of mathematics, such as geometry, logic and statistics.

26. In your main role, how relevant is the teaching of STEM skills?

[ASK ALL. SC PER ROW]

	Completely irrelevant	Somewhat irrelevant	Neither relevant nor irrelevant	Somewhat relevant	Very relevant
Science skills	1	2	3	4	5
Technology skills	1	2	3	4	5
Engineering skills	1	2	3	4	5
Mathematics skills	1	2	3	4	5
STEM as an integrative set of skills	1	2	3	4	5

27. How qualified do you feel to teach STEM subjects?

[ASK IF CURRENTLY TEACH, TAUGHT STEM, STEM RELEVANT TO MAIN ROLE OR PRIMARY TEACHER. SC PER ROW]

	Very unqualified	Somewhat unqualified	Neither	Somewhat qualified	Very qualified
Science skills	1	2	3	4	5
Technology skills	1	2	3	4	5
Engineering skills	1	2	3	4	5
Mathematics skills	1	2	3	4	5
STEM as an integrative set of skills	1	2	3	4	5

28. Which of the following qualifications or experiences related to STEM did you have **prior to** working in the education sector?

[ASK ALL. MC]

Undergraduate degree related to STEM	1
Post-graduate qualification related to STEM	2
Certificate or diploma related to STEM	3
STEM subject(s) covered within a non-STEM VET / university qualification	4
Certified mentorship program	5
Career / job in STEM related field	6
Other (please specify)	98
None	99

29. Which of the following further education have you undertaken to improve your knowledge of STEM since you started working the education sector?

[ASK TEACHERS. MC. RANDOMISE ORDER.]

Read a book	1
Watched a documentary	2
Completed course outside of my professional learning time	3
STEM related magazine subscription	4
Professional learning course offered at school (e.g. professional development days)	5
Professional development activity offered by an external provider (e.g. workshops, seminars, conferences, courses)	6
Attended a conference	7
Attended a webinar	8
Looked at websites	9

Participated in university lead initiatives	10
Observed other schools/ teachers	11
Volunteering or participating in STEM related activities (i.e. citizen science)	12
Attending STEM related event	13
Placement in STEM teaching area	14
Other (specify)	98
Not taken any further education to improve my knowledge of STEM	99

30. How **confident do you feel** in teaching STEM related subjects?

[ASK ALL. SC PER ROW]

	No confidence	Low confidence	Medium confidence	High confidence
Science	1	2	3	4
Technology	1	2	3	4
Engineering	1	2	3	4
Mathematics	1	2	3	4
STEM as an integrative set of skills	1	2	3	4

31. Why do you not feel confident about teaching [insert entry if codes 1 or 2 selected]?

[ASK THOSE WHO SAID 'NOT CONFIDENT AT ALL' OR 'NOT REALLY CONFIDENT'. OE.

INSERT ONE QUESTION PER NEGATIVE RESPONSE ABOVE (CODES 1 & 2).]

32. In your opinion, **how important** is it for your students to have STEM skills in order to acquire **a good job in the future**?

[ASK ALL. SC PER ROW]

	Very unimportant	Somewhat unimportant	Neither	Somewhat important	Very important
Science skills	1	2	3	4	5
Technology skills	1	2	3	4	5
Engineering skills	1	2	3	4	5
Mathematics skills	1	2	3	4	5
STEM as an integrative set of skills	1	2	3	4	5

33. Why do you believe it's not important for students to acquire [insert entry if codes 1 or 2 selected]?

[ASK THOSE WHO SELECT "VERY UNIMPORTANT" OR "SOMEWHAT UNIMPORTANT". OE.

INSERT ONE QUESTION PER NEGATIVE RESPONSE ABOVE (CODES 1 & 2).]

34. Which of the below are STEM skills?

[ASK ALL. MC PER ROW. RANDOMISE ORDER.]

	STEM skills
Mathematics skills (STEM Skill)	1
Science skills (STEM Skill)	2
Technology skills (STEM Skill)	3
Engineering skills (STEM Skill)	4
Problem solving skills (STEM Skill)	5
Creativity skills (STEM Skill)	6
Inquiry skills (STEM Skill)	7

Design thinking skills (STEM Skill)	8
Critical thinking skills (STEM Skill)	9
Collaboration skills (STEM Skill)	10
Communications skills	11
Project Management Skills	12
Hand-eye Coordination skills	13
Unsure	99

35. Below is a list of statements of how STEM is currently presented to young people in the media (e.g. in television, social media, books etc.). Please indicate how much you agree or disagree with the following statements.

[ASK ALL. SC PER ROW. RANDOMISE ROW ORDER.]

	Strongly disagree	Slightly disagree	Neither	Slightly Agree	Strongly agree
Generally, STEM is presented in a positive manner in the media	1	2	3	4	5
The media portrays it as more important than it actually is	1	2	3	4	5
All four STEM areas of study are equally presented in the media	1	2	3	4	5
There are conflicting messages in the media about the importance of STEM skills	1	2	3	4	5
It's not really presented in the media at all	1	2	3	4	5
The media portrays more men as STEM role models	1	2	3	4	5
There are more men experts than women experts available for media interviews	1	2	3	4	5
There is a lack of women role models in STEM	1	2	3	4	5
There is too much emphasis on getting girls into STEM	1	2	3	4	5
The media portrayal of STEM is very stereotypical (i.e. white lab coats)	1	2	3	4	5

36. Below is a list of statements about STEM skills and how they translate into future jobs/careers. How much do agree with each of these statements?

[ASK ALL. SC PER ROW. RANDOMISE ROW ORDER.]

	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree
STEM skills will provide job security to future workers	1	2	3	4
There are many STEM related jobs currently available for graduates	1	2	3	4

The number of jobs requiring STEM skills is growing	1	2	3	4
STEM related careers are more suited to boys than girls	1	2	3	4
STEM skills are important for the Australian economy	1	2	3	4
It is easier to engage boys with STEM subjects than other subject areas	1	2	3	4
It is easier to engage girls with STEM subjects than other subject areas	1	2	3	4
Boys and girls have the same career opportunities in STEM fields	1	2	3	4
Interest in STEM is cultivated from a young age	1	2	3	4
STEM skills are applied in everyday life	1	2	3	4
STEM skills are important when considering employment opportunities	1	2	3	4
Boys have a better chance to succeed in a STEM career compared to girls	1	2	3	4
Girls have a better chance to succeed in a STEM career compared to boys	1	2	3	4
STEM skills will provide job security to future workers	1	2	3	4

36a. How, if at all, has COVID-19 influenced how likely you would be to encourage students to study or work in the following STEM areas in the future?

[ASK ALL. SC PER ROW.]

COVID-19 has made me...	Science	Technology	Engineering	Mathematics
Much more likely to encourage	1	1	1	1
Slightly more likely to encourage	2	2	2	2
Has not impacted this	3	3	3	3
Slightly less likely to encourage	4	4	4	4
Much less likely to encourage	5	5	5	5

36b. How, if at all, has COVID-19 influenced how interested your students are in STEM and STEM careers?

[ASK ALL. SC PER ROW.]

COVID-19 has made my students...	Science	Technology	Engineering	Mathematics
Much more interested	1	1	1	1
Slightly more interested	2	2	2	2
Has not impacted this	3	3	3	3
Slightly less interested	4	4	4	4

Much less interested	5	5	5	5
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36c. To what extent, if at all, has COVID-19 and the associated lockdowns and online learning modes impacted students' learning on the following STEM topics?

[ASK ALL. SC PER ROW.]

COVID-19 has made a...	Science	Technology	Engineering	Mathematics
Very negative impact	1	1	1	1
Somewhat negative impact	2	2	2	2
Has not impacted this	3	3	3	3
Somewhat positive impact	4	4	4	4
Very positive impact	5	5	5	5

37. How essential do you think STEM skills are to the following careers?

[ASK ALL. SC PER ROW. RANDOMISE ORDER. SPLIT SAMPLE TO ONLY SHOW 10 CAREERS.]

	Must have STEM skills for this job	May require some STEM skills for this job	Do not require STEM skills for this job
Accountant	1	2	3
Architect	1	2	3
Clerical and administration (office support)	1	2	3
Corporate management	1	2	3
Economist	1	2	3
Farmer	1	2	3
Labourer	1	2	3
Machinery operator	1	2	3
Pharmacist	1	2	3
Teacher	1	2	3
Advertising or marketing consultant	1	2	3
Banker or finance	1	2	3
Computing or information technology (IT)	1	2	3
Data analyst	1	2	3
Emergency services (police, fire or ambulance)	1	2	3
Entrepreneur	1	2	3
Lawyer	1	2	3
Nurse	1	2	3
Public servant (includes Defence Force - Army, Airforce, Navy)	1	2	3
Trade worker (mechanic, electrician, carpenter)	1	2	3

38. Who do you believe is more confident in the following subjects?

[ASK ALL. SC PER ITEM. RANDOMISE ORDER]

	Boys are much more confident	Boys are a bit more confident	Boys and girls are equally confident	Girls are a bit more confident	Girls are much more confident
Mathematics	1	2	3	4	5
Science	1	2	3	4	5
Technology	1	2	3	4	5
Engineering	1	2	3	4	5
Arts	1	2	3	4	5
Social science	1	2	3	4	5
English	1	2	3	4	5
Sport	1	2	3	4	5

39. Of these jobs, which ones do you think are more for men, more for women or for both?

[ASK ALL. SC PER ITEM. SPLIT SAMPLE TO ONLY SHOW 10 CAREERS.]

	Strongly men	Moderately men	Slightly men	Neither men nor women	Slightly women	Moderately women	Strongly women
Accountant	-1	-2	-3	0	1	2	3
Architect	-1	-2	-3	0	1	2	3
Clerical and administration (office support)	-1	-2	-3	0	1	2	3
Corporate management	-1	-2	-3	0	1	2	3
Economist	-1	-2	-3	0	1	2	3
Farmer	-1	-2	-3	0	1	2	3
Labourer (construction, grounds maintenance, factory worker)	-1	-2	-3	0	1	2	3
Machinery operator	-1	-2	-3	0	1	2	3
Pharmacist	-1	-2	-3	0	1	2	3
Teacher	-1	-2	-3	0	1	2	3
Advertising or marketing consultant	-1	-2	-3	0	1	2	3
Banker or finance	-1	-2	-3	0	1	2	3
Computing or information technology (IT)	-1	-2	-3	0	1	2	3
Data analyst	-1	-2	-3	0	1	2	3
Emergency services (police, fire or ambulance)	-1	-2	-3	0	1	2	3
Entrepreneur	-1	-2	-3	0	1	2	3
Lawyer	-1	-2	-3	0	1	2	3
Nurse	-1	-2	-3	0	1	2	3

Public servant (includes Defense Force - Army, Airforce, Navy)	-1	-2	-3	0	1	2	3
Trade worker (mechanic, electrician, carpenter)	-1	-2	-3	0	1	2	3

40. Women currently hold a smaller portion of the science and engineering faculty positions at top research universities than men. The following factors are sometimes offered as reasons for this difference.

How valid do you think the following reasons are for explaining this difference?

[ASK ALL. SC PER ITEM]

	Not at all valid	Somewhat valid	Mostly valid	Completely valid
There is a greater proportion of men than women with the very highest levels of math ability.	1	2	3	4
On average, men and women differ in their willingness to devote the time required by such "high-powered" positions.	1	2	3	4
On average, men and women differ naturally in their scientific interest.	1	2	3	4
On average, men and women differ in their willingness to spend time away from their families.	1	2	3	4
Boys and girls tend to receive different levels of encouragement for developing scientific interest.	1	2	3	4
On average, whether consciously or unconsciously, men are favoured in hiring and promotion.	1	2	3	4
On average, women have to take longer career breaks due to childcare responsibilities, compared to men	1	2	3	4

41. How much emphasis does your school or institution put into the teaching of STEM?

[ASK THOSE IN SCHOOLS. SC]

No emphasis at all	1
Some emphasis, but not much	2
Quite a bit of emphasis	3
A lot of emphasis	4

42. What do you think are the barriers to schools placing an emphasis on the teaching of STEM?

[ASK THOSE IN SCHOOLS. SC]

Not enough qualified teachers	1
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School focus is in other areas	2
Budget constraints	3
Its slowly moving in that direction, but not there yet	4
Timetabling issues	5
Need to focus on single subjects that lead into exam subjects in senior years	6
Lack of STEM resources	7
Resistance to change	8
Other (specify)	98

SECTION 6: STUDENT ATTITUDE AND ENGAGEMENT - GENDER DIFFERENCES

[ONLY TO BE ASKED TO TEACHERS THAT TEACH STEM SUBJECTS OR TEACHING STEM IS RELEVANT FOR MAIN ROLE]

In the next few questions, we would like to ask you a few questions about the general performance of your boys/men and girls/women students in STEM subjects. We understand that there will be a wide range of differences among your students, but for these questions we'd like you to think of the average performance of your students.

43. What proportion of your students would you place in the categories below based on their attitudes towards STEM education?

[CONSTANT SUM. MUST ADD TO 100%.]

	Boys/Men	Girls/Women
Love it	1	1
Like it	2	2
Indifferent	3	3
Dislike it	4	4
Hate it	5	5

44. What would help you to improve the attitudes of your female students towards STEM?

SECTION 7: ABORIGINAL AND/OR TORRES STRAIT ISLANDER DEEP DIVE

You mentioned earlier that more than 10% of students at you school or institution identify as Aboriginal and/or Torres Strait Islander.

45. Do you encounter additional challenges engaging Aboriginal and Torres Strait Islander students with STEM subjects compared with other students?

[ASK IF 10+% OF STUDENTS IDENTIFY AS ABORIGINAL AND/OR TORRES STRAIT ISLANDER, IF CURRENTLY TEACH STEM OR HAVE TAUGHT IN THE PAST. SC]

A lot of additional challenges	1
A few additional challenges	2
About the same as everyone else	3
A few less challenges	4
A lot less challenges	5

46. What is your strategy for engaging Aboriginal and Torres Strait Islander students with STEM subjects? Is this different to other student groups or the same?

[ASK IF 10+% OF STUDENTS IDENTIFY AS ABORIGINAL AND/OR TORRES STRAIT ISLANDER. OE.]

47. Are there specific challenges you face engaging Aboriginal and/or Torres Strait Islander girls/women with STEM?
 [ASK IF 10+% OF STUDENTS IDENTIFY AS ABORIGINAL AND/OR TORRES STRAIT ISLANDER. OE.]

SECTION 6: APPROACH TO TEACHING STEM

In this next section we would like to ask you some questions about your interactions with students around STEM and your perceptions regarding their engagement with STEM.

48. How frequently do you have conversations about STEM with your students separate to the delivery of STEM curriculum?

This could be general discussions about future employment skills, soft skills such as problem solving and critical thinking, STEM stories in the media (e.g. vaccines, face masks), real world applications of science or specifically about discipline specific skills (Science, Technology, Engineering and Mathematics).

[ASK ALL. SC]

Everyday	1
A few times a week	2
At least once a week	3
A few times a month	4
At least once a month	5
A few times a semester	6
At least once a semester	7
A few times a year	8
At least once a year	9
Less often than once a year	10

49. How confident are you to connect STEM content with relevant, real-world applications and career examples?

[ASK ALL. SC]

Very confident	1
Somewhat confident	2
Somewhat not confident	3
Not confident at all	4

SECTION 7: STEM RESOURCES

In the next set of questions we'd like to ask you about STEM specific teaching resources.

50. Below is a list of STEM resources. Please select which of the following you've heard of before.

[ASK ALL. MC]

STEM Education Resources Toolkit	1
Scootle	2
Teachers pay teachers	3
Khan Academy	4
Scienceweb	5
Aussie Educator	6

Oresomeresources	7
STELR	8
Teacher Superstore	9
Digital Technologies Hub	10
Girls in STEM Toolkit	11
Careers with STEM magazine	12
STARportal	13
STEM Women website	14
STEM Career Guide (GradAustralia)	15
Primary Connections	16
Science By Doing	17
None of these	99

51. And which of the following have you used before?
 [ASK THOSE WHO SELECTED AN OPTION AT PREVIOUS QUESTION. MC.
 PIPE RESOURCES SELECTED ABOVE.]

None of these	99
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52. How useful did you find the STEM resources that you have used?
 [ASK ALL. SC PER ROW]

	Not useful	Somewhat useful	Very useful
[PIPE RESOURCES SELECTED AT PREVIOUS QUESTION]	1	2	3

53. Which of the following activities/events does your school/institution participate in?

CSIRO STEM Professionals in Schools	1
National Science Week	2
Science/Math Olympiads	3
Australian Mathematics Competition	4
Australian Science Competition	5
National Youth Science Forum	6
Science Fair	7
Maker Space	8
Questacon Science Circus	9
Other Science competitions/contests	10
Science Experience	11
Other:	12
None of these	99

54. How effective do you believe these programs ([AT Q57]) are at influencing students to choose elective STEM subjects or advanced STEM subjects in senior levels?
 [ASK ALL. SC.]

Very effective	1
Quite effective	2
Somewhat effective	3
Not effective	4
Don't know	5

55. How effective do you believe these programs (AT Q57)) are at increasing student interest in STEM careers?

[ASK ALL. SC.]

Very effective	1
Quite effective	2
Somewhat effective	3
Not effective	4
Don't know	5

SECTION 8: CAREER COUNSELLOR SECTION

56. In your experience as an educator, how often do you provide career advice to your students?

[ASK ALL HIGH SCHOOL EDUCATORS EXCEPT FOR CAREER COUNSELLORS]

Weekly	1
Fortnightly	2
Monthly	3
At least once per term	4
Less often	
Never	

[EDUCATORS WHO SELECTED CODES 1-3 ABOVE = MENTORS]

57. In your experience and to the best of your recollection, what proportion of students from each year level do you provide personalised career advice to in a school year?

[ASK CAREER COUNSELLORS IN HIGH SCHOOLS ONLY. OE – PERCENTAGE ENTRY]

Year levels	%
Year 7	1
Year 8	2
Year 9	3
Year 10	4
Year 11	5
Year 12	6
N/A	7

58. Thinking about your senior students from year 10 to 12, to the best of your knowledge what proportion are considering the following after high school?

[ASK CAREER COUNSELLORS IN HIGH SCHOOLS. OE – PERCENTAGE ENTRY]

Post school options	%
University	1
TAFE/VET	2
Apprenticeships	3
Employment	4
Other (specify)	5
Don't know	6

59. What proportion of students at your school/institution are seriously considering a career in STEM?

[ASK CAREER COUNSELLORS AND MENTORS. SC PER COLUMN. DISPLAY AS DROP DOWN.]

	Boys/Men	Girls/Women
None	1	1
10%	2	2
20%	3	3

30%	4	4
40%	5	5
50%	6	6
60%	7	7
70%	8	8
80%	9	9
90%	10	10
100%	11	11
Don't know	99	99

60. How would you rate your ability to explain what different STEM careers involve? What the people in those careers do?

[ASK ALL. MC.]

Very high	1
High	2
Medium	3
Low	4
Very low	5

61. How would you rate your ability to recommend STEM pathways to students showing an interest in this area?

[ASK CAREER COUNSELLORS AND MENTORS. MC.]

Very high	1
High	2
Medium	3
Low	4
Very low	5
Not applicable	99

62. When discussing skills and careers opportunities with students, where do you place yourself on the scale below.

[ASK ALL. SC. DISPLAY AS SLIDER TYPE QUESTION.]

STEM skills are important to everyone, no matter what job you plan to do	...	STEM skills are only important if you're going into a STEM career
1	2,3,4,5,6,7,8,9	10

63. When having career conversations with students about a STEM career, what are some of the barriers students raise?

[ASK CAREER COUNSELLORS AND MENTORS. MC.]

	Boys/Men	Girls/Women	Not applicable
ATAR result too hard to get	1	1	1
Not enough women in the field	2	2	2
Expectation that jobs will become automated	3	3	3
Sounds boring	4	4	4
No alternate pathways to get into STEM	5	5	5
Not having the pre-requisite subjects	6	6	6
Not feeling confident in Mathematics	7	7	7
Not feeling confident in science	8	8	8

Not feeling confident in technology	9	9	9
Not feeling confident in engineering	10	10	10
Not a “cool” profession	11	11	11
Perceptions of low wages	12	12	12
Lack of role models in the field	13	13	13

64. When speaking to students about STEM related careers, how much do you emphasise the following points?

[ASK CAREER COUNSELLORS. SC PER ROW.]

	Don't even talk about it	I talk about it, but don't emphasise it	Somewhat emphasise	Strongly emphasise
There are many job opportunities in this area for graduates	1	2	3	4
STEM related careers pay well	1	2	3	4
STEM related careers provide higher levels of job security	1	2	3	4
There are lots of opportunities for on the job training with STEM careers	1	2	3	4
STEM related jobs are for people with above average intelligence	1	2	3	4
Provide examples of real employers in this area	1	2	3	4
There are alternate pathways to STEM outside of University	1	2	3	4
There are many opportunities and pathways specially for women in STEM	1	2	3	4
There are many scholarships and other financial support specially for women studying STEM at university	1	2	3	4

65. What is your awareness and use of each the following STEM careers websites?

[ASK CAREER COUNSELLORS. SC PER ROW.]

	Never heard of it	Heard of it don't use it	Use infrequently	Use regularly
https://www.thegist.edu.au/	1	2	3	4
https://thefootnotes.com.au/	1	2	3	4
https://careerswithstem.com.au/	1	2	3	4
https://careers.amsi.org.au/	1	2	3	4
Foundation for Young Australians (fya.org.au)	1	2	3	4

66. What are the top 3 STEM careers you recommend to students and why?

[ASK CAREER COUNSELLORS AND MENTORS. DISPLAY AS TEXT BOX GRID. ONE COLUMN FOR BOYS AND ONE COLUMN FOR GIRLS.]

67. _____
 68. _____
 69. _____