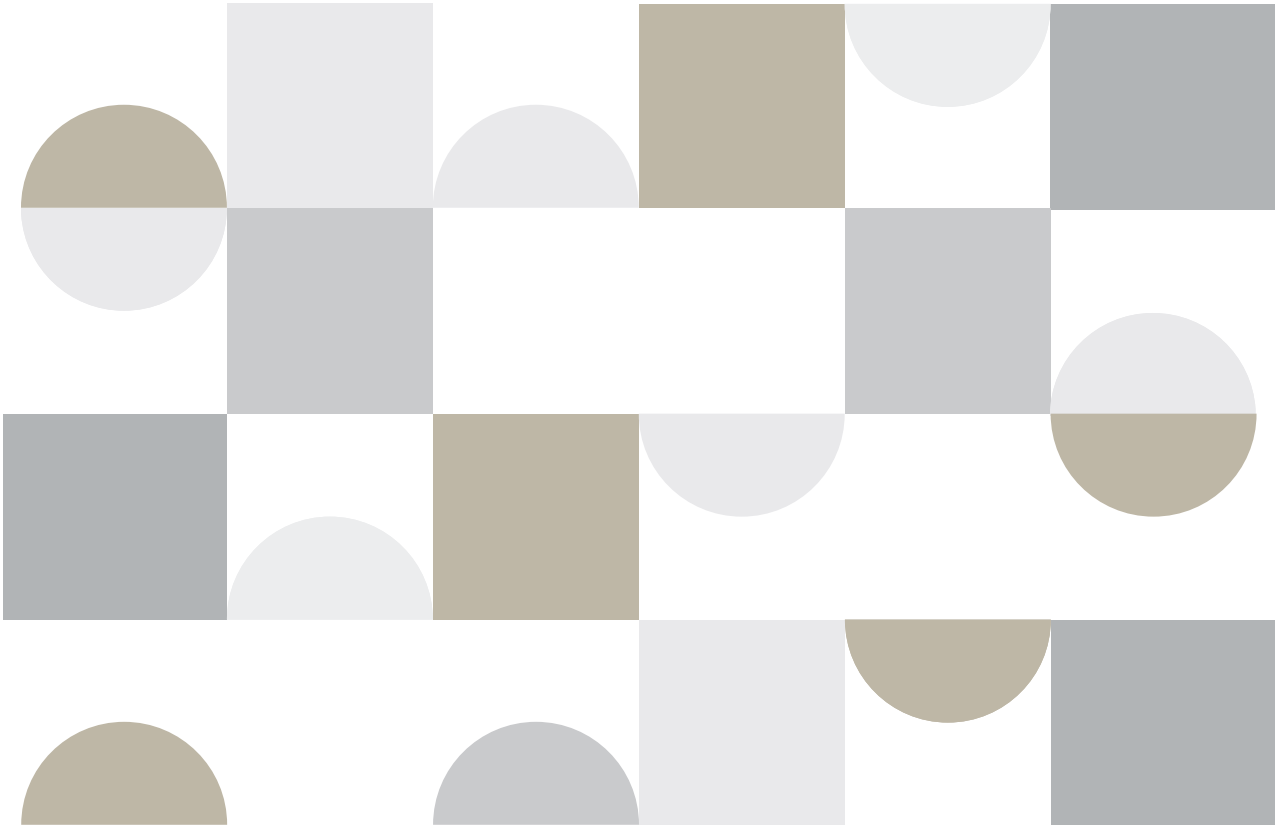
Australian Government

STEM Equity Monitor

Data report 2023



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STEM Equity Monitor ISSN: 2652-5321 (Online)

Disclaimer

Acknowledgements

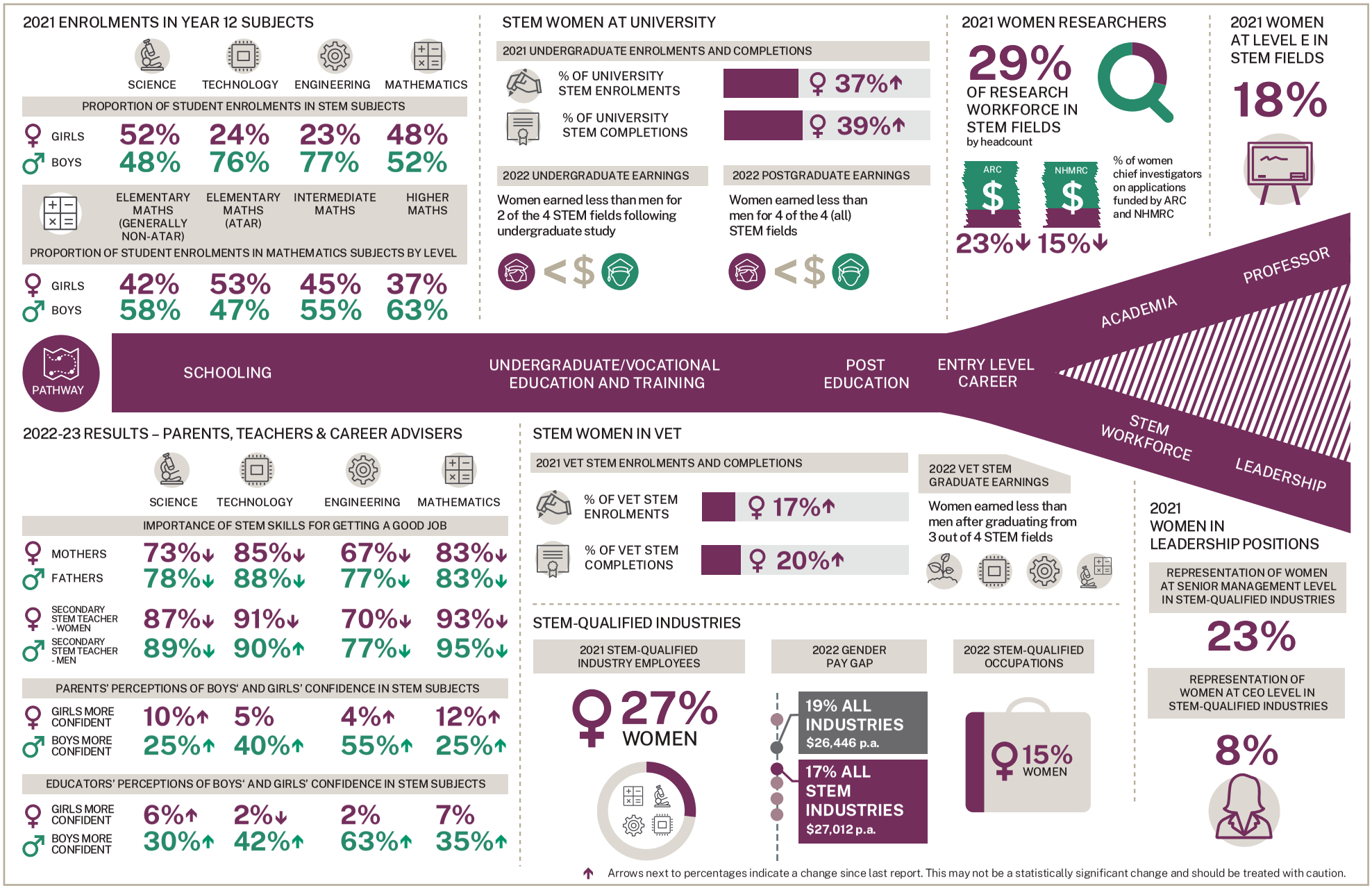
This report was prepared by the Department of Industry, Science and Resources.

The department would like to thank the following agencies, departments and other organisations who contributed data for the *STEM Equity Monitor*.

- Australian Antarctic Division (AAD)
- Australian Bureau of Statistics (ABS)
- Australian Curriculum, Assessment and Reporting Authority (ACARA)
- Australian Centre for International Agricultural Research (ACIAR)
- Australian Institute of Marine Science (AIMS)
- Australia's Nuclear Science and Technology Organisation (ANSTO)
- Australian Public Service Commission (APSC)
- Australian Research Council (ARC)
- Bureau of Meteorology (BoM)
- Commonwealth Scientific and Industrial Research Organisation (CSIRO)
- Department of Education
- Defence Science and Technology Group (DSTG)
- Geoscience Australia (GA)
- National Centre for Vocational Education Research (NCVER)
- National Health and Medical Research Council (NHMRC)
- Organisation for Economic Co-operation and Development (OECD)
- Social Research Centre
- YouthInsight
- Workplace Gender Equality Agency (WGEA)

We would also like to thank:

- the Office of the Chief Scientist
- Australia's Women in STEM Ambassador
- case study participants
- all those who contributed support and advice to the development of the monitor.


2021 ENROLMENTS IN YEAR 12 SUBJECTS
SCIENCE
TECHNOLOGY
ENGINEERING
MATHEMATICS
PROPORTION OF STUDENT ENROLMENTS IN STEM SUBJECTS
GIRLS 52% 24% 23% 48%
BOYS 48% 76% 77% 52%
ELEMENTARY MATHS (GENERALLY NON-ATAR)
ELEMENTARY MATHS (ATAR)
INTERMEDIATE MATHS
HIGHER MATHS
PROPORTION OF STUDENT ENROLMENTS IN MATHEMATICS SUBJECTS BY LEVEL
GIRLS 42% 53% 45% 37%
BOYS 58% 47% 55% 63%
STEM WOMEN AT UNIVERSITY
2021 UNDERGRADUATE ENROLMENTS AND COMPLETIONS
% OF UNIVERSITY STEM ENROLMENTS
♀ 37%↑
% OF UNIVERSITY STEM COMPLETIONS
♀ 39%↑
2022 UNDERGRADUATE EARNINGS
Women earned less than men for 2 of the 4 STEM fields following undergraduate study
2022 POSTGRADUATE EARNINGS
Women earned less than men for 4 of the 4 (all) STEM fields
2021 WOMEN RESEARCHERS
29%
OF RESEARCH WORKFORCE IN STEM FIELDS
by headcount
ARC
NHMRC
% of women chief investigators on applications funded by ARC and NHMRC
23%↓ 15%↓
2021 WOMEN AT LEVEL E IN STEM FIELDS
18%
PATHWAY
SCHOOLING
UNDERGRADUATE/VOCATIONAL EDUCATION AND TRAINING
POST EDUCATION
ENTRY LEVEL CAREER
ACADEMIA
PROFESSOR
STEM WORKFORCE
LEADERSHIP
2022-23 RESULTS – PARENTS, TEACHERS & CAREER ADVISERS
SCIENCE
TECHNOLOGY
ENGINEERING
MATHEMATICS
IMPORTANCE OF STEM SKILLS FOR GETTING A GOOD JOB
MOTHERS 73%↓ 85%↓ 67%↓ 83%↓
FATHERS 78%↓ 88%↓ 77%↓ 83%↓
SECONDARY STEM TEACHER - WOMEN 87%↓ 91%↓ 70%↓ 93%↓
SECONDARY STEM TEACHER - MEN 89%↓ 90%↑ 77%↓ 95%↓
PARENTS' PERCEPTIONS OF BOYS' AND GIRLS' CONFIDENCE IN STEM SUBJECTS
GIRLS MORE CONFIDENT 10%↑ 5% 4%↑ 12%↑
BOYS MORE CONFIDENT 25%↑ 40%↑ 55%↑ 25%↑
EDUCATORS' PERCEPTIONS OF BOYS' AND GIRLS' CONFIDENCE IN STEM SUBJECTS
GIRLS MORE CONFIDENT 6%↑ 2%↓ 2% 7%
BOYS MORE CONFIDENT 30%↑ 42%↑ 63%↑ 35%↑
STEM WOMEN IN VET
2021 VET STEM ENROLMENTS AND COMPLETIONS
% OF VET STEM ENROLMENTS
♀ 17%↑
% OF VET STEM COMPLETIONS
♀ 20%↑
2022 VET STEM GRADUATE EARNINGS
Women earned less than men after graduating from 3 out of 4 STEM fields
STEM-QUALIFIED INDUSTRIES
2021 STEM-QUALIFIED INDUSTRY EMPLOYEES
♀ 27% WOMEN
2022 GENDER PAY GAP
19% ALL INDUSTRIES $26,446 p.a.
17% ALL STEM INDUSTRIES $27,012 p.a.
2022 STEM-QUALIFIED OCCUPATIONS
♀ 15% WOMEN
2021 WOMEN IN LEADERSHIP POSITIONS
REPRESENTATION OF WOMEN AT SENIOR MANAGEMENT LEVEL IN STEM-QUALIFIED INDUSTRIES
23%
REPRESENTATION OF WOMEN AT CEO LEVEL IN STEM-QUALIFIED INDUSTRIES
8%
↑ Arrows next to percentages indicate a change since last report. This may not be a statistically significant change and should be treated with caution.

STEM Equity Monitor data report

The STEM Equity Monitor (the monitor) is an annual national data resource of girls' and women's participation in science, technology, engineering and mathematics (STEM). It also includes some data for other underrepresented groups in STEM.

This data report summarises the main points of the 2023 edition of the monitor. The online version of the monitor has more detailed data insights and interactive charts.

The monitor presents the current state of gender equity in STEM in Australia. It can be used for further analysis, including measuring changes and trends over time in key sectors and career phases of girls' and women's engagement with STEM.

The monitor follows girls' and women's participation pathway in STEM through:

- schooling
- higher education
- graduate outcomes
- the workforce.

STEM definitions and gender data labels

The monitor defines STEM as science, technology, engineering and mathematics. It uses the education fields defined by the Australian Standard Classification of Education (ASCED). This is consistent with the *Australia's STEM workforce* report (Office of the Chief Scientist 2020).

The monitor also matches education fields to research fields from the Australian and New Zealand Standard Research Classification (ANZSRC). It considers an occupation or industry to be STEM-qualified if the majority of people in the occupation or industry reported a STEM qualification in the 2021 *Census of Population and Housing* (ABS 2022).

However, the monitor recognises that STEM-qualified graduates work in wide range of sectors, including health fields. The monitor does not include health in its definition of STEM but recognises it as a closely related field that people with STEM qualifications may enter. The full web version of the monitor lets users combine health and STEM data for results on STEMM – science, technology, engineering, mathematics and medicine.

The terms 'women' and 'men' (and 'girls' and 'boys' for minors) include cisgender (someone whose gender corresponds to their birth sex), transgender, non-binary and intersex people who identify as women/girls or men/boys. Some data may have been collected and recorded by sex. However, consistent with the *Australian Government guidelines on the recognition of sex and gender* the terms 'gender', 'women' and 'men' are used throughout the monitor.

Data interpretation and methodology

The monitor collects data from a range of sources and applies a common STEM definition. Each section highlights areas of interest and high-level observations from the data.

Data custodians have used different methods to generate the data at each stage of the pathway (for example, surveys, Census responses and count data). This means data should not be compared between sections.

If you want to use data from the monitor to analyse changes and trends over time, you should:

- consider the original data generation method
- apply appropriate statistical techniques where necessary.

No significance testing has been carried out on data unless otherwise indicated.

See the methodology section of the online monitor for our full methodology of classifying into a standard STEM definition, as well as a list of sources and definitions.

STEM and gender definition references

Australian Bureau of Statistics (ABS) (2022) *Census of Population and Housing*, ABS, Australian Government, accessed 16 November 2022.

Attorney General's Department (2015) *Australian government guidelines on the recognition of sex and gender*, AGD, Australian Government, accessed 13 January 2022.

Office of the Chief Scientist (2020) *Australia's STEM workforce*, OCS, Australian Government, accessed 13 January 2022.

Schooling

Attitudes and perceptions towards STEM

Confidence and interest in STEM develops at a young age and can be influenced by many factors. Understanding the perceptions and attitudes to STEM of key influencers, such as parents and educators, will help inform how to further support girls and women to engage in STEM and consider STEM careers.

We commissioned YouthInsight to survey approximately 1,500 parents and 700 educators on their attitudes and perceptions toward STEM.

Key data from YouthInsight's 2022–23 STEM Influencers Survey

Effect of COVID-19

In 2022–23 parents were asked, for the first time, if COVID-19 influenced how likely they would be to encourage their child to study or work in each STEM area. Technology had the highest likelihood, with 51% of parents saying COVID-19 made them more likely to encourage their child to study or work in technology. Other STEM areas had 41% likelihood or lower.

STEM importance

Most parents (90%) agreed that a STEM-skilled workforce is important for the Australian economy. While this was slightly less than the previous STEM influencer survey in 2020–21 (which saw 92% agreement), the difference was not significant.

In the 2022–23 survey, a lower proportion of parents agreed that their child needed the following skills to get a good job in future:

- STEM as a general set of skills (81% in 2022–23, down from 86% in 2020–21)
- science skills (76% in 2022–23, down from 81% in 2020–21)
- engineering skills (72% in 2022–23, down from 75% in 2020–21)
- mathematics skills (83% in 2022–23, down from 89% in 2020–21)

The proportion of parents who thought technology skills were important for future employment did not change significantly (87% in 2022–23, down from 89% in 2020–21).

98% of all educators, irrespective of whether they teach STEM subjects or not, agreed that STEM skills are important for the Australian economy. 89% also thought these skills will help provide job security for future workers. These results have no statistically significant differences to the previous educators' survey in 2020–21.

Most educators saw STEM as an integrated set of skills, with all 4 STEM areas important for getting a good job. These results are similar to the 2020–21 survey outcomes.

- 58% said technology skills are very important.
- 48% said mathematics skills are very important.
- 33% said science skills are very important.
- 22% said engineering skills are very important.

STEM engagement

80% of parents said they had a general interest in STEM, with technology (81%) and science (77%) the most popular subjects. This is slightly higher than in 2020–21, but the changes are not statistically significant.

Almost half of all parents (47%) reported having at least weekly discussions with their children about STEM topics. There were no significant differences in weekly conversations about STEM topics among fathers compared to mothers, or parents of boys compared to parents of girls.

However, there have been changes among these groups since the last survey. Weekly conversations have increased significantly for mothers (46%, up from 38% in 2020–21) and parents of girls (48%, up from 42%). Meanwhile there were no significant differences for fathers (48%, down from 51%) or parents of boys (46%, down from 47%).

For educators across all teaching settings, 90% of men felt qualified to teach at least one STEM topic, compared to 83% of women. Across all teaching settings and STEM subject areas, educators felt least qualified to teach engineering, with only 30% saying they feel qualified to teach this subject.

Key data from YouthInsight's 2021–22 Youth in STEM survey

Australia's 2021–22 Youth in STEM survey by YouthInsight explored young people's awareness and perceptions of STEM subjects and careers. This was a survey of approximately 3,100 young people aged between 12 and 25 years.

Interest in STEM

Science was the most interesting STEM subject for girls in 2021–22.

- 62% of girls were interested in science in 2021–22, compared to 61% in 2019–20.
- 64% of boys were interested in science in 2021–22, compared to 63% in 2019–20.

Girls were least interested in engineering.

- 31% of girls were interested in engineering in 2021–22, compared to 30% in 2019–20.
- 56% of boys were interested in engineering in 2021–22, compared to 57% in 2019–20.

Confidence in STEM

Girls' confidence in all STEM subjects fell as they got older.

One exception was an increase in confidence in mathematics within the 14–17 years age range (71% compared to 57% for 12–13 years), before a decline from age 18 onward.

The following table shows girls' confidence in STEM subjects at different ages:

Subject	12–13 years	14–17 years	18–21 years	22–25 years
Science	65%	67%	63%	55%
Technology	68%	56%	56%	56%
Engineering	51%	30%	27%	27%
Mathematics	57%	71%	56%	50%

Source: YouthInsight (2021)

Importance of STEM knowledge for jobs

Girls considered technology and mathematics to be essential life skills. This was consistent with the survey results from 2019–20.

- Technology was the most important subject for girls, with 83% of girls considering it important, compared with 85% of boys.
- Despite an increase in positive responses since the previous survey, engineering remained the least important subject for girls. Just 56% of girls thought it was important, compared with 69% of boys.

Intention to study STEM in the future

Consistent with the 2019–20 survey, girls in Years 6 to 8 in 2021–22 were less likely than boys to choose STEM elective subjects in the future (59% compared to 79%).

In years 9 and 10, the likelihood of choosing specific STEM electives was skewed by gender. Girls were significantly more likely to choose biology and chemistry. Boys were significantly more likely to choose:

- physics
- design and technology
- information and digital technology
- industrial technology
- engineering

These differences have remained consistent over time.

Reasons for not studying STEM in the future

Girls were more likely than boys to list lack of interest as a barrier to studying STEM. This was more noticeable in the higher education cohort.

- 72% of primary and secondary school girls (ages 12–17) compared to 70% of boys.
- 70% of girls in the higher education age group (18–25) compared to 53% of boys.

Aspirations for a STEM career in the future

Girls were half as likely as boys to aspire to a career in STEM. 21% of girls wanted a STEM career compared to 42% of boys.

NAPLAN numeracy results

In 2022, girls' and boys' mean NAPLAN numeracy scores decreased for all year levels compared to 2021.

The decreases were similar between girls and boys, especially in years 5 and 7. Mean scores decreased slightly more for girls in year 3 and boys in year 9.

Mean numeracy scores in 2022 were closest in Tasmania, with boys scoring 6 points higher than girls when averaged across all year levels. They were furthest apart in Victoria, where boys scored 14 points higher than girls when averaged across all year levels.

Between 93% and 96% of girls at each year level scored at or above the minimum standard in numeracy in 2022. These proportions were 2 percentage points higher than boys in years 7 and 9, and the same as boys in years 3 and 5.

Across all year levels, a smaller percentage of girls than boys achieved at or above the highest band usually achieved in their year group. This is consistent with the 2021 NAPLAN numeracy results.

Year 12 enrolments

The number of enrolments in year 12 STEM subjects increased between 2020 and 2021 for both girls (up 1,529 enrolments or 0.9%) and boys (up 1,238 enrolments or 0.7%). In contrast, the number of girls enrolling in non-STEM subjects decreased by 603 (-0.2%), while the number of boys increased by 1,087 (0.4%).

In 2021, girls made up a large proportion of student enrolments in:

- biological sciences (65%, up from 64% in 2013)
- other natural and physical sciences, such as general or mixed science (57%, down from 61% in 2013)
- agriculture, environmental and related studies (52%, up from 49% in 2013)
- earth sciences (51%, up from 47% in 2013)
- chemical sciences (51%, up from 49% in 2013)
- mathematical sciences (48%, the same as 2013).

Girls remained underrepresented in:

- information technology (24% of enrolments, up from 22% in 2013)
- physics and astronomy (24%, up from 23% in 2013)
- engineering and related technologies (23%, down from 26% in 2013).

The Australian Mathematical Sciences Institute (AMSI) identified 4 levels of maths subject. From lowest to highest, they are:

- elementary (generally non-ATAR)
- elementary (ATAR[1])
- intermediate
- higher.

The total number of enrolments in maths subjects at all levels has decreased for both girls and boys since 2013.

The proportion of enrolments for girls has remained the same or increased for most levels of mathematics subjects since 2013. The exception is elementary (generally non-ATAR) maths, where the proportion of girls has decreased.

For higher mathematics subjects, the proportion of enrolments for girls increased from 36% in 2013 to 37% in 2021. Higher mathematics has the lowest proportion of girls out of all levels.

1 ATAR (Australian Tertiary Admission Rank) is the main criterion for Australian student entry into university. An ATAR subject is eligible to contribute to the calculation of a student's ATAR.

Schooling data references

Australian Curriculum, Assessment and Reporting Authority (ACARA) 2022, *National Assessment Program – Literacy and Numeracy (NAPLAN) Achievement in Reading, Writing and Numeracy: National Report for 2022*, ACARA, Sydney, accessed 2 November 2022.

Australian Institute of Family Studies (AIFS) (2016) *School subject coder*, AIFS, Australian Government, accessed 18 October 2022.

Australian Mathematical Sciences Institute (AMSI) (unpublished) (2021) *Maths subject classification*, data set provided to the Australian Government Department of Industry, Science and Resources, AMSI, accessed 1 November 2022.

Department of Education (unpublished) (2022) *Year 12 enrolments by subject, key learning area and gender*, data set provided to the Australian Government Department of Industry, Science and Resources, Department of Education, Australian Government, accessed 25 October 2022.

YouthInsight (2022) *2022–23 STEM Influencer – Teacher and career adviser survey*, report to the Australian Government Department of Industry, Science and Resources, YouthInsight, accessed 13 October 2022.

— — (2022) *2022–23 STEM Influencer – Parents survey*, report to the Australian Government Department of Industry, Science and Resources, YouthInsight, accessed 13 October 2022.

— — (2021), *2021–22 Youth in STEM survey*, report to the Australian Government Department of Industry, Science and Resources, YouthInsight, accessed 18 November, 2021.

Higher education

VET and university enrolments and completions

Students who study STEM at primary and secondary school may choose to continue their STEM studies through university or vocational education and training (VET). Understanding how women participate in STEM higher education can help the government and other sectors provide targeted support for women as they progress from schooling to the workforce. It can also help focus support on particular fields and education types. The National Centre for Vocational Education Research and the Department of Education collect data that informs this understanding.

Key data on enrolments and completions

Between 2015 and 2021, the number of women enrolled in university STEM courses increased from 70,378 to 92,162. This was a 31% increase, compared to a 13% increase for men. This saw the proportion of STEM enrolments that were women increase by 3 percentage points (37% compared to 34% in 2015).

From 2020 to 2021, the proportion of university STEM course completions that were women increased by 2 percentage points. The number of STEM course completions by women grew by 15%, from 16,072 in 2020 to 18,428 in 2021 (this includes both undergraduate and postgraduate completions).

The number of women enrolled in STEM vocational education and training has steadily increased since 2018. The proportion of women VET STEM enrolments increased to 17% in 2021.

The total number of completions in VET STEM qualifications increased in 2021. This was mostly due to more women completing qualifications, which offset a slight decrease in completions by men. The proportion of women completing VET STEM qualifications increased to 20% in 2021. This has risen by 4 percentage points since 2015.

More women are starting and finishing agriculture, environmental and related studies

In 2021, 22,070 women enrolled in VET agriculture, environmental and related studies. Women made up 33% of all students in the field, up 8 percentage points from 2015.

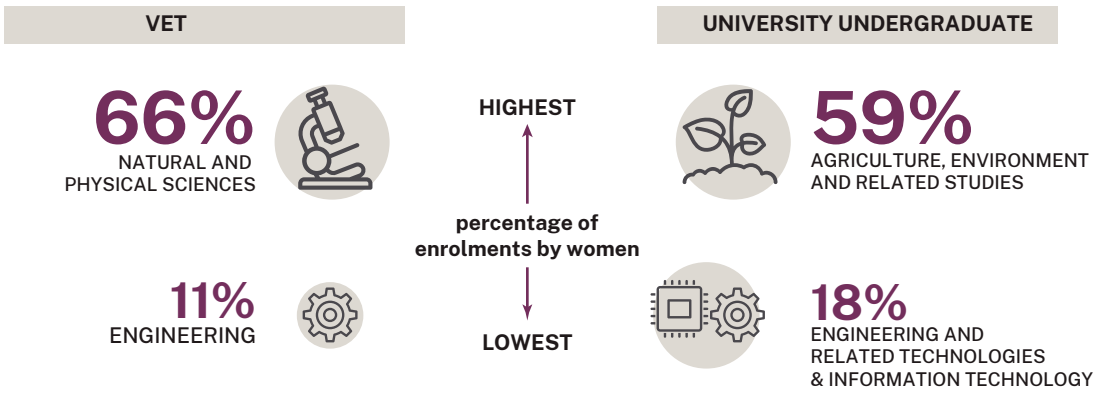
The proportion of women completing courses in this field also increased by 7 percentage points from 2015 to 2021.

This was the only VET STEM field where the proportion of women enrolments rose consistently from 2015 to 2021. There were no notable changes in the other STEM fields.

Natural and physical sciences remained the VET STEM field with the greatest proportion of women enrolments (66%) and completions (70%) in 2021. These proportions have remained between 61% and 73% every year from 2015 to 2021.

Engineering remained the least popular VET STEM field for women in 2021. Women have made up 11% or less of enrolments in this field since 2015.

STEM fields with the highest and lowest proportion of women enrolled in VET and university undergraduate courses



Source: Department of Education (2023); National Centre for Vocational Education Research (2022)

Longitudinal analysis of completion rates

After enrolling in university, some university students change their study choices or stop studying completely.

We commissioned the Australian Bureau of Statistics to do a longitudinal analysis of 140,000 university students aged under 25 who started undergraduate study for the first time in 2012. The analysis looked at these students' course completions by 2016.

The results provide context for the experiences of women and men in STEM courses compared to other fields.

Key data on completion rates for 2012 undergraduates

More women started undergraduate study in 2012 compared to men. 15% of the women who had completed study by 2016 were STEM graduates, compared to 33% of men.

49% of women who started in STEM completed STEM study by 2016, compared to 42% of men.

13% of women who started in STEM switched and completed a degree in a different field by 2016, compared to 6% of men.

493 women and 475 men started in a non-STEM or health field in 2012 and switched to complete a degree in STEM by 2016. This was around 1% of total non-STEM or health enrolments.

Fields of study

Women had the lowest completion rate for information technology. Only 25% of women who enrolled in information technology graduated with a degree in that field by 2016, compared to 37% of men.

By comparison, health had the highest completion rate for women. 60% of women who enrolled in health had completed a degree in that field by 2016.

STEM field enrolled in 2012	Gender	Graduated in same STEM field	Graduated in different STEM field	Graduated in non-STEM field	Graduated in health field	Did not finish by 2016
Natural and physical sciences	Women n = 9,111	49%	1%	7%	8%	12%
	Men n = 8,465	44%	2%	6%	3%	18%
Information technology	Women n = 804	25%	12%	14%	4%	18%
	Men n = 4,269	37%	3%	5%	0%	28%
Engineering and related technologies	Women n = 1,530	34%	4%	7%	5%	13%
	Men n = 8,129	34%	3%	3%	1%	18%
Agriculture, environmental and related studies	Women n = 1,011	47%	3%	6%	0%	20%
	Men n = 843	48%	2%	2%	0%	22%

Source: Australian Bureau of Statistics (unpublished data) (2021)

Higher education data references

Australian Bureau of Statistics (ABS) *Women in STEM longitudinal analysis of the 2011 higher education cohort and Completion rate analysis of the 2012–16 cohort*, analysis provided to the Australian Government Department of Industry, Science and Resources, ABS, Australian Government, accessed 7 December 2021

Department of Education (2023) *Student enrolments and award completions by field of education, gender and year*, Department of Education, Australian Government, accessed 10 February 2023.

National Centre for Vocational Education Research (NCVER) (2022) *Total VET students and courses* [data set], DataBuilder, NCVER website, accessed 10 November 2022.

Graduates outcomes

VET and university graduate outcomes

A successful transition into the workforce can be impacted by job availability, relevance of training to jobs, working conditions and pay. Understanding graduate employment outcomes for STEM-qualified women can provide valuable insights into factors that continue to affect women's progression and retention in STEM.

The National Centre for Vocational Education Research collects data on these indicators for VET students. Data from the annual Quality Indicators for Learning and Teaching (QILT) Graduate Outcomes Survey helps build a picture of skills use and university graduate satisfaction.

Key data on VET and university graduate outcomes

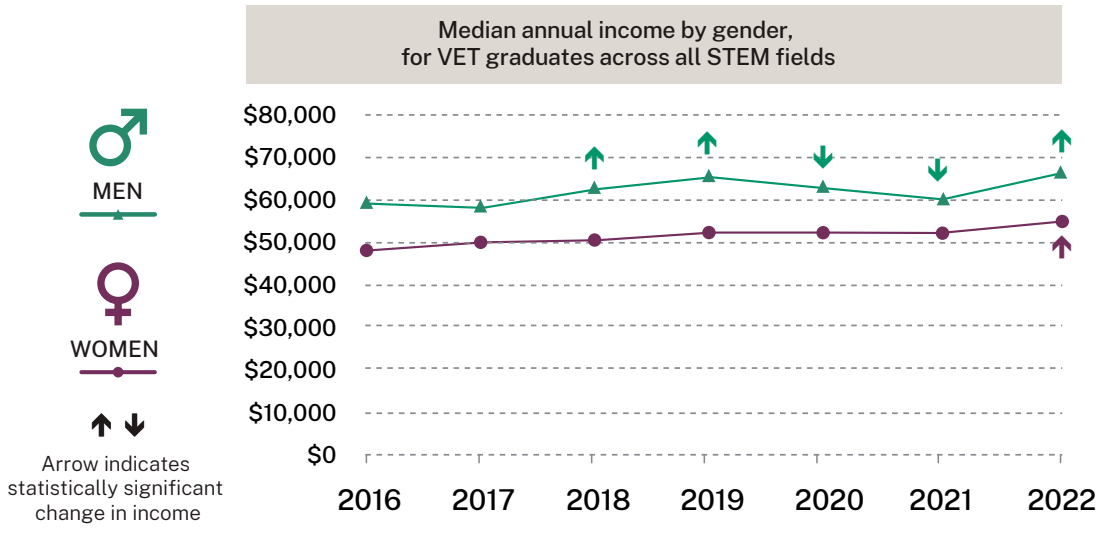
VET graduates

In 2022, 63% of women VET STEM graduates reported their training had some or high relevance to their jobs, a similar number to 2021. However, a higher proportion of men than women reported their training was somewhat or highly relevant to their jobs (76% of men compared to 63% of women). STEM graduates were more likely to report their training was highly relevant to their job than non-STEM graduates (50% compared to 47%) or health graduates (50% compared to 48%).

The proportion of women whose employment outcomes improved (by gaining employment or being employed at a higher skill level) after graduating in a VET STEM field increased. This proportion was 58% in 2022 compared to 52% in 2021. However, this was still lower than the proportion of men whose employment outcomes improved (67%).

Across all VET STEM fields, women's median full-time annual income was $55,000 in 2022, an increase from $52,000 in 2021. Men's median full-time annual income was $67,000, up from $60,000 in 2021. The larger increase in income for men saw the income gap for VET graduates widen in 2022.

The income gap for VET graduates increased in 2022



Source: National Centre for Vocational Education Research (2022)

University graduates

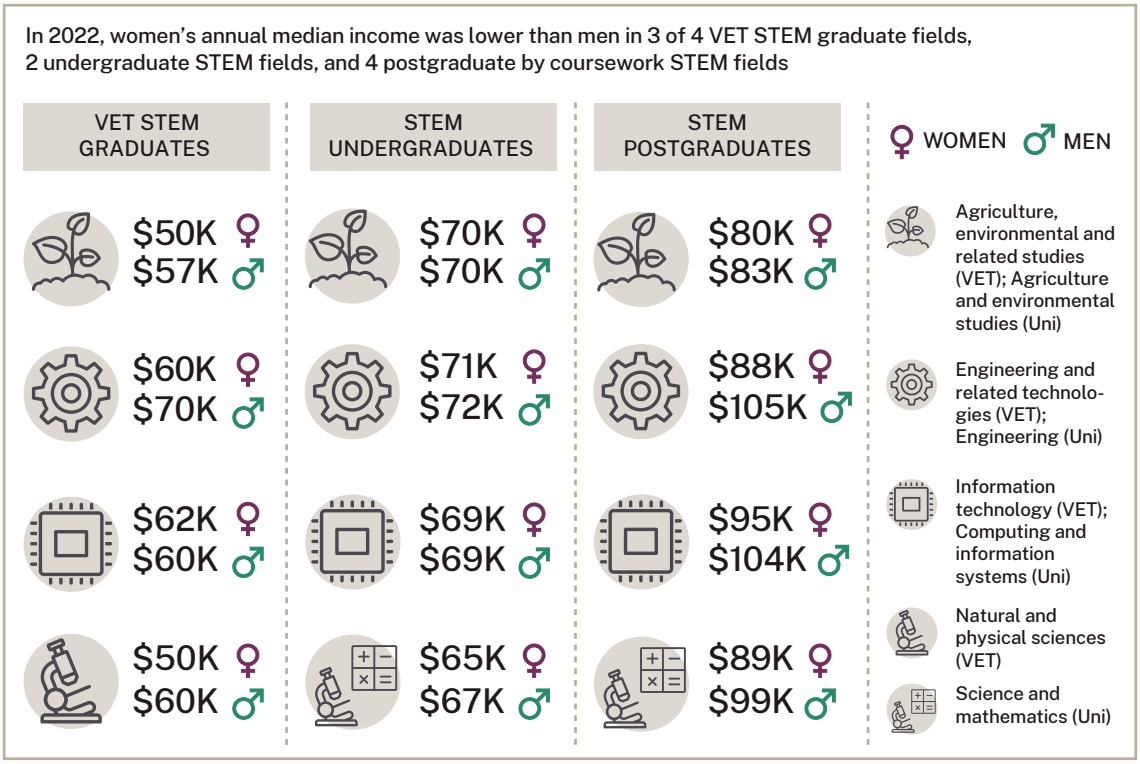
In 2022, similar proportions of employed women and men graduates in each STEM field felt their skills weren't being fully used in their jobs. The largest difference between genders was in agricultural and environmental studies, where 47% of employed women graduates felt they weren't using their skills, compared to 38% of men employed graduates.

Median full-time income for STEM graduates increased in all undergraduate STEM fields from 2021 to 2022. The largest increase was in agricultural and environmental studies, where median income increased from $60,000 in 2021 to $70,000 in 2022. For men graduates in this field, it increased from $63,000 to $70,000.

The median full-time income gap between men and women decreased for all undergraduate STEM fields from 2021 to 2022. Across all STEM fields, women earned an average of $1,000 less than men in 2022, compared to $2,000 less in 2021.

In 2022, the proportion of women undergraduates employed part-time was equal to or higher than men in each of the STEM fields. This has been the case for every STEM field almost every year since 2016. The exceptions were engineering in 2016 and 2020 and computing and information systems in 2017 and 2019.

In 2022, women's annual median income was lower than men in 3 of 4 VET STEM graduate fields, 2 undergraduate STEM fields, and 4 postgraduate by coursework STEM fields



Source: National Centre for Vocational Education Research (2022); Social Research Centre (2022)

Further study by graduates

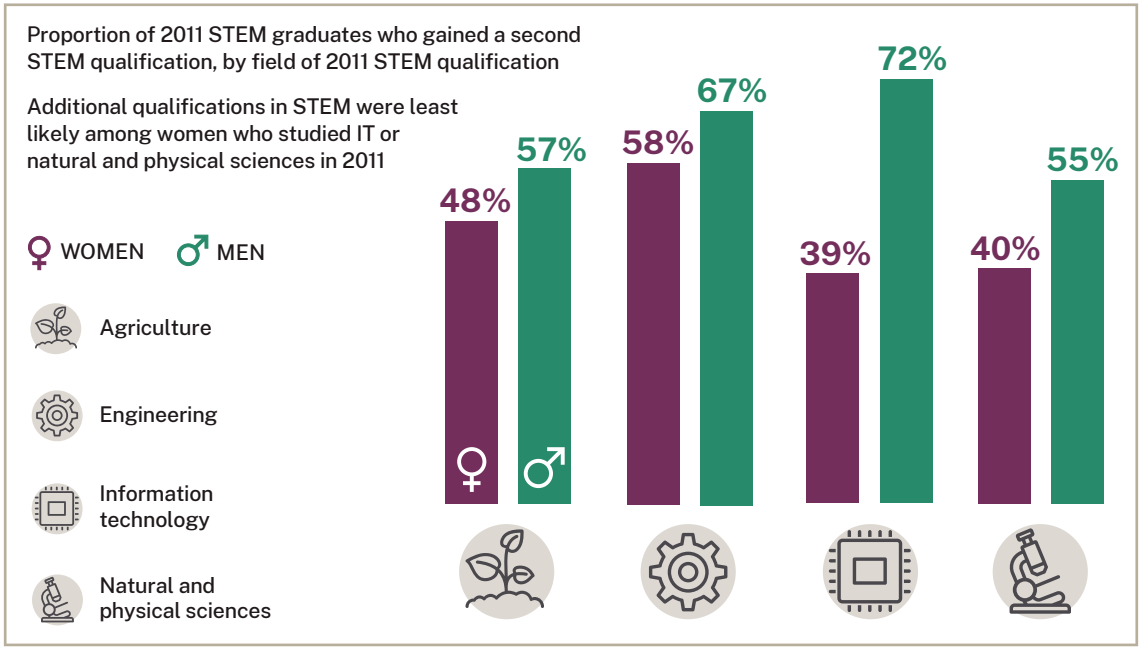
Longitudinal data can provide insights into the career progression of people after graduation. We commissioned the Australian Bureau of Statistics to perform longitudinal analysis of university graduates from 2011. The analysis explored the characteristics and outcomes of graduates who completed another qualification between 2012 and 2015.

The monitor will continue to examine the outcomes of this cohort as they progress further in their careers.

Key data on further study and associated career outcomes

Study choices

- 23% of women and men who completed a qualification in any field in 2011 completed a second qualification between 2012 and 2015.
- 38% of women who completed a STEM qualification in 2011 completed a second qualification between 2012 and 2015 (compared to 24% of STEM-qualified men).
- 29% of women who completed a STEM qualification in 2011 returned to study in a STEM field between 2012 and 2015 (compared to 27% of men).
- For women who completed a STEM qualification in 2011, the most popular field of further study was health (31%), followed by education (13%).
- Almost two-thirds of women (64%) and just over half of men (53%) who completed a second STEM qualification did so at undergraduate level.
- 60% of people who completed an additional STEM qualification between 2012 and 2015 did so at a postgraduate level.



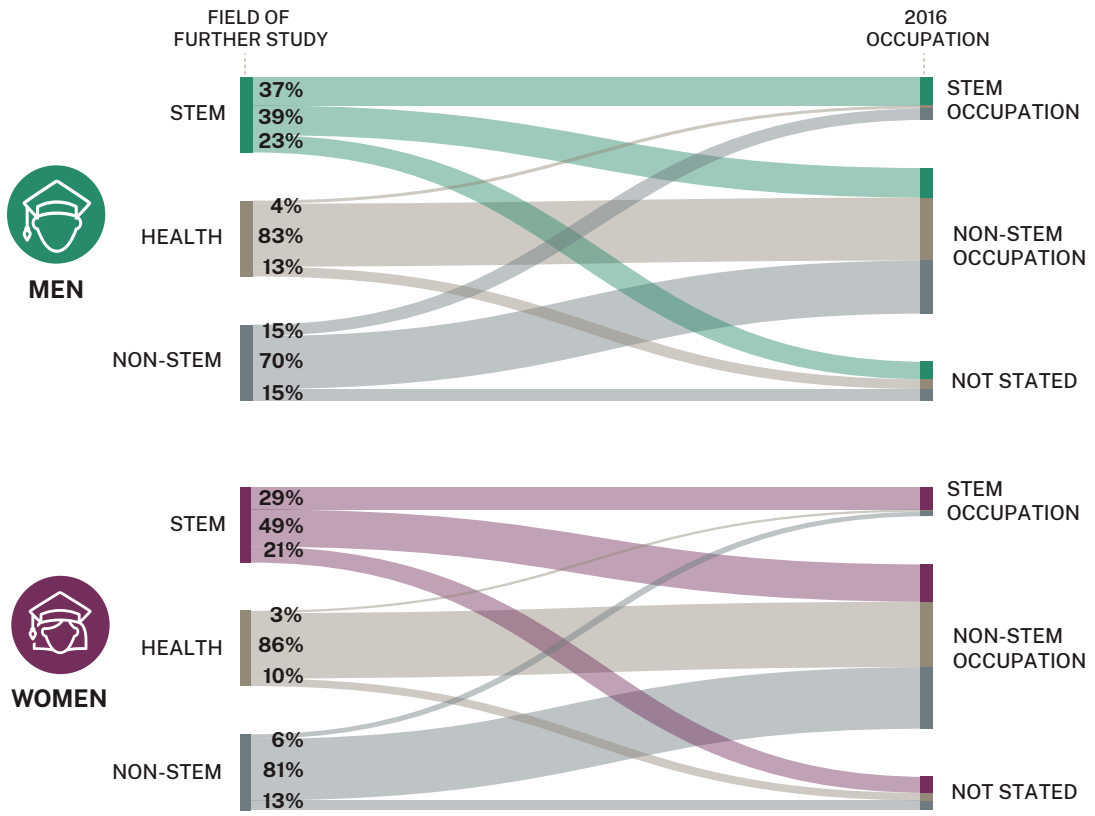
Source: Australian Bureau of Statistics (unpublished) (2021)

Career outcomes

Completing a second field of STEM study had the following relationships to being employed in STEM in 2016:

- Only 29% of women who completed further studies in STEM were employed in STEM occupations, compared with 37% of men.
- 49% of women who completed further studies in STEM moved into a non-STEM occupation, compared with 39% of men.
- 40% of women (and 46% of men) who had completed 2 STEM qualifications were employed as professionals, as defined by the Australian and New Zealand Standard Classification of Occupations (ANZSCO) major groups.
- 57% of women (and 53% of men) whose first qualification was in STEM but second qualification was in a non-STEM field were employed as professionals.

Type of occupation by field of further study, 2016



Source: Australian Bureau of Statistics (unpublished) (2021)

Income after study

The income of graduates who completed further study between 2012 and 2015 was measured in the 2015–16 financial year.

53% of the women who completed a STEM qualification in 2011 and didn't do any further study earned under $50,000. This compares to 38% of STEM-qualified men who didn't do any further study after graduating in 2011.

61% of women (and 59% of men) who completed a STEM qualification in 2011 and additional further study (field not specified) were earning below $50,000.

It may be too soon to notice the full impact of further study on income. However, women were likely to experience lower wage growth than men if they had not done further study.

Effects of unemployment on professional career outcomes

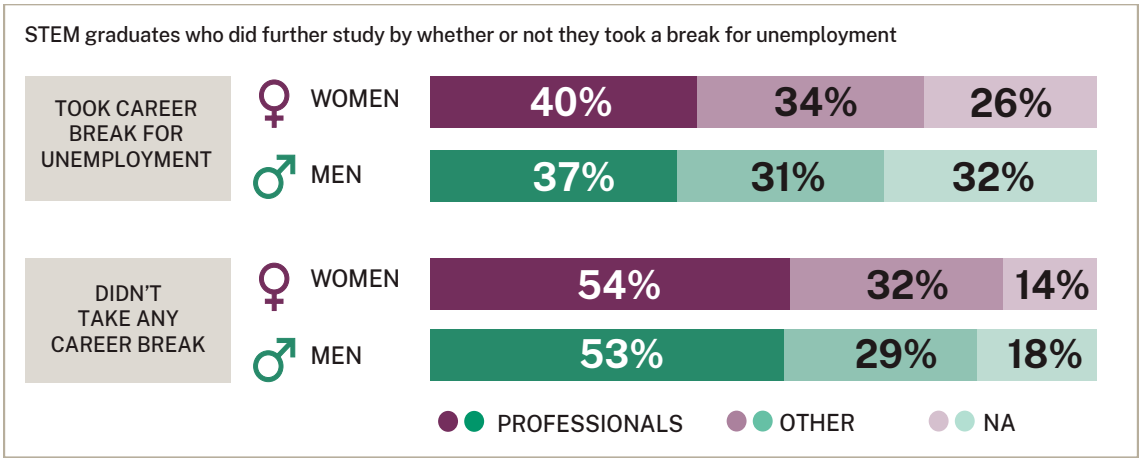
The ABS analysed whether people were employed as a professional (as defined by ANZSCO major groups) based on:

- their employment status from 2012 to 2015
- if they had done further study between 2012 and 2015.

40% of women who had a break for unemployment and had done further study were employed as a professional in 2016, compared to 37% of men. This is twice the employment rate of people who had a break for unemployment and did not do further study (20%).

People who had no break for unemployment between 2012 and 2015 were much more likely to be employed as a professional in 2016. The likelihood was even greater for women who had done further study between 2012 and 2015.

46% of all women who didn't do further study and did not take a break for unemployment were employed as professionals in 2016, compared to 55% of men. However, 54% of women who did further study and didn't take a break for unemployment were employed as professionals in 2016, compared to 53% of men.



Source: Australian Bureau of Statistics (unpublished) (2021)

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— — (unpublished) (2022) *Median salary, skill utilisation, and part time employment*, data set provided to the Australian Government Department of Industry, Science and Resources, Social Research Centre, accessed 22 December 2022.

Workforce

Research workforce and grant outcomes

STEM skills are important for people in the research workforce, including academic staff who do research and have teaching responsibilities.

Understanding women's participation in the STEM research workforce can help build inclusive and diverse workplaces. These workplaces have been shown to produce higher quality science with greater impact.

Key data on research workforce and grant outcomes

Department of Education data showed that in 2021, 46% of university staff in all teaching and research roles (by headcount) were women.

However, 29% of STEM teaching and research roles were held by women. The largest number of women in STEM teaching and research roles (601) were employed at academic staffing level B, while the largest number of men (1,561) were employed at level E (the highest level). At level B, the number of men was almost 1.5 times the number of women. At level E, the number of men was over 4.5 times the number of women.

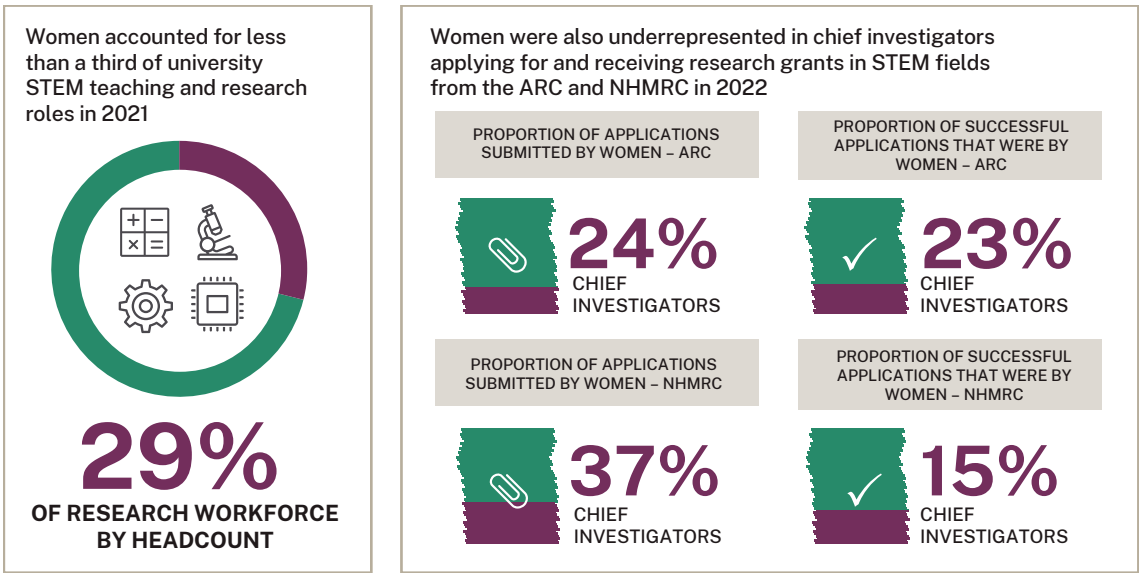
In 2022 fewer women than men were named on research grant applications, consistent with 2021 data. Across all STEM fields, 23% of applicants for ARC funding were women, compared to 22% in 2021. Women made up 35% of NHMRC applicants in 2022, compared to 34% in 2021.

As fewer women than men applied, fewer women received funding:

- 565 women received ARC funding, with 446 as chief investigator. In comparison 1,932 men received ARC funding, including 1,450 as chief investigator.
- 137 women received NHMRC funding, with 57 as chief investigator. 216 men received NHMRC funding, including 81 as chief investigator.

Success rates for women and men in STEM fields were similar. For NHMRC funding, the success rates for women were 2 percentage points higher than men.

- 24% of women investigators who applied for an ARC grant were successful. 24% of men were also successful.
- 23% of women chief investigators who applied for an ARC grant were successful. 24% of men were successful.
- 16% of women investigators who applied for an NHMRC grant were successful compared to 14% of men.
- 15% of women chief investigators who applied for an NHMRC grant were successful compared to 13% of men.



Source: Australian Research Council (2022); Department of Education (2021); National Health and Medical Research Council (2023)

Industries and occupations

STEM skills are widely valued and can be used in many different occupations and industries. Understanding women's participation in STEM-qualified occupations, and how STEM-qualified industries are taking action to support women's participation, can highlight industries that are driving change and industries where more effort is needed.

The monitor uses data from relevant employers that reported to the Workplace Gender Equality Agency. We source data on occupations and participation rates from the Australian Labour Force Survey.

Key data on industries and occupations

Workforce gender equity and pay gap

In 2021, women made up 27% of the workforce across all STEM industries, 1 percentage point less than in 2020.

23% of all managers in STEM industries were women. The highest proportion of women in senior STEM positions were in key management and other management roles (24%). The lowest proportion were in CEO and head of business positions. Only 8% of women across all STEM industries were in CEO positions, compared to 43% in health and 19% across all industries.

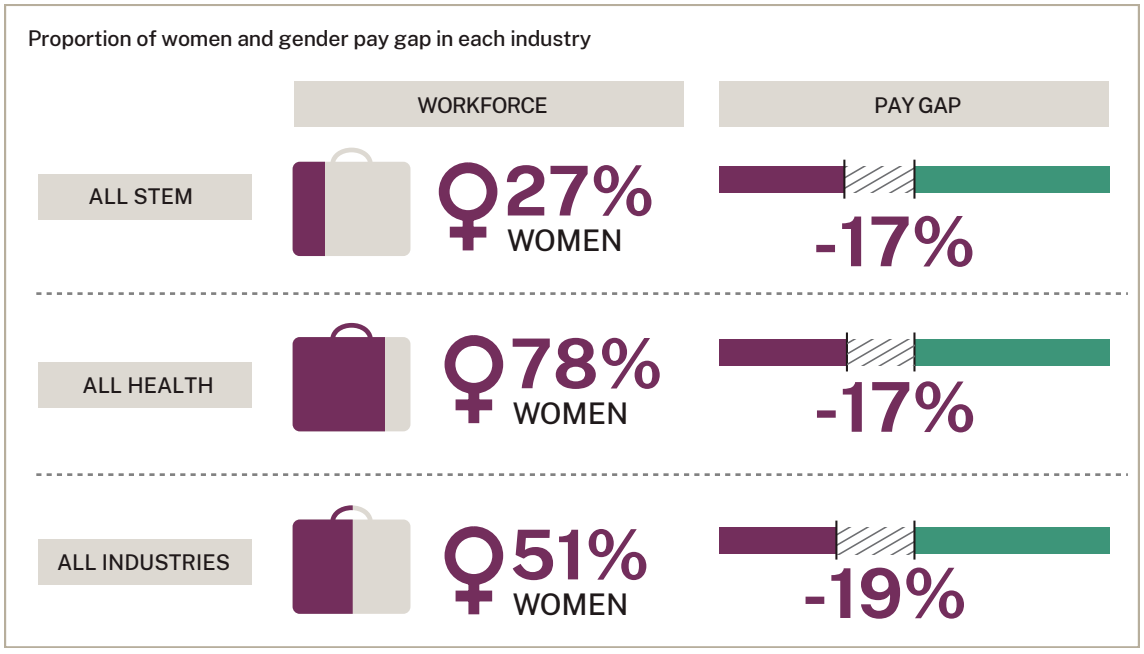
In 2022, the gap between women's and men's pay in STEM industries was $27,012, or 17%. This was slightly larger than in 2021, when the pay gap was $26,568 (also 17%). In 2016, the gender pay gap for full-time total remuneration (which includes discretionary pay) was 22%, 5 percentage points higher than the 2022 result.

The gender pay gap for all industries, including STEM, health and non-STEM industries, increased from $25,752 in 2021 to $26,446 in 2022. For health industries, the pay gap increased from $19,165 in 2021 to $22,161 in 2022.

In 2022, the STEM industries with the largest percentage gender pay gap for full-time total remuneration were:

- machinery and equipment repair and maintenance (24%)
- architectural, engineering, and technical services (23%)
- electricity generation (23%).

Oil and gas extraction had the largest gender pay gap in dollar terms: about $63,000, down from $75,000 in 2021.



Source: Workplace Gender Equality Agency (2023)

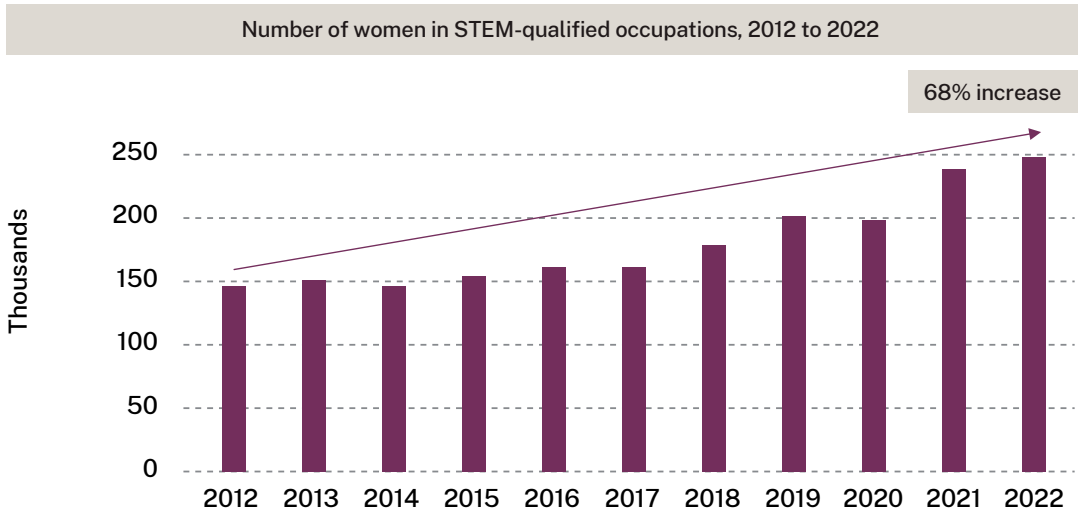
Australian labour force

Based on the ABS *Labour Force Survey*, the number of women in STEM-qualified occupations increased by around 9,000 (4%) from 2021 to 2022. The number of men increased by around 60,000, also a 4% increase.

The proportion of women in STEM-qualified occupations was 15% in 2022, up from 10% in 2002. In comparison, women have made up approximately 50% of workers in non-STEM occupations and 75% of workers in health occupations since 2002.

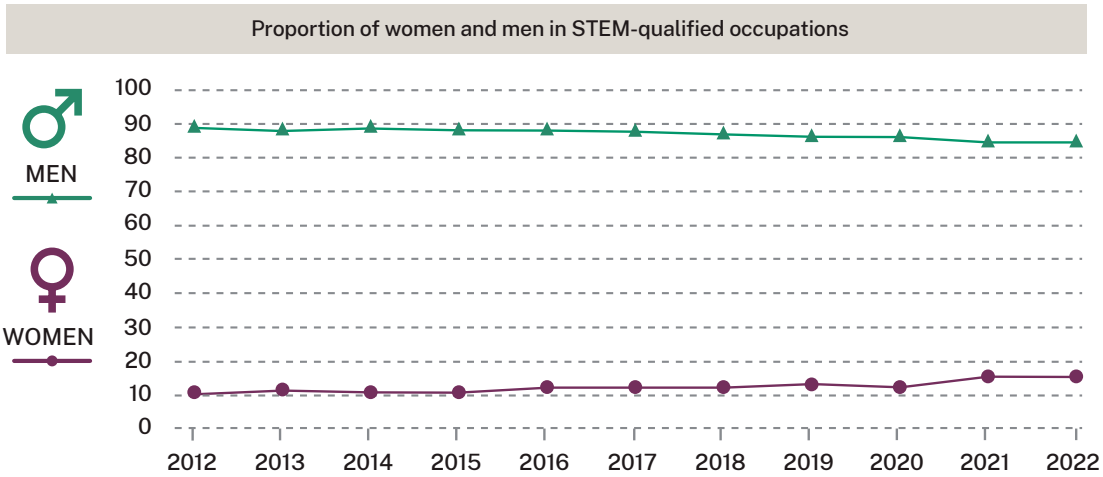
From 2012 to 2022, women in STEM-qualified occupations rose from approximately 147,000 to approximately 247,000 – about a 68% increase. The number of men in STEM-qualified occupations increased by about 18% during this time.

The number of women in STEM occupations increased by around 68% from 2012 to 2022



Source: Australian Bureau of Statistics (2022)

The proportion of women in STEM-qualified occupations has only changed from 11% in 2012 to 15% in 2022



Source: Australian Bureau of Statistics (2022)

Australian Public Service (APS) workforce

Responses to the 2022 *APS Employee Census* provide an insight into STEM roles in the APS.

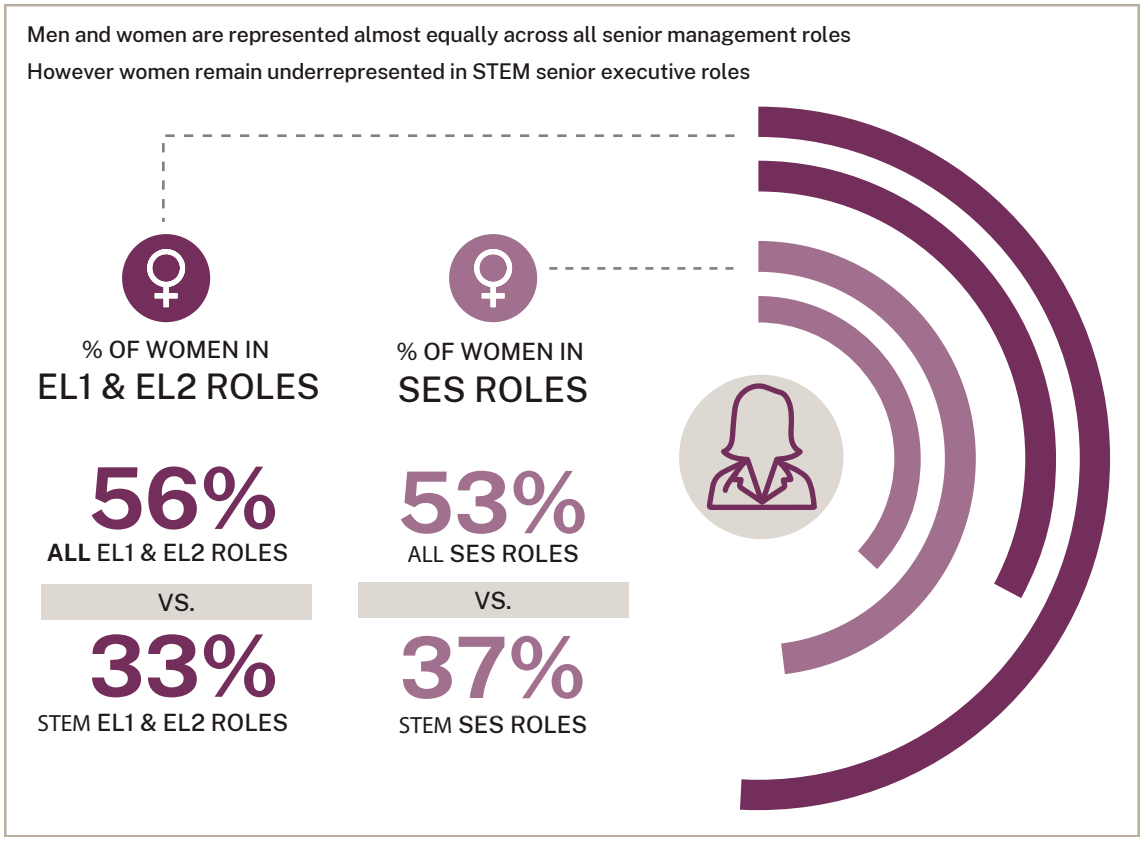
Only 36% of APS employees working in STEM roles were women. This proportion has remained stable since 2020. In comparison, women made up 66% of employees in non-STEM roles and 77% of health roles.

Most STEM roles in the APS had a classification level of APS 5 or 6. The proportion of women in STEM roles at that level was substantially lower than men.

- Women working at APS 5 or 6 level made up 17% of all STEM roles in the APS. Men at APS 5 or 6 level made up 27%.
- Women at Executive Level 1 (EL1) made up 10% of all STEM roles. EL1 men made up 20%.
- Women at EL2 made up 4% of all STEM roles, EL2 men made up 9%.

Overall there was a higher proportion of women in EL1 and EL2 roles (56%). However, only one third (33%) of EL1 and EL2 STEM roles were filled by women.

The overall proportion of women and men at Senior Executive Service (SES) levels was about equal (53% women compared to 47% men). However, only 37% of SES-level STEM roles were filled by women.



Source: Australian Public Service Commission (2022)

Publicly funded research agencies (PFRAs) workforce

In 2022, 70% of all people working in the sampled PFRAs were in STEM occupations, 1 percentage point lower than in 2021. Women made up 29% of people in STEM occupations, a 1 percentage point increase from 2021. In comparison, women made up 60% of non-STEM occupations in PFRAs.

The largest number of women in STEM were working at the EL1 level (871, or 35% of total women in STEM occupations). The largest number of men in STEM were also at the EL1 level (2,216 or 36% of total men in STEM occupations). Although the EL1 level has the highest number of STEM employees, it has one of the lowest proportion of women in STEM roles (28% women compared to 72% men).

The EL2 level had the largest difference between men and women in STEM roles – 20% of EL2 STEM roles were held by women and 80% were held by men. This was a slight improvement on 2021, where the gender split was 18% women and 82% men.

Workforce data sources

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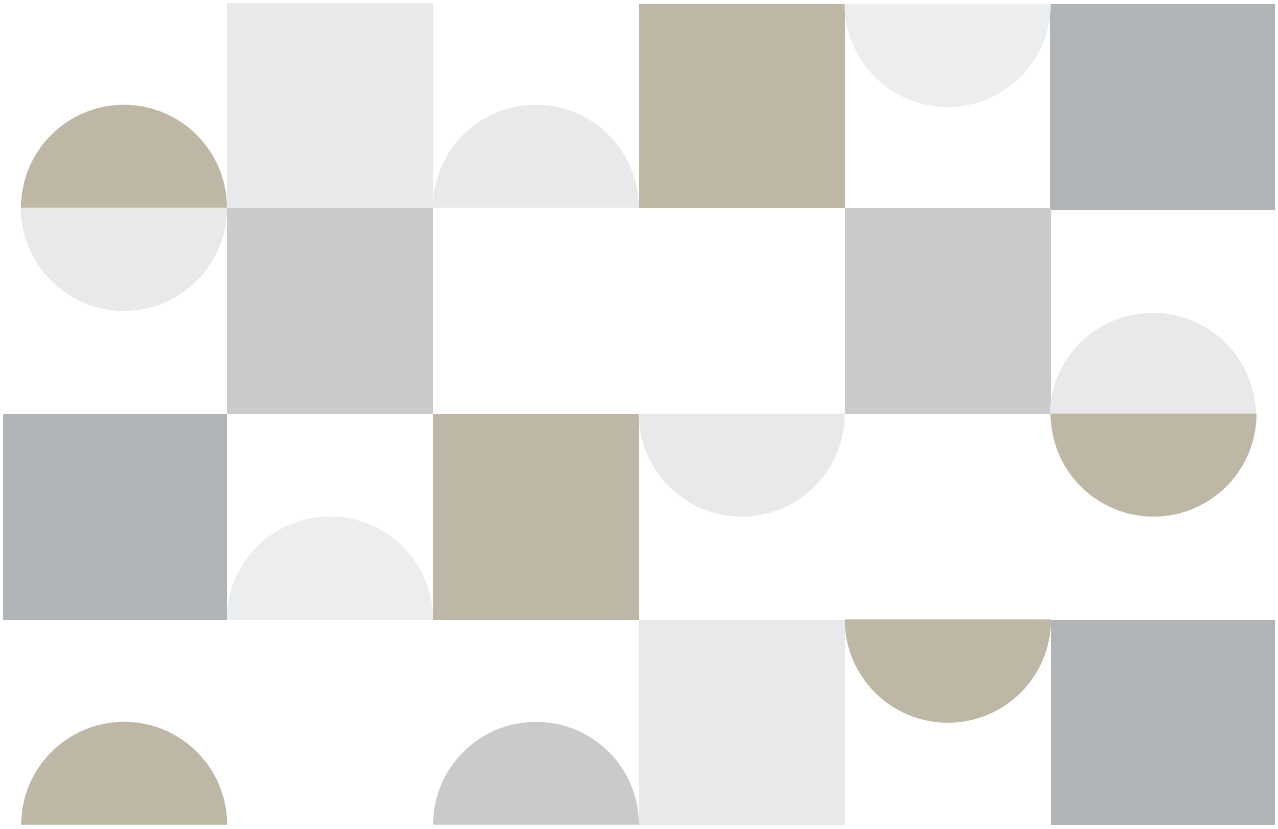

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