Australian Bureau of Statistics

WOMEN IN STEM

Longitudinal employment analysis of the 2011 Higher Education graduate cohort, 2021 outcomes

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Contents

EXECUTIVE SUMMARY

The Women in STEM (Science, Technology, Engineering and Mathematics) longitudinal employment outcomes analysis described in this report investigates the employment outcomes in 2021 of a cohort of students who completed a Higher Education qualification in 2011. Using data from the Person Level Integrated Data Asset (PLIDA), the analysis focuses on how the labour force status, industry of employment, occupation and income of 2011 Higher Education graduates – particularly those with a STEM qualification[1] – differ according to gender. The report also summarises the employment outcomes of STEM graduates according to demographic, socio-economic and geographic characteristics such as age, disability status, Aboriginal and Torres Strait Islander status, country of birth, and remoteness.

The report consists of six chapters:

- Chapter 1 describes the background to and aims of the analysis
- Chapter 2 describes the data and methods used
- Chapter 3 describes the demographic and educational profile of the cohort of 2011 Higher Education graduates
- Chapter 4 presents detailed analysis of graduates' labour force status and industry of employment in 2021
- Chapter 5 presents detailed analysis of graduates' occupations from 2010-11 to 2020-21
- Chapter 6 presents detailed analysis of graduates' income from 2010-11 to 2020-21.

Background

The Australian Government has a long-standing commitment to growing Australia's STEM-skilled workforce, including a commitment to increase gender equity in STEM education and careers.[2] As part of this policy commitment, the Department of Industry, Science and Resources (DISR) publishes the STEM Equity Monitor.

The STEM Equity Monitor is a national data report on girls' and women's participation in STEM. It presents the current state of STEM gender equity in Australia and provides a baseline for measuring change over time in key sectors and career phases of girls' and women's engagement with STEM.

The analysis in this report contributes to the STEM Equity Monitor, providing insights into gender gaps and key differences between the employment outcomes of women and men over time.

[1] Graduates' qualifications are grouped into STEM, Health and other (non-STEM) fields of education. For further detail, see Appendix 3.1.
[2] Women and girls in STEM | Department of Industry, Science and Resources.

Key findings

Demographic profile of 2011 Higher Education graduates

- Women made up less than two in five (37.8%) STEM graduates, but three in five (60.9%) graduates across all fields of education.
- STEM graduates tended to be younger than graduates in other fields, with 84.7% of STEM graduates aged 15-29 years, compared with 71.1% of health and 73.4% of non-STEM graduates.
- Aboriginal and Torres Strait Islander graduates made up 0.6% of male and 0.7% of female STEM graduates. Aboriginal and Torres Strait Islander Australians made up 2.7% of the Australian population in 2011[3], and were therefore under-represented among STEM graduates.
- 4.5% of male and 5.5% of female STEM graduates had a disability, impairment or long-term medical condition in 2011. This was similar to the proportion with disability among 2011 Higher Education graduates overall (4.9% of men and 5.5% of women).
- Approximately one in five STEM graduates (22.4% of men and 21.8% of women) were born overseas.
- One in five STEM graduates (20.9% of men and 19.1% of women) used a language other than English at home.

Higher Education profile of 2011 STEM graduates

- Male and female STEM graduates tended to study in different fields of education:
    - Most female STEM graduates studied Natural and Physical Sciences (68.6%), followed by Agriculture, Environment and Related Studies (14.1%).
    - Most male STEM graduates studied Engineering and Related Technologies (40.2%), followed by Natural and Physical Sciences (33.7%).
- STEM graduates aged 30 years or older tended to study in different fields than graduates aged 15-29 years:
    - A smaller proportion of STEM graduates aged 30 years or over studied Natural and Physical Sciences (53.0% of women, 23.2% of men), compared with those aged 15-29 years (71.2% of women, 35.7% of men).
    - A larger proportion of STEM graduates aged 30 years or older studied Agriculture, Environment and Related Studies (24.4% of women and 13.4% of men), compared with graduates aged 15-29 years (12.4% of women and 6.8% of men).
- Three in ten (30.7%) STEM graduates attended part-time. Part-time attendance differed by age group.
    - Two-thirds of STEM graduates aged 30 years or above attended part-time (66.2% of men and 65.0% of women).

[3] Aboriginal and Torres Strait Islander Australians as proportion of the Estimated Resident Population aged 15-74 in 2021. Source: 3238.0 - Estimates and Projections, Aboriginal and Torres Strait Islander Australians, 2001 to 2026 (abs.gov.au).

    - One quarter of male (26.2%) and one in five female (21.5%) STEM graduates aged 15-29 years attended part-time.
- A larger proportion of STEM graduates obtained a bachelor degree (80.6% of men and 82.6% of women), than health (72.2% of men and 68.3% of women) and non-STEM graduates (64.3% of men and 65.4% of women).

Labour force outcomes of 2011 STEM graduates in 2021

- Across all fields of education, a large majority of male and female graduates were employed in 2021.
    - A smaller proportion of female STEM graduates were employed (89.3%) than male STEM graduates (93.6%).
    - A larger proportion of female STEM graduates were not in the labour force (8.7%), than male STEM graduates (4.5%).
    - A slightly smaller proportion of female STEM graduates were employed (89.3%), than female health graduates (92.3%).
- Labour force outcomes differed by age group, as well as gender:
    - A larger proportion of STEM graduates aged 30 years or older at graduation were not in the labour force in 2021 (15.4% of women and 8.9% of men), than those aged 15-29 years (7.5% of women and 3.6% of men).
- Among STEM graduates who were employed in 2021, a larger proportion of women (28.7%) worked part-time than men (10.8%).
- A similar proportion of female (37.7%) and male (36.3%) STEM graduates provided unpaid child care in 2021. However, the provision of unpaid childcare differed by gender when labour force status was taken into account.
    - Among employed STEM graduates, a similar proportion of men (37.6%) and women (35.9%) provided unpaid care for children.
    - However, among STEM graduates who were not employed, a much larger proportion of women (53.1%) provided unpaid childcare than men (18.1%).

Industry of employment of 2011 STEM graduates in 2021

- In 2021, the top four industries in which STEM graduates worked were the same for men and women, but the proportion of graduates working in these industries differed by gender.
    - One in five STEM graduates worked in Professional, Scientific and Technical Services (24.1% of men and 15.2% of women).
    - Almost one in six STEM graduates worked in Health Care and Social Assistance (9.9% of men and 26.0% of women).
    - Approximately one in eight STEM graduates worked in Public Administration and Safety (11.7% of men and 13.4% of women).
    - Approximately one in eight STEM graduates worked in Education and Training (16.5% of women and 9.5% of men).

- Among employed STEM graduates, a larger proportion of men (21.6%) worked in a STEM-qualified industry than women (9.8%).[4]

Occupations of 2011 STEM graduates in 2020-21

- Among employed STEM graduates, a larger proportion of men (55.7%) worked in a STEM-qualified occupation than women (30.6%) in 2020-21.[5]
- A larger proportion of female (17.8%) than male (6.7%) STEM graduates worked in a health occupation in 2020-21.
- A large proportion of employed graduates of Engineering and Related Technologies (72.3% of men and 60.9% of women) and Information Technology (64.6% of men and 39.0% of women) worked in a STEM-qualified occupation in 2020-21.
- The university STEM-qualified occupations in which STEM graduates worked differed by gender:
    - Among male STEM graduates who worked in a university STEM qualified occupation, 19.4% were Civil Engineering Professionals and 16.0% were Software and Application Programmers.
    - Among female STEM graduates who worked in a university STEM qualified occupation, 18.8% were Environmental Scientists and 16.6% were Life Scientists.

Income of 2011 STEM graduates, from 2010-11 to 2020-21

- In 2010-11, male and female STEM graduates had a similar income profile, and a large majority (83.6% of men and 90.2% of women) had an annual income below $50,000.
- By 2015-16, the gap between male and female STEM graduates' incomes had widened.
    - 46.1% of women earned less than $50,000, compared with 29.0% of men.
    - 45.5% of men earned $75,000 or more, compared with 24.4% of women.
- In 2020-21, male STEM graduates continued to earn more than female STEM graduates:
    - 54.8% of men earned $100,000 or more, compared with 30.2% of women.
    - 33.1% of men earned $125,000 or more, compared with 13.3% of women.
- Among STEM graduates employed full-time in 2021:
    - 36.3% of men earned $125,000 or more in 2020-21, compared with 18.4% of women.
    - 25.6% of women earned under $75,000 in 2020-21, compared with 16.3% of men.
- Among STEM graduates employed part-time in 2021:
    - 25.4% of men earned $100,000 or more in 2020-21, compared with 8.9% of women.
    - 47.3% of women earned under $50,000 in 2020-21, compared with 38.2% of men.

[4] A STEM-qualified industry is an industry in which the majority of employees have a STEM qualification. Further information is provided in Chapter 2 and Appendix 3.2.
[5] A STEM-qualified occupation is an occupation in which the majority of employees have a STEM qualification. Further information is provided in Chapter 2 and Appendix 3.3.

Summary and opportunities for further analysis

This report summarises the employment outcomes of 2011 Higher Education graduates, ten years after they completed their qualification. The report focusses on the outcomes of STEM graduates and how women's outcomes differ from those of men. It also considers the employment outcomes of graduates from specific population groups, including Aboriginal and Torres Strait Islander graduates, graduates born overseas, graduates with a language background other than English, graduates with a disability, graduates living in regional and remote areas, and graduates living in areas of relatively low socio-economic advantage or high disadvantage.

Understanding the career trajectories of STEM graduates provides insights into the equity of employment outcomes, as well as the supply of people with STEM qualifications in the labour market. Further investigating career trajectories and patterns of employment in STEM-qualified industries and occupations can inform policy initiatives to support equity and the supply of STEM skills in the labour market.

The use of PLIDA data in this analysis demonstrates the value of bringing together a range of data to support the analysis of graduates' long-term employment outcomes. The addition of new data sources and reference periods also opens up new analytical possibilities. Opportunities for further analysis which may be explored in future are listed below.

1. Longitudinal employment outcomes for additional cohorts of Higher Education graduates, such as those graduating after 2011.
    - Aim:
        - To understand how the demographic and educational profile of STEM graduates has changed since 2011.
        - To provide insights into the employment outcomes of more recent STEM graduates.
    - Available data:
        - Higher Education completions from 2005.
2. Longitudinal employment outcomes of STEM graduates across the tertiary education sector, including the Vocational Education and Training (VET) sector and Apprentices and Trainees.
    - Aim:
        - To understand the demographic and educational profile of STEM graduates in VET and Apprentices and Trainees in STEM fields and occupations.
        - To provide insights into employment outcomes for STEM graduates from VET courses and Apprenticeships and Traineeships.
    - Available data:
        - Total VET activity, from 2015.
        - Updated Apprentices and Trainees data from 2006 onwards is expected to be available in PLIDA in 2024.
3. The investigation of additional data sources to inform longitudinal employment outcomes
    - Aim:
        - To improve the timeliness, relevance, accuracy, and/or coherence of analysis of industry, occupation and income data.
        - To facilitate the investigation of additional outcomes, such as the receipt of government payments, or STEM graduates who leave Australia.

- Available data sources:
    - As well as Personal Income Tax Income Tax Return (PIT ITR) and the Census of Population and Housing, income data is also available in the Australian Taxation Office (ATO) Payment Summary and Single Touch Payroll datasets.
    - ATO PIT ITR and Business ownership data provides information about people who own their own business. This may be relevant for understanding outcomes for some VET and Apprenticeship and Traineeship graduates.
    - DOMINO Centrelink Administrative data provides information about income and the receipt of government payments for Centrelink clients.
    - Migration data can enable insights into outcomes for graduates who have migrated to Australia.
    - A PLIDA core scoping dataset is under development and aims to facilitate the scoping of data to persons who are alive, resident in Australia, and active in administrative datasets. This could support the scoping of the analysis population as well as provide insights about graduates who leave Australia after graduation.

4. The further investigation of career breaks and barriers to employment over time
    - Aim:
        - The ABS analysed career breaks taken by 2011 Higher Education graduates to understand the incidence and impact of specific life events that occurred between 2012 and 2016 (having a child, becoming unemployed or returning to study) on employment outcomes in 2016. This analysis could be expanded to analyse the incidence and impact of career breaks from 2011 to 2021.
        - The analysis could also be expanded to include additional life events, such as becoming a carer, being diagnosed with a disability or experiencing a chronic health issue.
        - The analysis could be expanded to evaluate the statistical relationship between demographic characteristics, educational qualifications, life events, and the likelihood of employment outcomes such as working in a STEM-qualified occupation, or not being in the labour force.
    - Available data:
        - DOMINO Centrelink Administrative Data from 2009
        - ATO PIT ITR from 2010-11, Payment Summary from 2010-11, Single Touch Payroll from 2020-21
        - National Disability Insurance Scheme (NDIS) from 2019, which provides information about participants in the NDIS.
        - Medicare Benefits Schedule from 2006, which provides information about claims processed for subsidised health services provided to people under the Medicare Benefits Schedule.
        - Pharmaceutical Benefits Scheme from 2006, which contains information about medicines provided to people under the Pharmaceutical Benefits Scheme.
5. The investigation of graduates who undertake further study
    - Aim:
        - The ABS analysed 2011 Higher Education graduates who returned to further study between 2012 and 2016, including their characteristics and the relationship between further study and career breaks.

    - This analysis could be expanded to include further study in Higher Education and VET to 2021, to understand pathways between fields of education (such as STEM and Health) and between VET and Higher Education.
- Available data:
    - Higher Education from 2005
    - Total Vet Activity from 2015

6. Further investigation of outcomes for specific cohorts of graduates over time
    - Aim
        - To provide insight into educational and employment outcomes for specific population groups, such as Aboriginal and Torres Strait Islander graduates, graduates born overseas, graduates in particular fields of study, graduates from regional or remote areas, etc, to inform diversity in STEM policy.
        - This analysis could look at employment outcomes, career breaks and life events, further study, graduate mobility, etc, for Higher Education and / or VET graduates.
    - Available data:
        - PLIDA combined demographics, locations, relationships and scoping modules.
        - Census of Population and Housing 2016 or 2021
        - Higher Education from 2005
        - Total VET Activity from 2015
        - PIT ITR from 2010-11
7. Further analysis of industries and occupations which STEM graduates work in
    - Aim:
        - The definition of STEM-qualified industry and occupation used in this report supports the analysis of industries and occupations in which a majority of employees have a STEM qualification. Further analysis of industries and occupations which employ large numbers of STEM graduates, or which graduates from particular fields are more likely to work in, may be approached using various methods, and may provide additional insights into employment outcomes for diverse STEM graduates.
        - Options for further analysis include:
            - STEM graduate pathways into different industries / occupations
            - Industries / occupations with a high proportion of employees who are STEM and/or Health graduates
            - Occupations which require STEM skills, particularly those experiencing labour supply shortages.
    - Available data
        - Census of Population and Housing
        - PIT ITR from 2010-11
        - Skills Priority List, available at: Skills Priority List | Jobs and Skills Australia.

The feasibility of any future analyses would need to be further explored. Some analyses may be limited due to the size of groups within the graduate population, such as those with specific combinations of demographic and educational characteristics and outcomes. Having a sufficient sample size is necessary not only to meet confidentiality requirements for the release of data but also to support confidence in the reliability of inferences made using analytical methods.

CHAPTER 1: INTRODUCTION

1.1 Background

The Australian Government has a long-standing commitment to growing Australia's STEM-skilled workforce, including by increasing gender equity in STEM education and careers.[6] As part of this policy commitment, the Department of Industry, Science and Resources (DISR) publishes the STEM Equity Monitor.

The STEM Equity Monitor is a national data resource on girls and women in STEM. First published in 2020 and updated regularly, it reports the current state of STEM gender equity in Australia and measures changes and trends. The STEM Equity Monitor provides insights into girls' and women's participation in STEM through school, higher education, graduation and the workforce. It aims to assist policy makers and the STEM sector to understand where progress is being made, and where future investment in programs and policies can be focussed to drive greater gender equity in STEM.

In 2020, DISR commissioned the ABS to undertake a series of analyses to inform the STEM Equity Monitor. In the first tranche of analysis, the ABS looked at the cohort of Higher Education graduates in 2011, focusing on their employment outcomes in 2016, career breaks, and pursuit of further study, through a gender lens (ABS, 2021). This report constitutes the second tranche of analysis, providing updated longitudinal employment outcomes analysis in 2021 for the 2011 Higher Education graduate cohort. The ABS will undertake a third tranche of analysis in 2028, to investigate the employment outcomes of the 2011 graduates in 2026, fifteen years after the completion of their Higher Education qualifications.

1.2 Project objectives

The ABS' Women in STEM analysis aims to undertake longitudinal analysis of the employment outcomes of Australians with STEM qualifications, through a gender lens. This will provide insights into long-term career progression for women in STEM, using data available in the PLIDA.

Insights from the project will contribute to the STEM Equity Monitor, which will be updated and added to over time. The insights will focus on gender gaps and key differences between the employment outcomes of women and men over time.

Insights from the project will also provide supporting data for policy and program development and evaluation. The analysis described in this report extends the first tranche of analysis, enabling the professional journeys of individuals with STEM qualifications to be traced over an extended period of time. Therefore, it has the potential to uncover new challenges and provide further evidence of known barriers to women's engagement with STEM.

[6] For further information about Australian Government policy initiatives aimed at increasing the representation of women and girls in STEM, see: Women and girls in STEM | Department of Industry, Science and Resources.

1.3 Research questions

- Do women with STEM qualifications find suitable jobs in their associated industries/occupations and what are their employment outcomes compared to women that do not have STEM qualifications and compared to men with STEM qualifications?
- What are the demographic characteristics of women with STEM qualifications? The characteristics explored include age, Aboriginal and Torres Strait Islander origin, country of birth and disability status.
- What are the employment outcomes of women in specific population groups, such as Aboriginal and Torres Strait Islander women, women with a disability, and women born overseas?
- How does the income of people with STEM qualifications change from 2011 to 2021?
- What proportion of STEM graduates stay in the workforce and work in STEM-related industries and occupations over the ten-year period from 2011 to 2021?

CHAPTER 2: DATA

This chapter describes the data sources, key definitions and populations used in this analysis. It also describes the limitations of the data, and privacy and confidentiality requirements.

2.1 Data sources

The analysis in this report is based on the Women in STEM integrated dataset 2011-2021, which uses PLIDA data. PLIDA is a secure data asset combining information on health, education, government payments, income and taxation, employment, and population demographics (including the Census of Population and Housing) over time.[7]

The PLIDA datasets used in this analysis are:

- Higher Education
- Census of Population and Housing
- Personal Income Tax Income Tax Return
- PLIDA combined demographics
- PLIDA combined locations

2.1.1 Higher Education data

Description

Higher Education data is provided by the Department of Education and contains information about enrolments, completions, courses, and loan amounts for students studying at Australian higher education institutions. The Higher Education data used in this analysis was collected using the Higher Education Information Management System (HEIMS).

Scope

In this analysis, higher education completions records are summarised to provide insights into the cohort of students who completed a qualification in 2011. While most students only have one completion record in a year, if a student completed multiple qualifications in the year, the highest qualification was used. As the analysis uses variables from the higher education enrolments table, students without an enrolment record from 2005 to 2011 were excluded.

Variables

Variables sourced from the higher education enrolments table:

- Attendance type (ATTENDANCE_TYPE)
- Country of birth (COUNTRY_BIRTH)
- Disability status (DISABILITY)
- Gender (GENDER)

[7] Further information about PLIDA is available at: Person Level Integrated Data Asset (PLIDA) | Australian Bureau of Statistics (abs.gov.au). PLIDA was formerly known as the Multi-Agency Data Integration Project (MADIP).

Variables sourced from the higher education completions table:

- Course type (COURSE_TYPE)
- Field of education (FOE)
- Year of completion (YEAR)

Further information about these variables is provided in Appendix 2: Data Item List.

Reference period

The analysis in this report describes outcomes for students who completed a higher education qualification in 2011. The higher education enrolments data used in this analysis is from 2005 to 2011. Higher education enrolments and completions are compiled by calendar year.

2.1.2 The Census of Population and Housing (the Census)

Description

The ABS conducts a Census of Population and Housing every five years as required by the *Census and Statistics Act 1905*. Regularly taking a census provides a comprehensive snapshot of the nation and enables the updating and maintenance of Australia's official population estimates.

The Census collects data on a broad range of topics including marital status, family size, occupation, language used at home, country of birth, income, and ancestry. For more information about the 2021 Census, see: About the Census | Australian Bureau of Statistics (abs.gov.au).

Scope

The Census aims to measure the number and key characteristics of dwellings and people in Australia on Census Night. All people in Australia on Census Night are in scope, except foreign diplomats and their families. Visitors to Australia are counted in the Census, however, people recorded as overseas visitors in the 2021 Census have been excluded from all analysis in this report. Australian residents not in the country on Census Night are out of scope of the Census.

The ABS uses several strategies to ensure everyone can participate in the Census. For more information, see: Participation in the 2021 Census | Australian Bureau of Statistics (abs.gov.au).

For further information about the quality of the 2021 Census, see:

- Quality declaration | Australian Bureau of Statistics (abs.gov.au)
- Report on the quality of 2021 Census data: Statistical Independent Assurance Panel to the Australian Statistician | Australian Bureau of Statistics (abs.gov.au).

Variables

The Census variables used in this analysis include:

- Industry of employment (INDP)
- Labour force status (LFSP)
- Language used at home (LANP)
- Status in Employment (SIEMP)

- Unpaid child care (CHCAREP)
- Unpaid domestic work (DOMP)
- Year of arrival in Australia (YARP)

Further information about these variables is provided in Appendix 2: Data Item List.

Reference period

The Census is carried out by the ABS every five years. Data from the most recent Census, a snapshot as at 10 August 2021, was used in this analysis.

2.1.3 Personal Income Tax Income Tax Return (PIT ITR)

Description

The Australian Taxation Office (ATO) provides a range of data to PLIDA, including information from individual income tax returns submitted to the ATO in the Income Tax Return dataset. This dataset includes information about income, losses, deductions, expenses, offsets, tax withheld and debts.

Scope

PIT ITR data includes personal income information for all people who submit a personal income tax return each year. The dataset does not cover all people, such as people who are not residents of Australia for tax purposes, late lodgers of tax returns (i.e. those who lodge more than 16 months after the end of the financial year) and people whose taxable earnings are below the tax-free threshold and who do not submit a tax return. More information about the requirements for lodging a personal income tax return is available at: Home | Australian Taxation Office (ato.gov.au).

The PIT analysis cohort includes persons with a PIT ITR record in PLIDA and a non-zero wage and salary income amount in any financial year from 2010-11 to 2020-21.

Variables

The key PIT ITR variables used in this analysis are:

- The main salary and wage occupation – code (IDV_OCPTN_CD)
- Gross salary or wages amount (GRS_PMT_TOTL_CA)

Further information about these variables is provided in Appendix 2: Data Item List.

Reference periods

The analysis in this report includes PIT ITR records from 2010-11 to 2020-21. PIT ITR data is compiled on a financial year basis.

2.1.4 PLIDA combined demographics

Description

The PLIDA combined demographics modules are created by combining demographic information about persons on the Person Linkage Spine from several PLIDA datasets.[8] The datasets used to create these modules, and their data custodians, are:

- Medicare Consumer Directory (Services Australia)
- DOMINO Centrelink Administrative Data (Department of Social Services)
- ATO Client Register (Australian Taxation Office)
- The Census (Australian Bureau of Statistics)
- Death Registrations (Australian Bureau of Statistics)

Scope

The PLIDA combined demographics modules contain basic demographic information about persons on the Spine from 1 January 2006 until 2022.

Variables

PLIDA combined demographics was used in this analysis to inform age and Aboriginal and Torres Strait Islander status (EVER_INDIGENOUS_PERSON). Further information about these variables is provided in Appendix 2: Data Item List.

Reference periods

In this analysis, age is derived as at the completion of study in 2011. Aboriginal and Torres Strait Islander status indicates whether people have ever recorded being of Aboriginal and/or Torres Strait Islander descent in any of the component datasets. PLIDA demographics data is updated annually, with a reference period ending 30 June.

2.1.5 PLIDA combined locations

Description

The PLIDA combined locations module contains geocoded location information from three datasets. These datasets and their data custodians are:

- Medicare Consumer Directory (Services Australia)
- DOMINO Centrelink Administrative Data (Department of Social Services)
- ATO Client Register (Australian Taxation Office)

[8] The Person Linkage Spine is central to ABS data linking methods. All datasets are linked to the Spine once and analytical datasets are combined via the Spine as needed. This enables more efficient and higher quality linkage. The spine aims to cover all people who were resident in Australia at any point during a given reference period. For more information about the Person Level Spine, see: Person linkage spine | Australian Bureau of Statistics (abs.gov.au).

Scope

The PLIDA combined locations module contains location information about persons on the Spine from 1 January 2006 until 2022.

Variables

The geographic variables used in this analysis are:

- Remoteness area
- 2021 Socio-Economic Indexes for Area Index of Relative Socio-Economic Advantage and Disadvantage (SEIFA IRSAD)

Geographic variables in this analysis are coded to the Australian Statistical Geography Standard (ASGS) Edition 3. Further information is provided in Appendix 2: Data Item List.

Reference periods

The geographic variables in this analysis use PLIDA combined locations data as at 2021. This dataset may contain periods of time where no known address information is available for an individual. This is due to a delay between when an individual actually changes their address and when they report this change to service providers (i.e. Medicare, ATO, Centrelink). Therefore, the real-world start date of addresses recorded will often be earlier than the date recorded in the combined locations data. Also, while the combined locations module aims to determine an individual's main place of residence (within monthly intervals), there may be individuals who legitimately have multiple concurrent places of residence.

PLIDA combined locations is updated annually, in line with the annual Spine updates, with a reference period ending 30 June.

2.2 Population

This section describes the three analysis populations used in this report.

2.2.1 2011 Higher Education graduates

The 2011 Higher Education graduate population consists of students in the Higher Education dataset who completed a qualification in 2011, excluding:

- people who did not link to the PLIDA spine
- people who did not link to a Higher Education enrolment record from 2005-2011
- people aged 14 years or younger in August 2011
- people recorded as deceased prior to the end of 2021
- people recorded as an Overseas Visitor in the 2021 Census.

This population is used to analyse the demographic characteristics of the cohort at the time of completion of their qualification in 2011. It is the basis for two additional analysis populations.

2.2.2 2011 Higher Education graduates linked to the 2021 Census

The second analysis population consists of the subset of the 2011 Higher Education graduates (defined above) who linked to the 2021 Census. This population is used to analyse the labour force status, industry of employment, language spoken at home and provision of unpaid childcare of the cohort in 2021.

2.2.3 2011 Higher Education graduates linked to PIT ITR

The third analysis population is the subset of 2011 Higher Education graduates who linked to one or more PIT ITR datasets from 2010-11 to 2020-21 and had a non-zero wage and salary income amount. This population is used to analyse graduates' income and occupation.

Table 1: Number and percentage of persons in the Women in STEM 2011 Higher Education graduate analysis populations, 2011-2021

Datasets	Count	Percentage
All students with a Higher Education completion record in 2011, less:	169,494	100%
• students without a Higher Education enrolment record from 2005 to 2011	- 68	
• people who did not link to the PLIDA spine	- 4319	
• people aged 14 years or younger in August 2011	- 19	
• people recorded as deceased prior to the end of 2021	- 702	
• people recorded as an Overseas Visitor in the 2021 Census	- 184	
2011 Higher Education graduates	164,202	96.9%
2011 Higher Education graduates linked to the 2021 Census	145,343	85.8%
2011 Higher Education graduates linked to PIT ITR datasets (2010-11 to 2020-21)	161,534	95.3%

Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021

2.3 Definitions

2.3.1 STEM, Health and non-STEM fields of education

The analysis in this report groups the qualifications of students into STEM, health and non-STEM field of education. This definition is consistent with the STEM Equity Monitor (DISR, July 2023), and with ABS' analysis of 2011 Higher Education graduates' longitudinal employment outcomes in 2016.

Field of education is classified using the Australian Standard Classification of Education (ASCED) (ABS, 2001). Table 2 summarises STEM, health and non-STEM fields of education at the 2-digit level, with further detail provided in Appendix 3.1.

Table 2: STEM, health and non-STEM fields of education, 2021

Broad field of education	Field code Level (2-digit)	Field of education
STEM	01	Natural and physical sciences
	02	Information technology (IT)
	03	Engineering and related technologies
	05	Agriculture, environment and related studies
Health	06	Health
Non-STEM	04	Architecture and Building
	07	Education
	08	Management and Commerce
	09	Society and Culture

Source: OCS 2016, OCS 2020, Australian Standard Classification of Education, ABS 2001.

2.3.2 STEM-qualified industries of employment

A STEM-qualified industry is defined as an industry in which the majority (more than 50%) of people employed had a STEM qualification from a Vocational Education and Training (VET) and/or higher education provider, according to the 2021 Census (DISR, July 2023) (Table 3). This definition is consistent with the STEM Equity Monitor.

Table 3: Definition of STEM-qualified industry of employment, 2021

Classification	Description
University STEM-qualified	At least 50% of the industry's working population have a university STEM qualification
VET STEM-qualified	At least 50% of the industry's working population have a VET STEM qualification
Mixed STEM-qualified	At least 50% of the industry's working population have a STEM qualification in either VET or university

Source: https://www.industry.gov.au/publications/stem-equity-monitor/methodology

The definition of a STEM-qualified industry used in the ABS' analysis of 2011 Higher Education graduates' longitudinal employment outcomes in 2016 used the same conceptual approach, but was based on 2016 Census data. As such, the industries classified as STEM-qualified in 2021 may differ from the industries classified as STEM-qualified in 2016. For further detail, see Appendix 3.2.

2.3.3 STEM-qualified occupations

A STEM-qualified occupation is defined as an occupation in which the majority (more than 50%) of people employed had a STEM qualification from a VET and/or higher education provider, according to the 2021 Census (DISR, July 2023) (Table 4). In the 2021 Census, occupation (OCCP 2021) was defined using ANZSCO 2013, version 1.3. This definition is consistent with the STEM Equity Monitor.

Table 4: Definition of STEM-qualified and health occupations, STEM Equity Monitor, 2021

Classification	Description
University STEM-qualified	At least 50% of the occupation's working population have a university STEM qualification
VET STEM-qualified	At least 50% of the occupation's working population have a VET STEM qualification
Mixed STEM-qualified	At least 50% of the occupation's working population have a STEM qualification from either VET or university
Health occupation	At least 50% of the occupation's working population have a health qualification from either VET or university

Source: https://www.industry.gov.au/publications/stem-equity-monitor/methodology

As with STEM-qualified industries, the definition of a STEM-qualified occupation used in the ABS' analysis of 2011 Higher Education graduates' longitudinal employment outcomes in 2016 used the same conceptual approach, but was based on 2016 Census data. As such, the occupations classified as STEM-qualified in this analysis may differ from those classified as STEM-qualified in the ABS' earlier analysis. For a list of STEM-qualified occupations, see Appendix 3.3.

2.3.4 Gender

The analysis in this report uses two gender categories, reflecting the definitions used to collect data over time. This analysis uses the gender variable from Higher Education enrolment records from 2005-2011, collected using HEIMS. At the time, gender was defined as "a code which identifies the sex of a person" and included two categories: male and female. For consistency with the STEM Equity Monitor, this report uses the terms 'men' for the male gender category and 'women' for the female gender category.

From 2014, in response to the Australian Government Guidelines on the Recognition of Sex and Gender, HEIMS was updated to allow the reporting of code X (indeterminate/Intersex/Unspecified). This facilitated the progressive implementation of the aforementioned guidelines by providers of data to HEIMS (2014 315 Gender code | TCSI Support).

From 2020, HEIMS was replaced with the Tertiary Collection of Student Information (TCSI). In 2021, the definition of gender was updated to "a code which identifies the gender of a person", with three response categories (Gender code | TCSI Support).

In PLIDA, Higher Education data is provided via an annual resupply of data. Therefore, gender information may be updated for students who have enrolled in further study since the systems and definitions were updated.

2.4 Data quality

2.4.1 Limitations of using administrative data

The ABS acknowledges the support of data custodians in enabling this analysis of integrated administrative data. The ABS acknowledges that administrative data is collected for the purpose of

administering government services and not for statistical purposes. Any discussion of the limitations of the data for statistical purposes is not related to its ability to support service delivery.[9]

Bringing together data from a range of sources can introduce limitations to the quality of data for statistical purposes. Some considerations relevant to the analysis in this report are described below.

Scope and coverage

The target population for the analysis in this report is students who completed a higher education qualification in 2011. Due to the use of information from a range of data sources, three analysis populations have been used. These analysis populations do not provide complete coverage of all students in the target population. This is because a small proportion of students may not have linked to the PLIDA data, or may have linked but may not have a record in one or more of the datasets used in this analysis. The coverage of the target population in the analysis populations is shown in Table 1.

Coherence

Coherence refers to the internal consistency of a statistical collection, product or release, as well as its comparability with other sources of information, within a broad analytical framework and over time. In considering the coherence of this analysis with other data sources, and with the ABS' analysis of 2011 Higher Education graduates' longitudinal employment outcomes in 2016, it is important to note:

- Key definitions used in this analysis are provided in section 2.3 above, and detailed definitions of all variables used in the analysis in this report are provided in Appendix 2: Data Item List. Care should be taken when comparing results from this analysis with results from other sources, as different variables (e.g. age, gender, disability status) may have been used.
- Consistency with the ABS' previous Women in STEM analysis has been maintained, where possible. However, some of the variables and definitions used in this analysis differ from those used in the ABS' analysis of 2016 employment outcomes, and this should be taken into account when comparing results from the two reports. In particular, the industries and occupations classified as STEM-qualified in 2021 differ from those classified as STEM-qualified in 2016. Where analysis of STEM-qualified occupations in this report refers to graduate outcomes in 2016, the 2021 definitions have been used.
- The analysis in this report uses updated PLIDA data, including the most recent Person Level Spine. As such, the number of graduates in the 2011 Higher Education graduate analysis population used in this analysis differs from that used in the ABS' previous report.

Timeliness

- This report describes graduates' employment outcomes in 2021. However, the reference periods of several variables used in this analysis differ. For example:
    - 2021 Census variables reflect graduates' circumstances as at 10 August 2021

[9] Personal income tax data is supplied by the ATO to the ABS under the *Taxation Administration Act 1953,* which requires that such data is only used for the purposes of administering the *Census and Statistics Act 1905*. Any discussion of data limitations or weaknesses is made within the context of using the data for statistical purposes, and is not related to the ability of the data to support the ATO's core operational requirements.

- Income and occupation data from PIT ITR represent graduates' circumstances during the financial year, up to the 2020-21 financial year.
- Geographic variables, such as remoteness, are based on graduates' main address during the 2021 calendar year.

- Graduates' employment outcomes in 2021 coincide with the COVID-19 pandemic
  - The 2021 Census was undertaken during the COVID-19 pandemic and several regions were in various stages of lockdown on Census night and during the week preceding it. The ABS undertook extensive planning to carry out the 2021 Census safely. For more information, see: Story 13: Delivering a successful Census during a pandemic | Australian Bureau of Statistics (abs.gov.au).
  - Some aspects of the labour market in 2021 may have differed from the labour market before and after the pandemic[10], and this should be considered when interpreting graduates' outcomes during this period.

2.4.2 Privacy, security and confidentiality

The ABS is authorised to collect, compile, analyse and publish statistics under the *Australian Bureau of Statistics Act 1975* and the *Census and Statistics Act 1905*. The ABS protects privacy and is committed to keeping integrated data safe and secure. The data used in this analysis is protected by the secrecy provisions of the *Census and Statistics Act 1905*. This means that the ABS cannot release data in a way that is likely to identify an individual. For more information about the ABS' privacy protections, see Keeping integrated data safe and Privacy at the ABS.

Statistics in this report have been assessed to ensure the secrecy, privacy and identity of information collected from individuals and organisations is protected.[11] Maintaining confidentiality, especially where a statistic describes a small population group, may result in a treatment such as suppression of small counts or aggregation of categories being applied.

[10] A range of ABS products provide insights into the impact of the COVID-19 pandemic on the labour market, including during and after the pandemic emerged. Timeseries labour market estimates are available in Labour Force Australia and timely payroll jobs estimates sourced from Single Touch Payroll data are available in Weekly Payroll Jobs. In addition, a series of analytical articles have been produced, such as One Year of COVID-19 and The impact of the COVID-19 pandemic on employee jobs and income, June 2020.

[11] Further information about confidentiality in the ABS is available at: Data confidentiality guide | Australian Bureau of Statistics (abs.gov.au).

CHAPTER 3: DEMOGRAPHIC AND EDUCATIONAL PROFILE OF 2011 HIGHER EDUCATION GRADUATES

3.1 Profile of 2011 Higher Education graduates

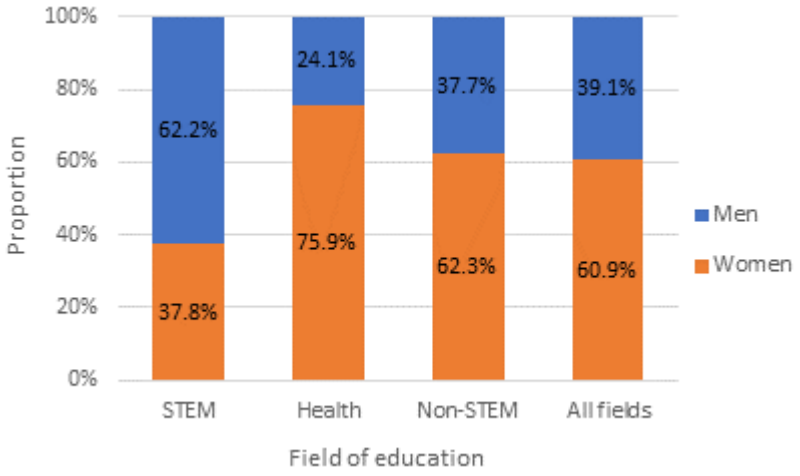
3.1.1 Analysis population

This chapter summarises the key demographic characteristics of people who completed a Higher Education qualification in 2011 and the fields of education in which they studied. The following information is based on the 2011 Higher Education graduate analysis population, consisting of 164,202 graduates, as defined in chapter 2.

3.1.2 Gender composition of 2011 Higher Education graduates

- In 2011, three in five (60.9%) Higher Education graduates were women and two in five (39.1%) were men (Figure 3.1).
- Women comprised the majority of graduates in health (75.9%) and non-STEM (62.3%) fields of education. In contrast, the majority of STEM graduates were men (62.2%), with women comprising 37.8%.

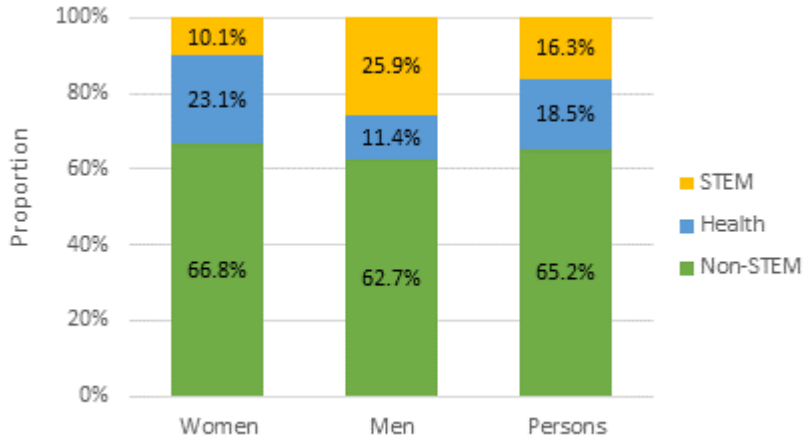
Figure 3.1: Proportion of 2011 Higher Education graduates in each field of education, by gender, 2011



Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates analysis population.

- In 2011, almost two-thirds (65.2%) of graduates obtained a non-STEM qualification, one in five (18.5%) obtained a health qualification, and one in six (16.3%) obtained a STEM qualification (Figure 3.2).
- One in ten (10.1%) women obtained a STEM qualification, compared with one in four (25.9%) men.

Figure 3.2: Proportion of 2011 Higher Education graduates in each gender and overall, by field of education, 2011



Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduate analysis population.

3.1.3 Aboriginal and Torres Strait Islander graduates

- Aboriginal and Torres Strait Islander graduates made up 0.6% (or 172 people) of the 26,765 people who completed a STEM qualification in 2011.
- Aboriginal and Torres Strait Islander men and women had a similar level of representation among all men (0.6%) and women (0.7%) who completed a STEM qualification in 2011.
- Graduates of Aboriginal and Torres Strait Islander origin made up a greater proportion of health (1.3% of men, 1.7% of women) and non-STEM graduates (1.0% of men and 1.4% of women), than they did STEM graduates.
- For context, Aboriginal and Torres Strait Islander Australians made up 2.7% of the total Estimated Resident Population aged 15-64 years in 2011.[12] This indicates that Aboriginal and Torres Strait Islander Australians were under-represented in the 2011 Higher Education graduate cohort overall, and as a proportion of STEM graduates.

3.1.4 Graduates with a disability, impairment or long-term medical condition in 2011

- Among STEM graduates, 4.5% of men and 5.5% of women had a disability, impairment or long-term medical condition in 2011. This was similar to the proportion of all 2011 Higher Education graduates with disability (4.9% of men and 5.5% of women).
- For context, the 2012 Survey of Disability, Ageing and Carers (SDAC) estimated that 9.9% of Australian males and females aged 15 to 64 years had a schooling or employment restriction associated with a disability.[13] However, the SDAC estimate is not comparable to the Higher Education estimate because the SDAC uses a different method to determine disability status.

[12] 3238.0 - Estimates and Projections, Aboriginal and Torres Strait Islander Australians, 2001 to 2026 (abs.gov.au).
[13] 4430.0 - Disability, Ageing and Carers, Australia: Summary of Findings, 2012 (abs.gov.au)

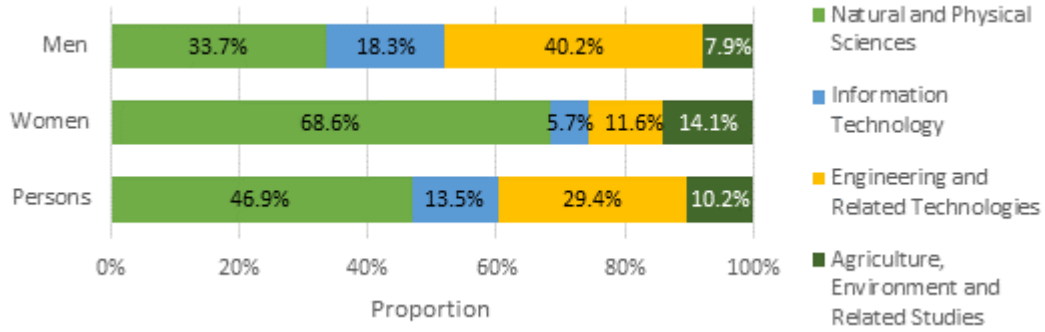
3.1.5 Gender and age of graduates in STEM fields of education

Gender

In 2011, male and female STEM graduates tended to study in different fields of education.

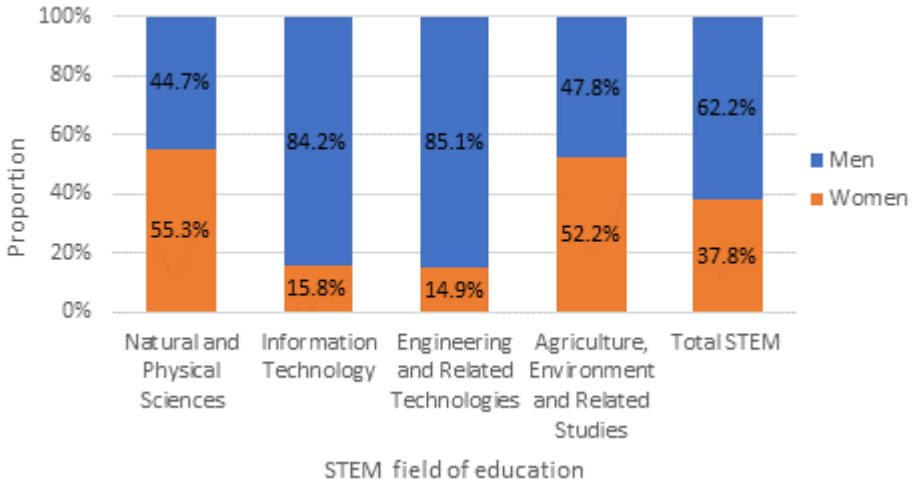
- A larger proportion of women studied Natural and Physical Sciences (68.6% of women, 33.7% of men) and Agriculture, Environment and Related Studies (14.1% of women, 7.9% of men) (Figure 3.3).
- A larger proportion of men studied Engineering and Related Technologies (40.2% of men, 11.6% of women) and Information Technology (18.3% of men, 5.7% of women) (Figure 3.3).
- Women made up over half of graduates in Natural and Physical Sciences (55.3%) and Agriculture, Environment and Related Studies (52.2%), but only 15.8% of graduates in Information Technology and 14.8% of graduates in Engineering and Related Technologies (Figure 3.4).

Figure 3.3: Proportion of 2011 Higher Education graduates with a STEM qualification in each gender, by STEM field of education, 2011



Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduate analysis population.

Figure 3.4: Proportion of 2011 Higher Education graduates with a STEM qualification in each STEM field of education, by gender, 2011



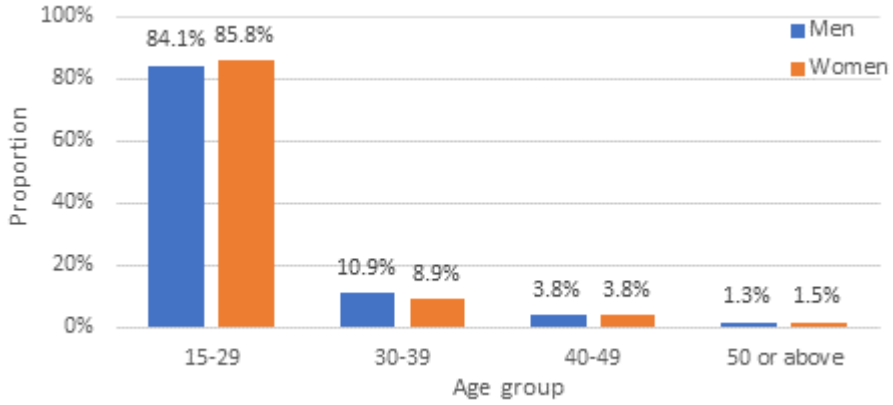
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduate analysis population.

Age

STEM graduates tended to be younger than graduates in other fields, with 84.7% of STEM graduates aged 15-29 years, compared with 71.1% of health and 73.4% of non-STEM graduates.

Among STEM graduates, men and women had a similar age profile, with 84.1% of men and 85.8% of women aged 15-29 years (Figure 3.5).

Figure 3.5: Proportion of 2011 Higher Education graduates with a STEM qualification, by gender and age group, 2011(a)



(a) Age group refers to graduates' age in 2011.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduate analysis population.

Figure 3.6 shows the proportion of 2011 STEM graduates, by gender, age group, and field of education. STEM graduates aged 30 years or above tended to study in different fields than graduates aged 15-29 years.

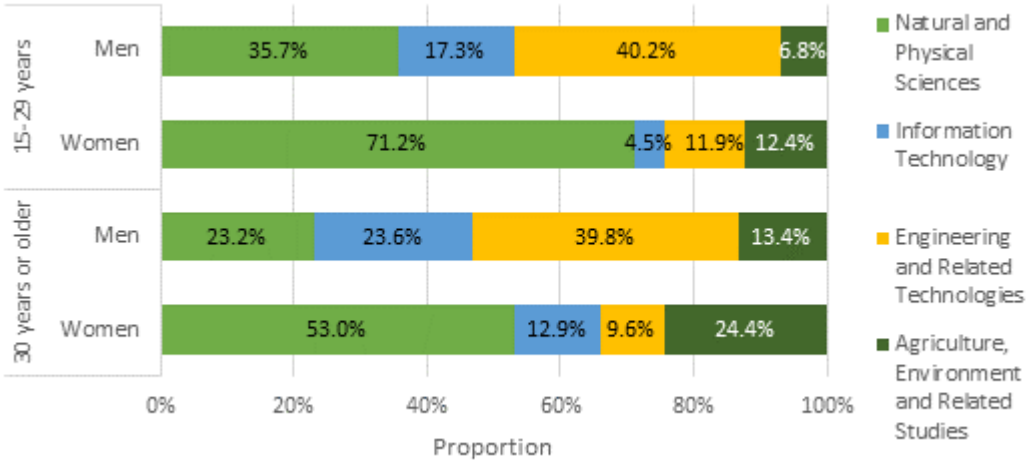
Among men who completed a STEM qualification in 2011:

- A quarter of those aged 30 years or above (23.6%) graduated with an Information Technology degree, compared with 17.3% of those aged 15-29 years.
- A smaller proportion of graduates aged 30 years or above studied Natural and Physical Sciences (23.2%), than those aged 15-29 years (35.7%).

Among women who completed a STEM qualification in 2011:

- A quarter (24.4%) of those aged 30 or above studied Agriculture, Environment and Related Studies, compared with 12.4% of those aged 15-29 years.
- A larger proportion of those aged 30 or above studied Information Technology (12.9%), than those aged 15-29 years (4.5%).
- A smaller proportion of women aged 30 or above studied Natural and Physical Sciences (53.0%), than those aged 15-29 years (71.2%).

Figure 3.6: Proportion of 2011 Higher Education graduates with a STEM qualification, by age group, gender and field of education, 2011(a)



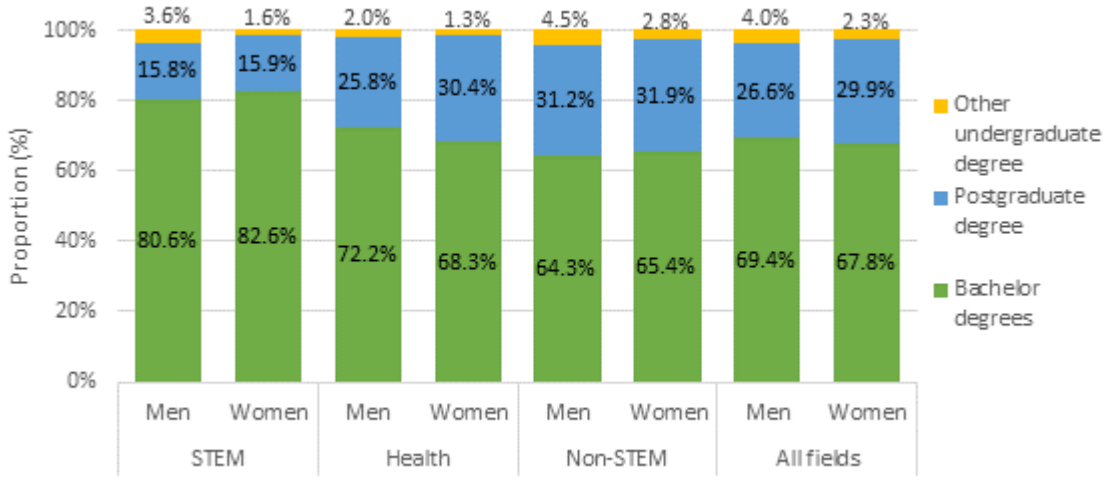
(a) Age group refers to graduates' age in 2011.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduate analysis population.

3.1.6 Level of qualification

In 2011, consistent with the younger age profile of STEM graduates:

- A larger proportion of STEM graduates obtained a bachelor degree (80.6% of men and 82.6% of women) than graduates in other fields of education (for example, 64.3% of men and 65.4% of women with a non-STEM qualification) (Figure 3.7).
- A smaller proportion of STEM graduates obtained a postgraduate qualification (15.8% of men and 15.9% of women) than graduates in other fields of education (for example, 31.2% of men and 31.9% of women with a non-STEM qualification).

Figure 3.7: Proportion of 2011 Higher Education graduates, by field of education, gender and level of qualification, 2011



Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduate analysis population.

3.1.7 Attendance type

In 2011, one-third (33.0%) of graduates in all fields of education attended part-time, and this was similar for both men (33.8) and women (32.6%). Part-time attendance differed by age group, as 60.1% of graduates aged 30 years and over attended part-time, compared with 24.0% of graduates aged 15-29 years.

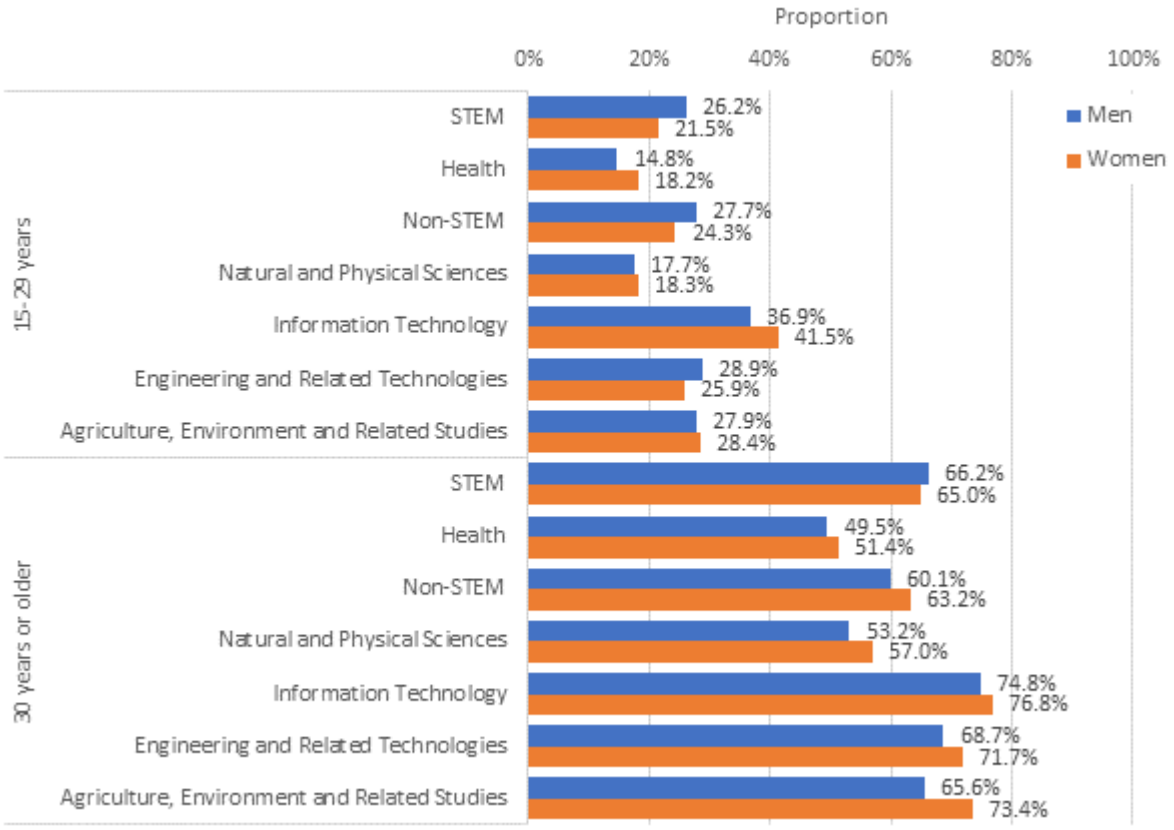
A slightly lower proportion of STEM graduates attended part-time (30.7%) than graduates from all fields (33.0%). However, among graduates aged 30 years or above, a larger proportion of STEM graduates attended part-time (66.2% of men and 65.0% of women) than health (49.5% of men and 51.4% of women) and non-STEM graduates (60.1% of men and 63.2% of women) (Figure 3.8).

The STEM field with the highest part-time attendance was Information Technology, with:

- 76.8% of female and 74.8% of male graduates aged 30 years and over attending part-time.
- 41.5% of female and 36.9% of male graduates aged 15-29 years attending part-time.

Natural and Physical Sciences had the lowest level of part-time attendance, with 53.2% of men and 57.0% of women aged 30 years and over attending part-time.

Figure 3.8: Proportion of 2011 Higher Education graduates who attended part-time, by gender, age group and field of education, 2011(a)



(a) Age group refers to graduates' age in 2011.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduate analysis population.

CHAPTER 4: LABOUR FORCE STATUS AND INDUSTRY OF EMPLOYMENT OF 2011 HIGHER EDUCATION GRADUATES, 2021

4.1 Analysis population

The analysis in this chapter is based on the 2011 Higher Education graduate cohort linked to 2021 Census data, consisting of 145,343 people.

4.2 Labour Force Status

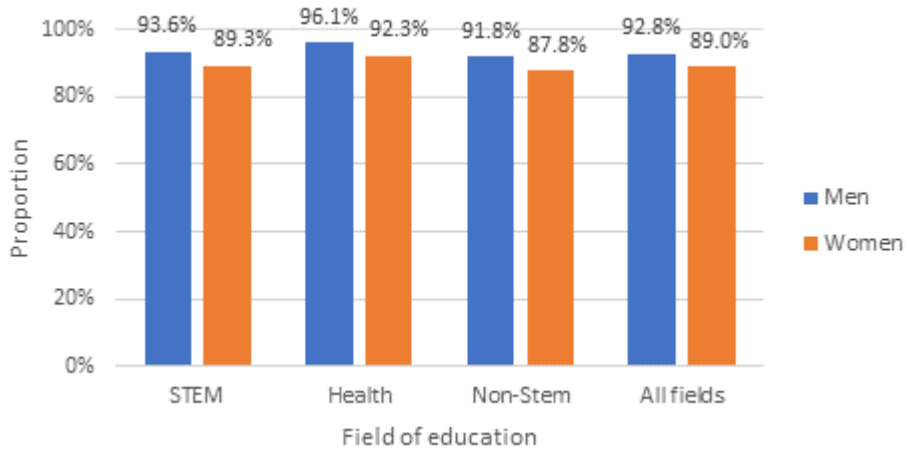
4.2.1 2011 Higher Education graduates who were employed in 2021

Of the 2011 Higher Education graduates linked to the Census, 90.5% were employed in 2021. A slightly higher proportion of men (92.8%) were employed than women (89.0%).

Figure 4.1 shows the proportion of 2011 Higher Education graduates who were employed in 2021, by field of education and gender.

- A slightly larger proportion of women with a health qualification were employed (92.3%), compared with STEM (89.3%) and non-STEM (87.8%).
- A larger proportion of men were employed than women across all fields of education.

Figure 4.1: Proportion of 2011 Higher Education graduates who are employed, by field of education and gender, 2021



Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census analysis population.

4.2.2 2011 Higher Education graduates who were not in the labour force or unemployed in 2021

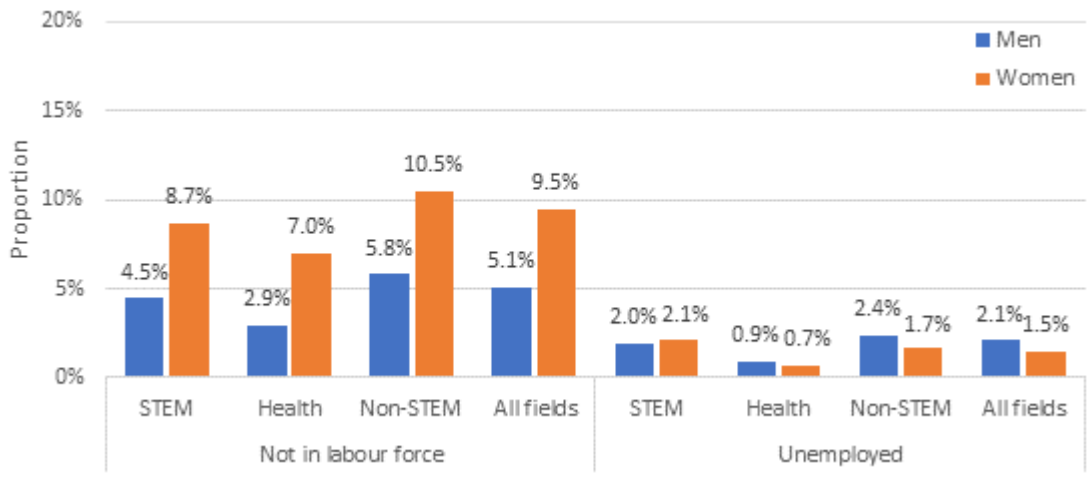
Figure 4.2 shows the proportion of graduates who were not in the labour force and unemployed in 2021, by field of education and gender.

- Approximately one in twelve female STEM graduates (8.7%) were not in the labour force. This was lower than the corresponding proportion for women with a non-STEM qualification (10.5%), but higher than that of women with a health qualification (7.0%).
- A smaller proportion of male STEM graduates were not in the labour force (4.5%), compared with female STEM graduates (8.7%).

Across all fields of education and gender, a small proportion of the 2011 graduate cohort was unemployed in 2021. The groups with the highest proportion of unemployed graduates were:

- men who completed a non-STEM qualification (2.4%)
- women who completed a STEM qualification (2.1%)
- men who completed a STEM qualification (2.0%).

Figure 4.2: Proportion of 2011 Higher Education graduates not in the labour force and unemployed, by field of education and gender, 2021



Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census analysis population.

4.2.3 Labour force status of STEM graduates by age group

The proportion of 2011 STEM graduates who were not in the labour force or unemployed in 2021 differed by age group as well as gender (Figure 4.3).

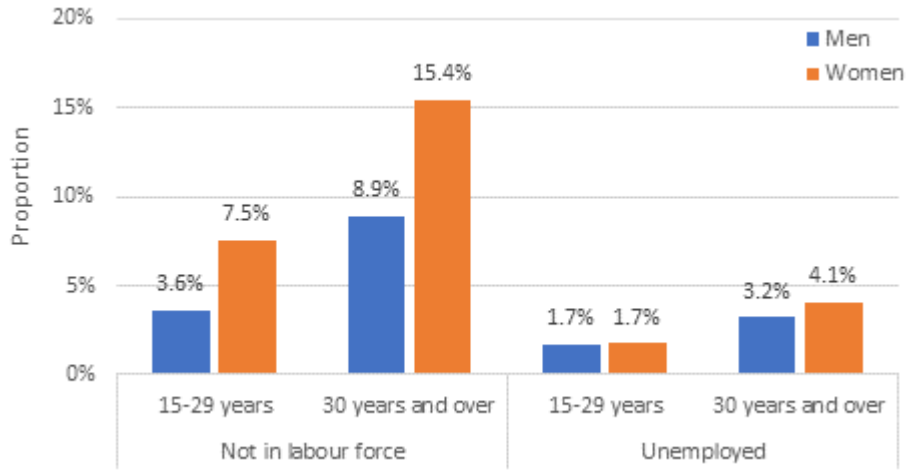
For female STEM graduates, the proportion not in the labour force or unemployed in 2021 was higher among women aged 30 years and over in 2011.

- 15.4% of women aged 30 years and over were not in the labour force, compared with 7.5% of women aged 15-29 years.
- 4.1% of women aged 30 years and over were unemployed, compared with 1.7% of women aged 15-29 years.

For male STEM graduates, the pattern was similar, although the proportion not in the labour force or unemployed was smaller than that of women.

- 8.9% of men aged 30 years and over were not in the labour force, compared with 3.6% of men aged 15-29 years.
- 3.2% of men aged 30 years and over were unemployed, compared with 1.7% of men aged 15-29 years.

Figure 4.3: Proportion of 2011 Higher Education graduates with a STEM qualification not in the labour force and unemployed, by age group and gender, 2021(a)



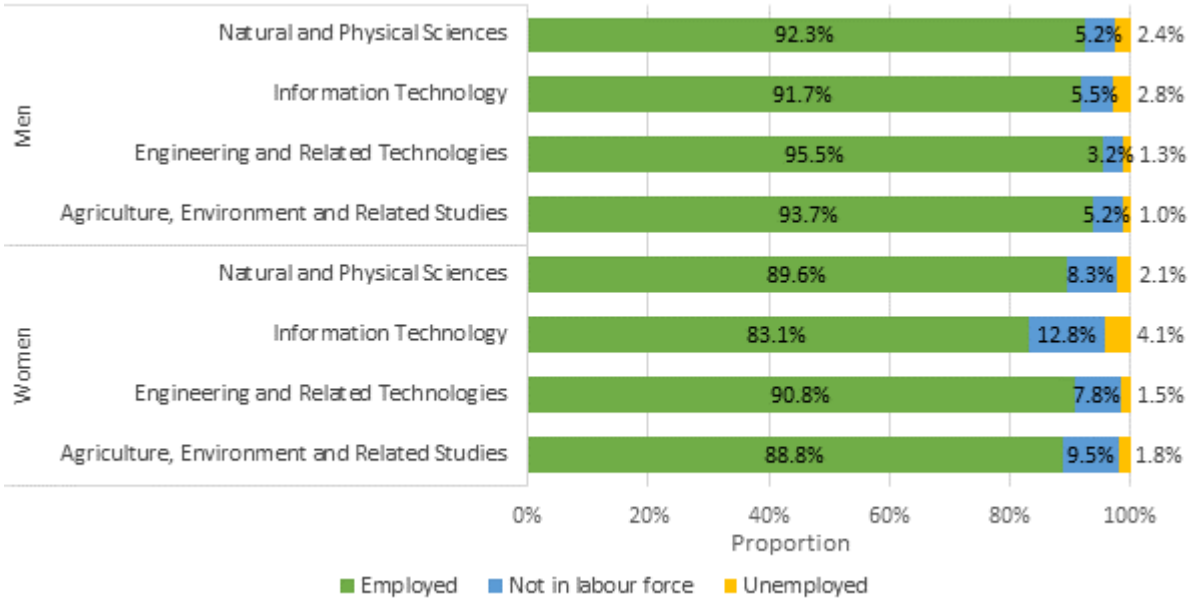
(a) Age group refers to graduates' age in 2011.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census analysis population.

4.2.4 Labour force status of STEM graduates, by field of education

Figure 4.4 shows the proportion of male and female 2011 STEM graduates in each field of education who were employed, not in the labour force, or unemployed in 2021. The proportion employed was high for both genders and across all STEM fields of education.

- For both men (95.5%) and women (90.8%), the field of education with the highest proportion of graduates employed in 2021 was Engineering and Related Technologies.
- The field of education with the highest proportion of graduates not in the labour force in 2021 was Information Technology, with 12.8% of women and 5.5% of men.
- Information Technology was also the field of education with the highest proportion of graduates unemployed in 2021, with 4.1% of women and 2.8% of men.

Figure 4.4: Proportion of 2011 Higher Education graduates with a STEM qualification, by labour force status, gender and field of education, 2021



Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census analysis population

4.2.5 Unpaid care of own and/or other children

This section looks at the proportions of men and women who provided unpaid care of their own and/or other children and their labour force status. While caring for children may be one reason that some graduates are not in the labour force in 2021, there are also likely to be other reasons.

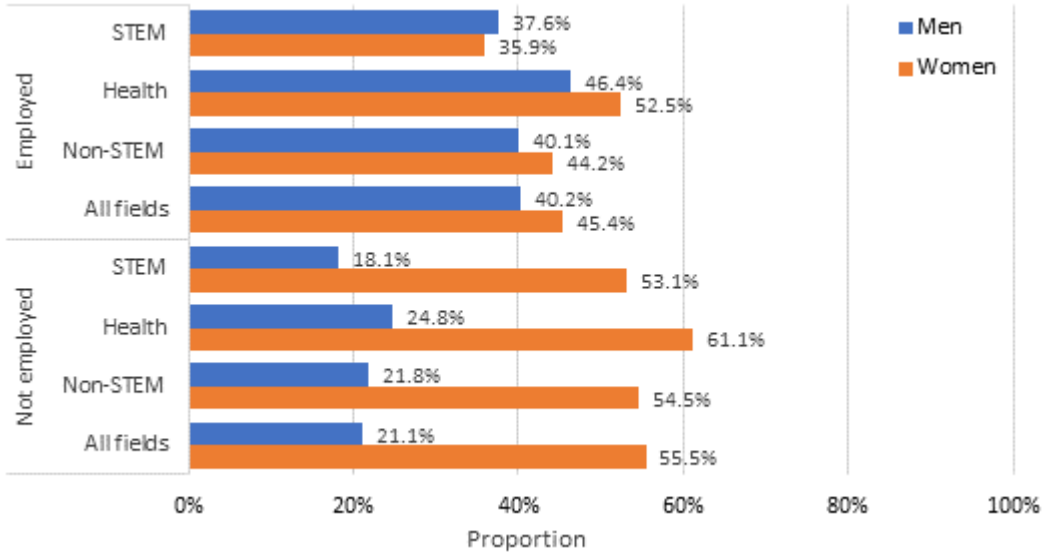
In 2021, a smaller proportion of STEM graduates provided unpaid care of children, compared with graduates in other fields of education.

- Among STEM graduates, 37.7% of women and 36.3% of men provided unpaid child care in 2021, compared with:
    - 53.1% of women and 45.6% of men with a health qualification
    - 45.5% of women and 38.6% of men with a non-STEM qualification.

Figure 4.5 shows the proportion of men and women who provided unpaid child care in 2021, by labour force status, field of education and gender. A larger proportion of women who were not employed provided unpaid child care, compared with women who were employed. The same pattern was not seen among men, and this was consistent across fields of education.

- 53.1% of female STEM graduates who were not employed provided unpaid child care, compared with 35.9% of those who were employed.
- 18.1% of male STEM graduates who were not employed provided unpaid childcare, compared with 37.6% of those who were employed.

Figure 4.5: Proportion of 2011 Higher Education graduates who provided unpaid child care, by labour force status, field of education and gender, 2021(a)



(a) Not employed includes not in the labour force and unemployed.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census analysis population.

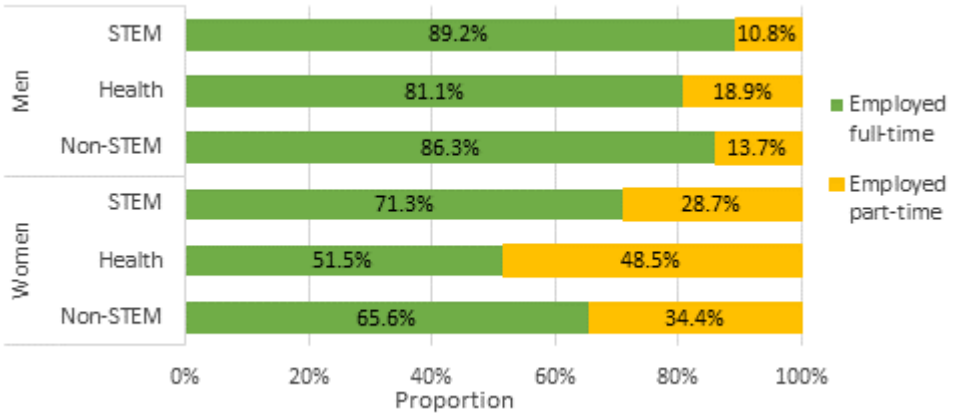
4.2.6 Full-time and part-time employment

In 2021, almost three quarters (72.4%) of graduates who were employed worked full-time, while 27.6% worked part-time. (These proportions exclude around 8.0% of people who were employed in 2021 but were away from work and their full-time or part-time status could not be determined).

Figure 4.6 shows the proportion of employed graduates who worked full-time or part-time, by field of education and gender, in 2021.

- In all fields of education, a larger proportion of female graduates worked part-time than male graduates. Among employed STEM graduates, 28.7% of women worked part-time, compared with 10.8% of men.
- Compared with other fields of education, a smaller proportion of STEM graduates worked part-time. Among health graduates, 48.5% of women and 18.9% of men worked part-time.

Figure 4.6: Proportion of employed 2011 Higher Education graduates, by full-time and part-time status, gender and field of education, 2021(a)



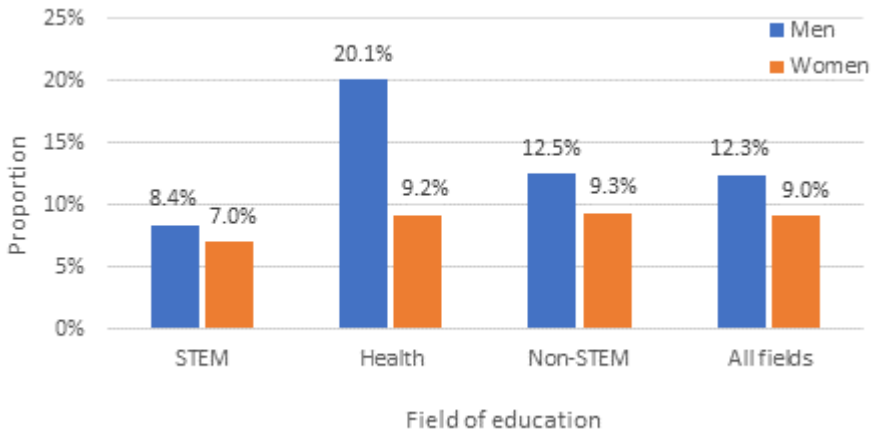
(a) Full-time and part-time percentages calculated from employed persons excluding those who were away from work.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census analysis population.

4.2.7 Status in employment

Of the 2011 Higher Education graduates employed in 2021, 89.7% were employees and 10.3% were owner managers or worked in a family business. A smaller proportion of STEM graduates were owner managers (7.9%) than non-STEM graduates (10.5%) and health graduates (11.8%).

- Among employed graduates in all fields, the proportion of owner managers was higher for men (12.3%) than women (9.0%) (Figure 4.7).
- 8.4% of male STEM graduates were owner managers, compared with 20.1% of male health graduates.
- 7.0% of female STEM graduates were owner managers, which was less than female non-STEM (9.3%) or health (9.2%) graduates.

Figure 4.7: Proportion of employed 2011 Higher Education graduates who were owner managers or worked in a family business, by field of education and gender, 2021(a)



(a) Excludes status in employment not stated.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census analysis population.

4.3 Labour Force Status of graduates in key population groups

This section describes labour force outcomes in 2021 for 2011 STEM graduates from key population groups, using the population of 2011 Higher Education graduates linked to the 2021 Census. Key population groups include graduates with a disability, born overseas, graduates who use a language other than English at home, graduates living in regional or remote areas and graduates living in areas of low relative socio-economic advantage in 2021. Labour force status for Aboriginal and Torres Strait Islander graduates is not available for confidentiality reasons.

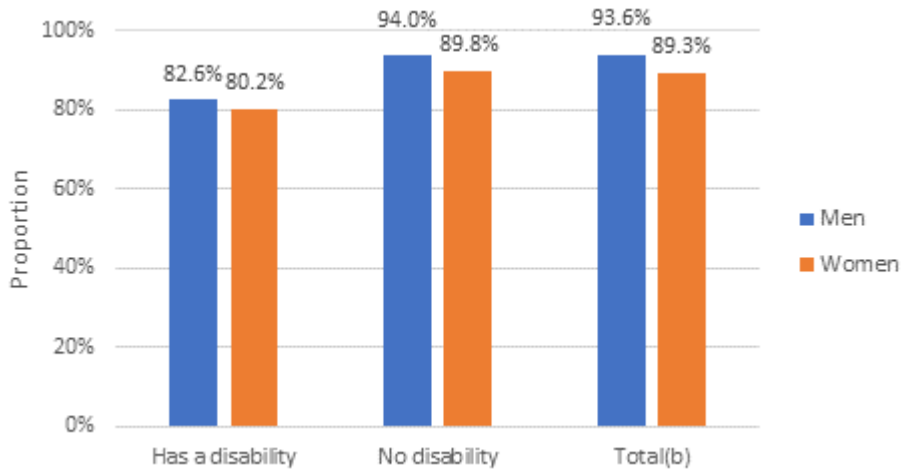
Some key population groups represent a small proportion of 2011 STEM graduates. Caution should be exercised when interpreting proportions based on small population groups.

4.3.1 Graduates with disability

Among 2011 STEM graduates linked to Census data, 5.5% of men and 8.0% of women reported having a disability, impairment or long-term health condition by 2020. Around seven in ten STEM graduates (71.3% of men and 74.7% of women) reported having no disability, and for 23.2% of men and 17.4% of women, disability status was not available.

Figure 4.8 shows the proportion of 2011 STEM graduates employed in 2021, by disability status and gender. 82.6% of men and 80.2% of women with a disability were employed in 2021, compared with 94.0% of men and 89.8% of women with no disability.

Figure 4.8: Proportion of 2011 Higher Education graduates with a STEM qualification employed, by disability status and gender, 2021(a)

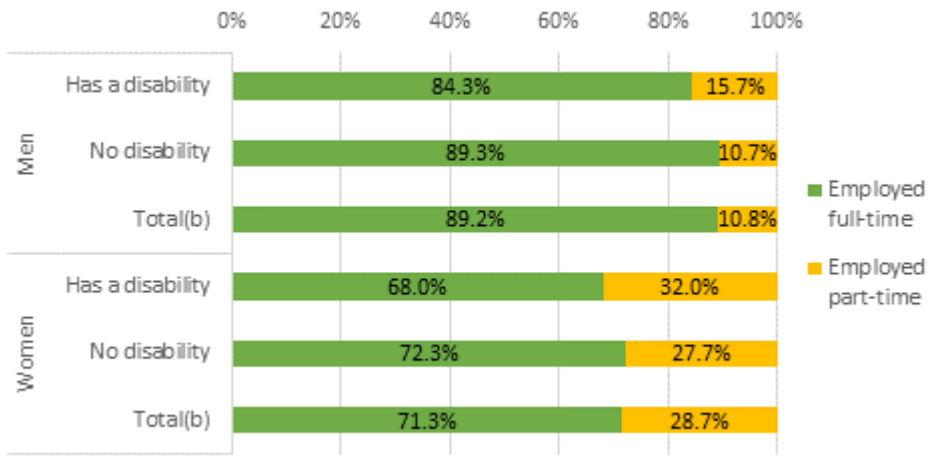


(a) Graduates with not stated labour force status are included in totals.
(b) Total includes graduates with disability status not stated.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census analysis population.

Figure 4.9 shows the proportion of employed 2011 STEM graduates who worked full-time or part-time, by disability status and gender, in 2021. (These proportions exclude the 6.4% of employed STEM graduates who were away from work and whose full-time or part-time status could not be determined.)

The proportion of 2011 STEM graduates who worked part-time in 2021 was slightly higher for graduates with a disability (15.7% of men and 32.0% of women) than those with no disability (10.7% of men and 27.7% of women).

Figure 4.9: Proportion of employed 2011 Higher Education graduates with a STEM qualification, by full-time and part-time status, disability status and gender, 2021(a)



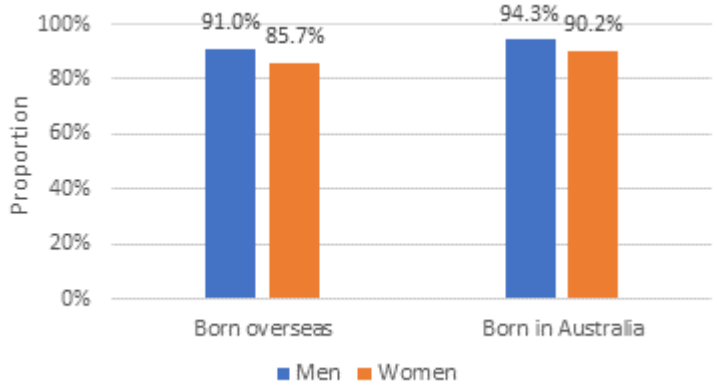
(a) Full-time and part-time percentages calculated from employed persons excluding those who were away from work.
(b) Total includes disability status not known.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census analysis population.

4.3.2 Graduates born overseas

Approximately one in five 2011 STEM graduates linked to Census data (22.4% of men and 21.8% of women) were born overseas.

Figure 4.10 shows the proportion of 2011 STEM graduates employed in 2021, by country of birth and gender. A slightly smaller proportion of 2011 STEM graduates who were born overseas (85.7% of women and 91.0% of men) were employed in 2021, compared with those born in Australia (90.2% of women and 94.3% of men).

Figure 4.10: Proportion of 2011 Higher Education graduates with a STEM qualification employed, by country of birth and gender, 2021(a)(b)



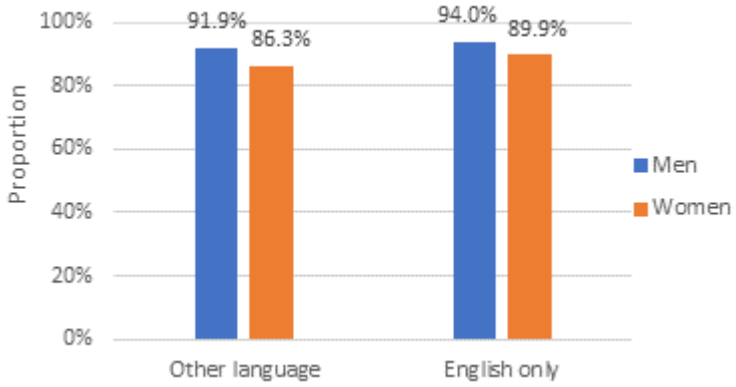
(a) Born in Australia includes those with country of birth not stated.
(b) Graduates with not stated labour force status are included in totals.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census analysis population.

4.3.3 Language used at home

Among 2011 STEM graduates linked to Census data, around one in five (20.9% of men and 19.1% of women) used a language other than English at home.

Figure 4.11 shows the proportion of 2011 STEM graduates employed in 2021, by language used at home and gender. In 2021, 91.9% of men and 86.3% of women who used a language other than English at home were employed, compared with 94.0% of men and 89.9% of women who used English only.

Figure 4.11: Proportion of 2011 Higher Education graduates with a STEM qualification employed, by language spoken at home and gender, 2021(a)(b)



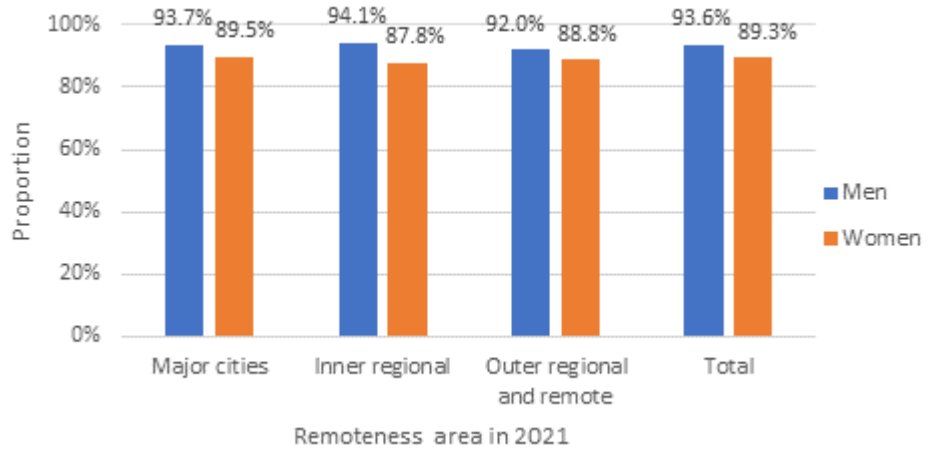
(a) English only includes those with language spoken at home not stated.
(b) Graduates with not stated labour force status are included in totals.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census analysis population.

4.3.4 Remoteness area

Remoteness area was available for 89.9% of 2011 STEM graduates linked to Census data in 2021. Of these STEM graduates, 81.8% lived in a major city area, 12.2% lived in an inner regional area and 5.9% lived in an outer regional or remote area.

Figure 4.12 shows the proportion of 2011 STEM graduates employed in 2021, by remoteness area and gender. A similar proportion of STEM graduates were employed in 2021 across all remoteness areas. The proportion of women employed was lower than that of men in all remoteness areas.

Figure 4.12: Proportion of 2011 Higher Education graduates with a STEM qualification, by labour force status, remoteness area and gender, 2021(a)(b)



(a) Total includes people who did not have a valid remoteness area in 2021.
(b) Graduates with not stated labour force status are included in totals.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census analysis population.

4.3.5 SEIFA Index of Relative Socioeconomic Advantage and Disadvantage

A SEIFA IRSAD quintile was assigned to the areas in which 89.8% of 2011 STEM graduates linked to Census data lived. In 2021, STEM graduates tended to live in areas of lower relative socio-economic disadvantage or higher advantage[14]:

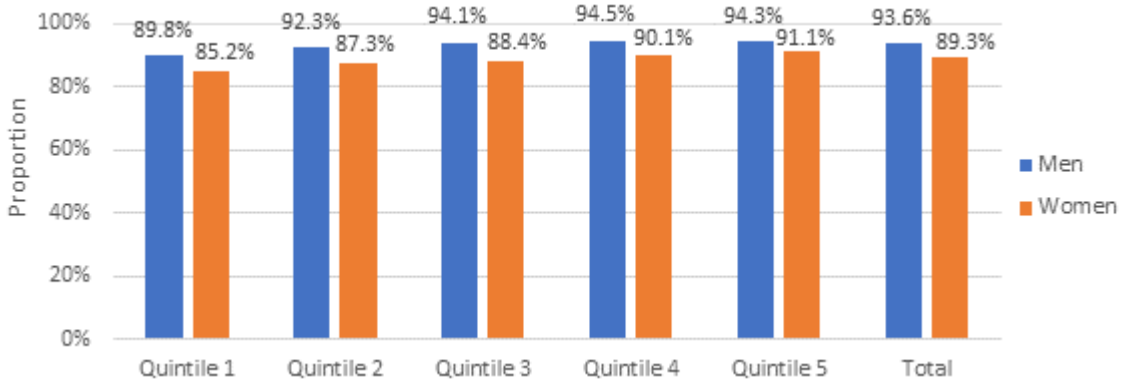
- 8.1% lived in areas in quintile 1
- 14.1% lived in areas in quintile 2
- 19.3% lived in areas in quintile 3
- 26.5% lived in areas in quintile 4
- 32.0% lived in areas in quintile 5.

[14] These proportions represent the SEIFA IRSAD quintile distribution of 2011 STEM graduates, linked to 2021 Census data, with available geographic information to assign a SEIFA quintile in 2021. Quintile 1 refers to the 20% of areas in Australia of lowest relative socio-economic advantage or highest relative disadvantage. Quintile 5 refers to the 20% of areas with lowest relative disadvantage or highest relative advantage.

Figure 4.13 shows the proportion of 2011 STEM graduates employed in 2021, by SEIFA IRSAD quintile and gender.

A large majority of both male and female 2011 STEM graduates across all SEIFA quintiles were employed in 2021. A slightly smaller proportion of STEM graduates living in SEIFA quintiles 1 and 2 were employed, compared with those living in other SEIFA quintiles.

Figure 4.13: Proportion of 2011 Higher Education graduates with a STEM qualification employed, by SEIFA IRSAD quintile and gender, 2021(a)(b)



(a) Total includes people with unknown SEIFA IRSAD quintile in 2021.
(b) Graduates with not stated labour force status are included in totals.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census analysis population.

4.4 Industry of employment

4.4.1 STEM graduate employment, by industry

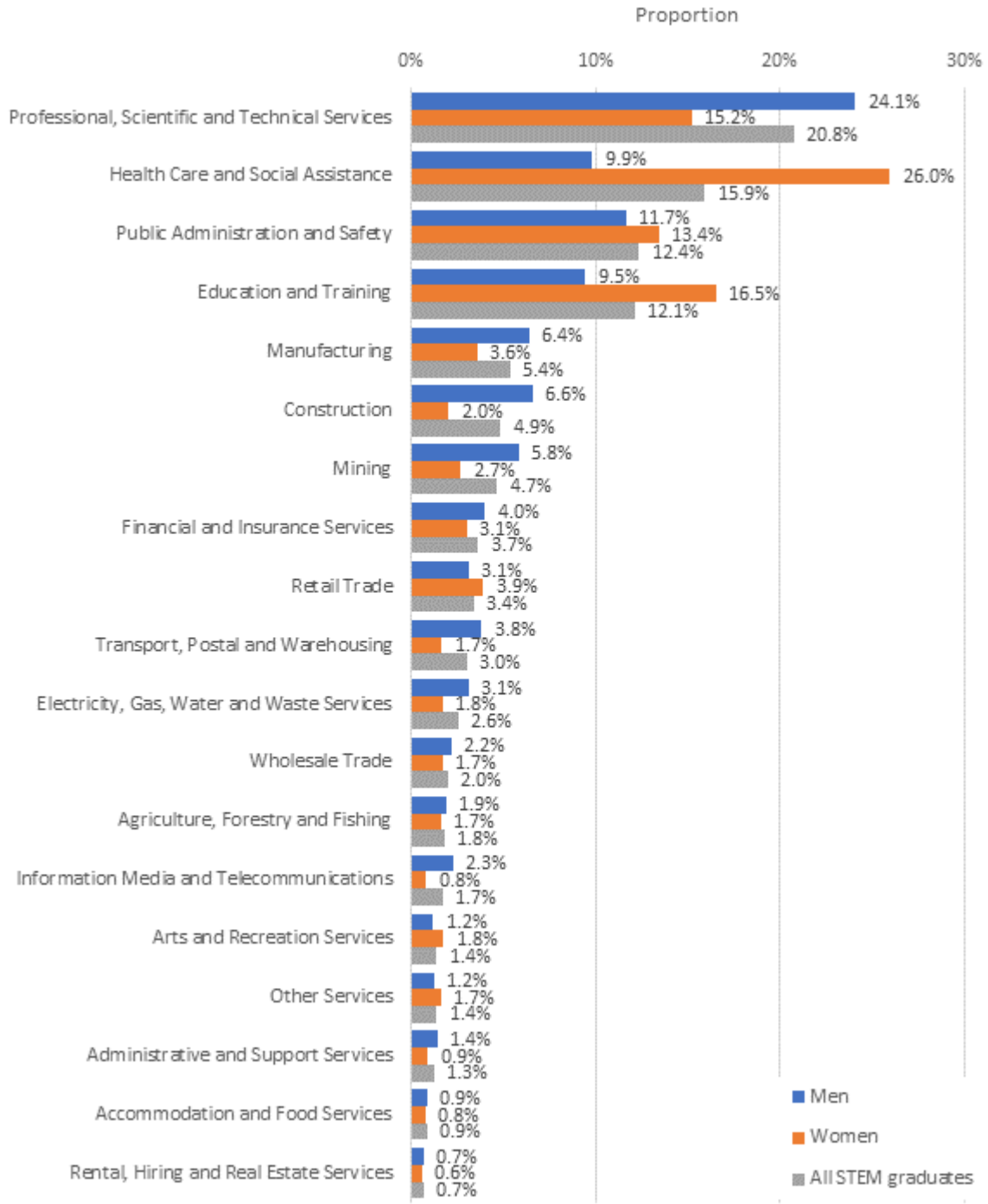
This section summarises the industries in which 2011 STEM graduates worked in 2021. Figure 4.14 shows the proportion of employed STEM graduates, by industry division and gender. The industries are listed in order, from those employing the most STEM graduates to those employing the least.

In 2021, the top four industries in which STEM graduates worked were the same for men and women, but the proportion of STEM graduates working in these industries differed by gender.

- Almost a quarter of men (24.1%) and 15.2% of women worked in Professional, Scientific and Technical Services.
- Over a quarter of women (26.0%) and one in ten men (9.9%) worked in Health Care and Social Assistance.
- Approximately one in eight STEM graduates (11.7% of men and 13.4% of women) worked in Public Administration and Safety.
- Similarly, about one in eight STEM graduates worked in Education and Training. This consisted of one in six women (16.5%), compared with one in ten men (9.5%).

The employment of female STEM graduates was concentrated in fewer industries than that of men. The top four industries employed 71.2% of women, compared with 55.1% of men.

Figure 4.14: Proportion of employed 2011 Higher Education graduates with a STEM qualification, by industry division and gender, 2021(a)

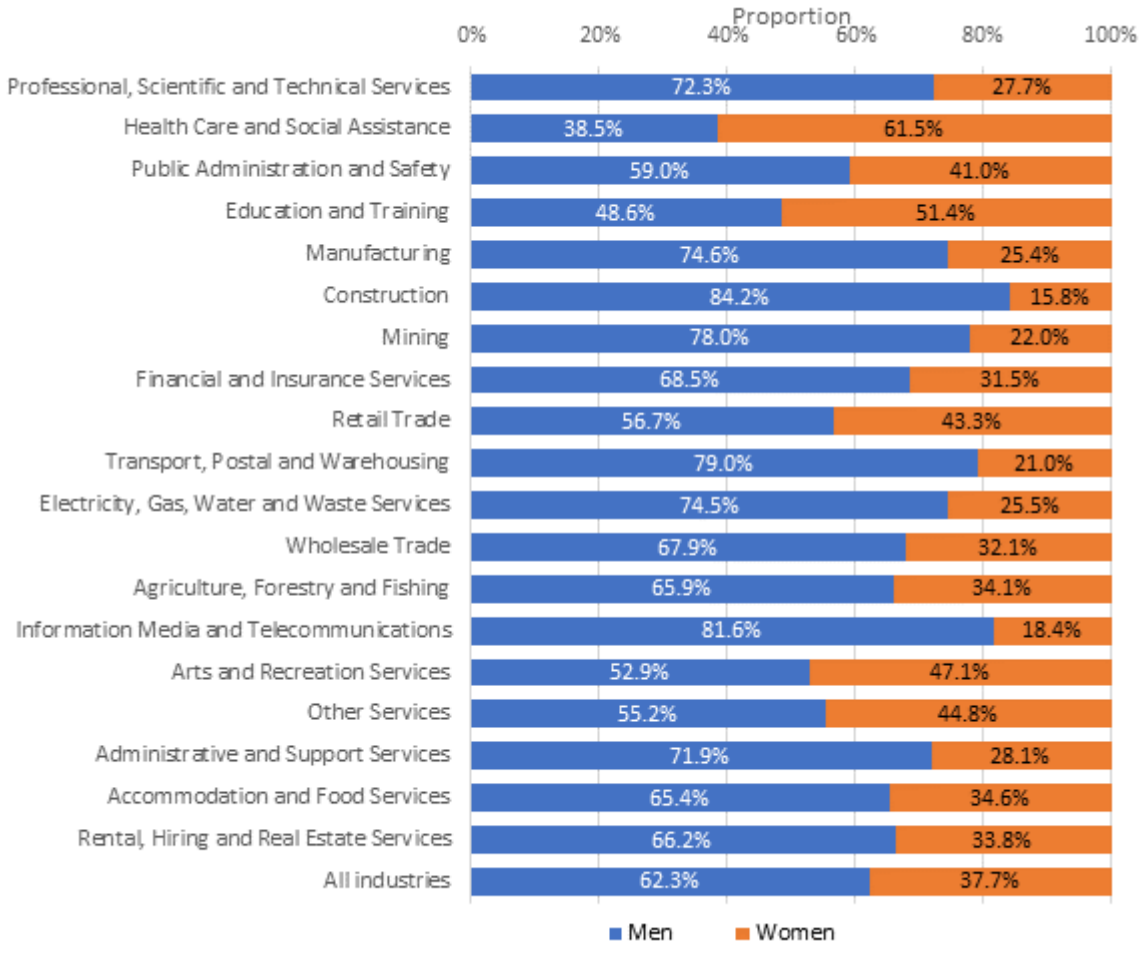


(a) Excludes industry of employment not stated.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census analysis population.

Figure 4.15 shows the proportion of male and female 2011 STEM graduates employed in each industry division in 2021.

- Across all industries, 62.3% of employed STEM graduates were men and 37.7% were women, reflecting the larger number of men than women who studied STEM in 2011, and their slightly higher rate of employment after graduation.
- Female STEM graduates outnumbered male STEM graduates in two industries:
    - Health Care and Social Assistance, in which 61.5% of employed STEM graduates were women.
    - Education and Training, in which 51.4% of employed STEM graduates were women.
- Construction, the sixth biggest employer of STEM graduates, was the most male-dominated industry, with men making up 84.2% of STEM graduates employed in construction in 2021.

Figure 4.15: Proportion of employed 2011 Higher Education graduates with a STEM qualification in each industry division, by gender, 2021(a)



(a) Excludes industry of employment not stated.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census analysis population.

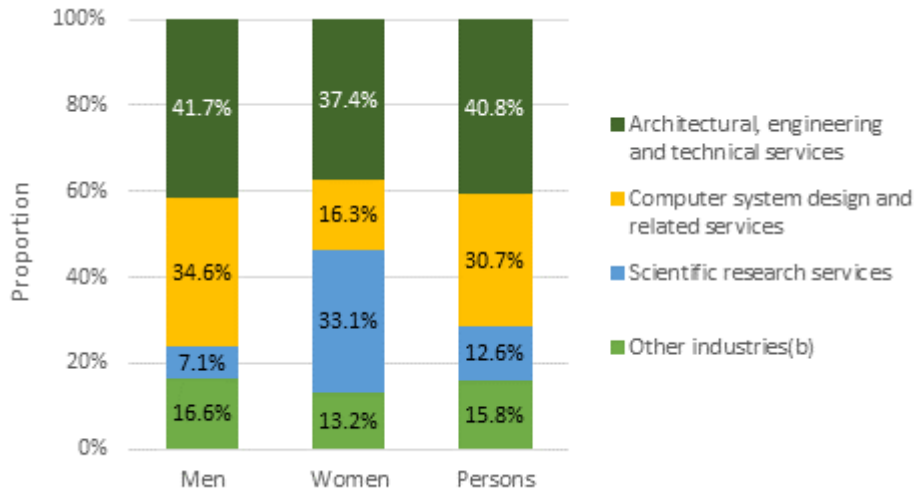
4.4.2 Employment in STEM-qualified industries

Of the 2011 Higher Education graduates who were employed in 2021, a larger proportion of men worked in a STEM-qualified industry than women.[15]

- Among employed STEM graduates, one in five men (21.6%) worked in a STEM-qualified industry, compared with one in ten women (9.8%).
- Among non-STEM and health graduates, 6.6% of men worked in a STEM-qualified industry, compared with 3.1% of women.

Figure 4.16 shows the proportion of employed 2011 STEM graduates who worked in a STEM-qualified industry in 2021, by the industry in which they worked. Among STEM graduates employed in a STEM-qualified industry in 2021, 41.7% of men and 37.4% of women worked in architectural, engineering and technical services.

Figure 4.16: Proportion of employed 2011 Higher Education graduates with a STEM qualification who were employed in a STEM-qualified industry, by gender, 2021(a)



(a) Excludes industry of employment not stated.
(b) Other industries include Oil and gas extraction, other transport equipment manufacturing, Electricity generation, Electricity distribution, Specialised machinery and equipment manufacturing, other machinery and equipment manufacturing, Automotive repair and maintenance, Machinery and equipment repair and maintenance.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census analysis population.

[15] STEM-qualified industries are defined at the 3-digit, or industry group, level.

CHAPTER 5: OCCUPATION OF 2011 HIGHER EDUCATION GRADUATES, 2020-21

5.1 Analysis population

The information in this chapter is based on analysis of the 2011 Higher Education graduate cohort linked to PIT ITR data, as described in chapter 2, which consists of 161,534 people. When analysing variables from the 2021 Census, the population is limited to those with Census data.

5.2 Employment in STEM-qualified occupations

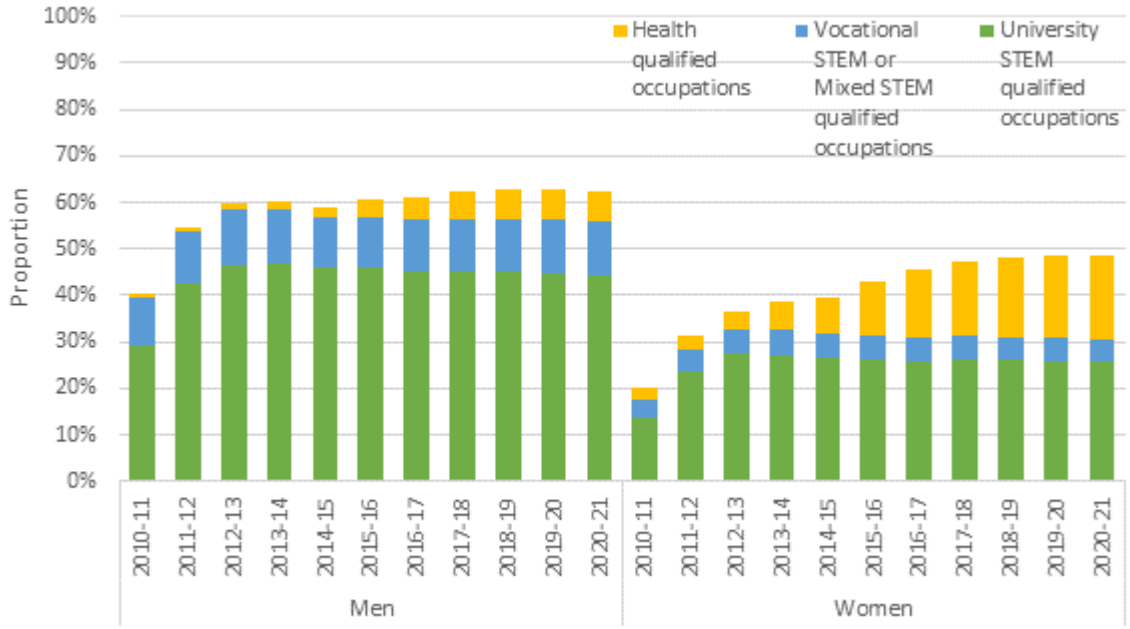
5.2.1 STEM graduate employment in STEM-qualified occupations over time

Figure 5.1 shows the proportion of employed 2011 STEM graduates who worked in STEM or health-qualified occupations from 2010-11 to 2020-21.

- Over half of men (55.7%) and three in ten women (30.6%) worked in a STEM-qualified occupation in 2020-21. This gap remained fairly constant since 2010-11, when 39.5% of men and 17.7% of women worked in a STEM-qualified occupation.
- In the year following graduation (2011-12), employment in a STEM-qualified occupation increased to 53.7% for men and 28.4% for women.
- The proportion of STEM graduates working in a health-qualified occupation increased from 1.5% in 2010-11, to 6.9% in 2015-16, to 10.9% in 2020-21. For context, the proportion of employed people working in health occupations in Australia increased from 4.9% in 2011 to 6.0% in 2021.[16]
- A higher proportion of STEM-qualified women worked in a health-qualified occupation (17.8%) than men (6.7%) in 2020-21.

[16] Source: Labour Force, Australia, Detailed, December 2023. Derived from table EQ08. Proportions based on May quarter data from 2011 to 2021.

Figure 5.1: Proportion of employed 2011 Higher Education graduates with a STEM qualification working in a STEM or health-qualified occupation, by gender, 2010-11 to 2020-21(a)



(a) Proportion denominators exclude people who did not have a PIT record for that year.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR analysis population.

5.2.2 Employment in STEM-qualified occupations, by field of education, 2020-21

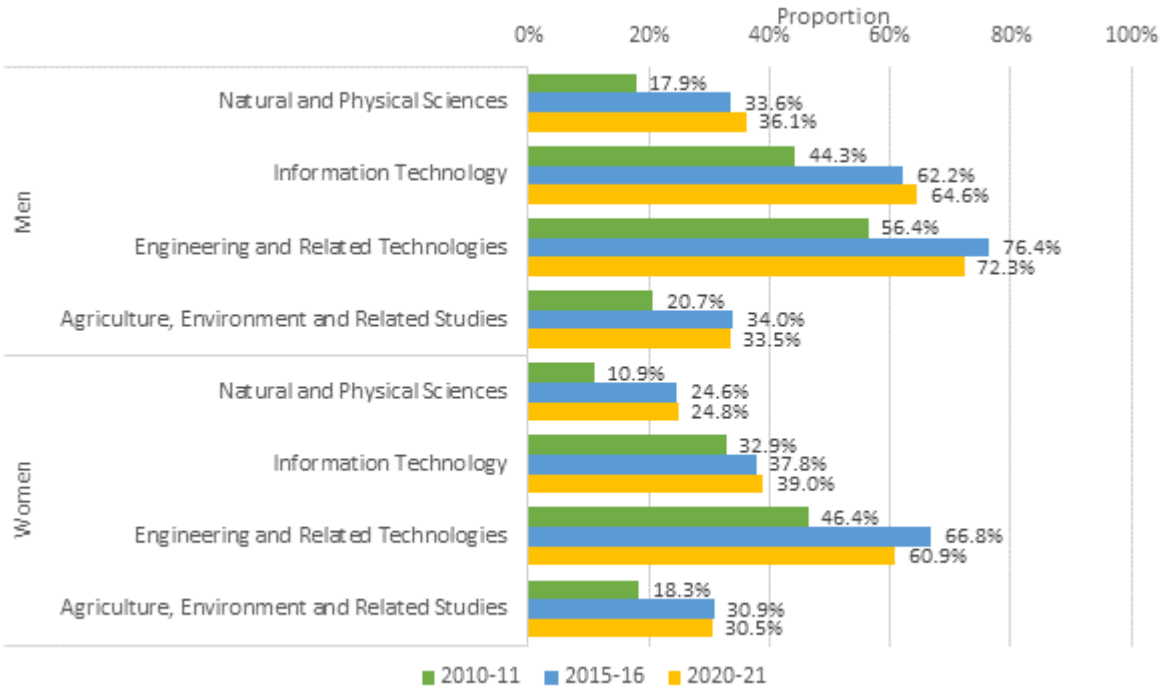
Figure 5.2 shows the proportion of employed 2011 STEM graduates who worked in STEM-qualified occupations in 2010-11, 2015-16 and 2020-21, by field of education and gender.

In 2020-21, the fields of education with the highest proportion of employed graduates working in a STEM-qualified occupation were Engineering and Related Technologies and Information Technology. For these graduates, a lower proportion of women worked in STEM-qualified occupations than men.

- 72.3% of men and 60.9% of women who studied Engineering and Related Technologies were employed in a STEM-qualified occupation in 2020-21.
- 64.6% of men and 39.0% of women who studied Information Technology were employed in a STEM-qualified occupation in 2020-21.
- From 2015-16 to 2020-21, the proportion of graduates of Engineering and Related Technologies who worked in a STEM-qualified occupation declined from 66.8% to 60.9% for women and from 76.4% to 72.3% for men.

A relatively low proportion of graduates in Natural and Physical Sciences (36.1% of men, 24.8% of women) and Agriculture, Environment and Related Studies (33.5% of men, 30.5% of women) worked in a STEM-qualified occupation. Together, these fields accounted for 82.8% of female and 41.4% of male STEM graduates.

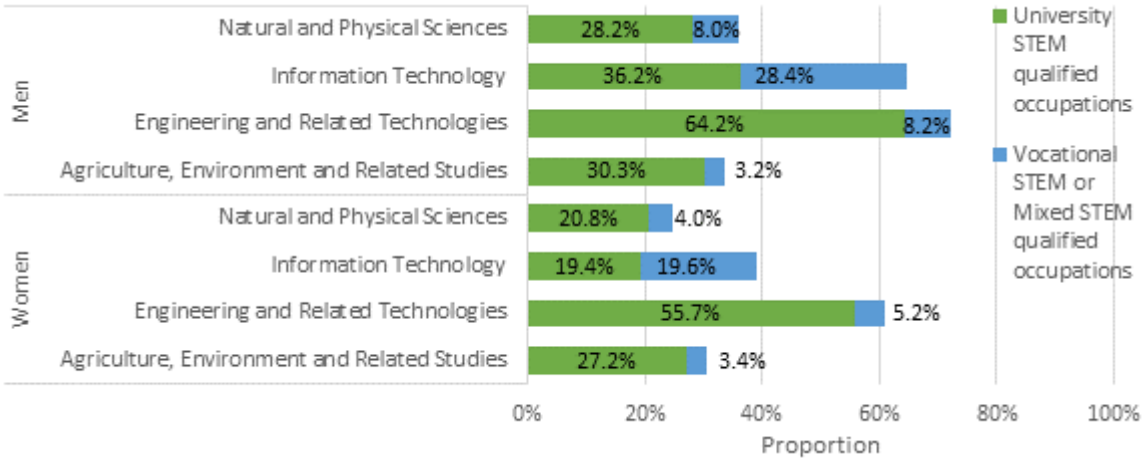
Figure 5.2: Proportion of employed 2011 Higher Education graduates with a STEM qualification working in STEM-qualified occupations, by gender and STEM field of education, 2010-11, 2015-16, 2020-21(a)



(a) Proportion denominators exclude people who did not have a PIT record for that year.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR analysis population.

Figure 5.3 shows the proportion of employed 2011 STEM graduates who worked in a university STEM-qualified occupation and a vocational or mixed STEM-qualified occupation in 2020-21, by field of education and gender.

Figure 5.3: Proportion of employed 2011 Higher Education graduates with a STEM qualification working in a STEM-qualified occupation, by gender, field of education and type of STEM-qualified occupation, 2020-21(a)



(a) Proportion denominators exclude people who did not have a PIT record in 2020-21.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR analysis population.

5.2.3 University STEM-qualified occupations

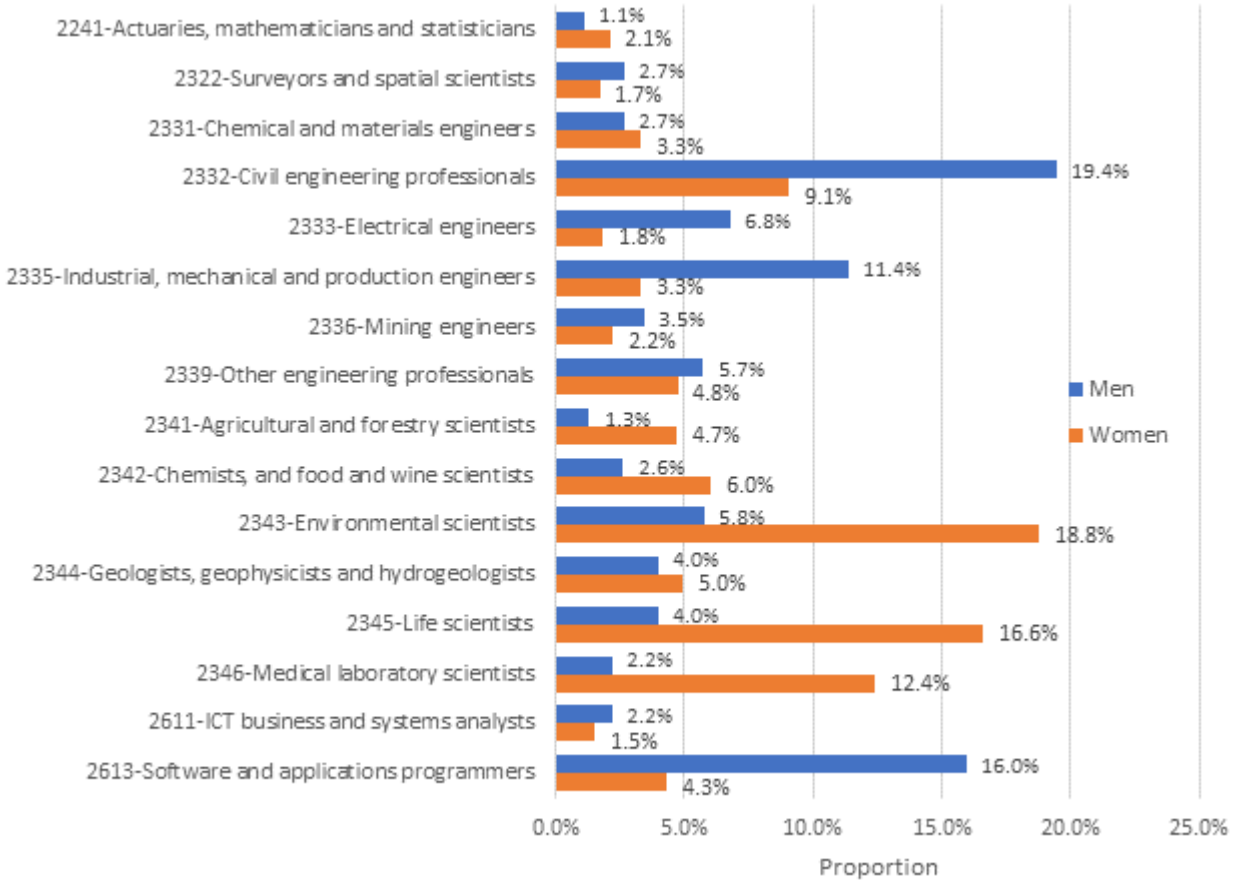
Over two in five (44.3%) employed male STEM graduates worked in a university STEM-qualified occupation in 2020-21. The main occupations in which these men worked were:

- Civil Engineering Professionals (19.5%)
- Software and Application Programmers (16.0%)
- Industrial, Mechanical and Production Engineers (11.4%)

Around a quarter (25.7%) of employed female STEM graduates worked in a university STEM-qualified occupation in 2020-21. The main occupations in which these women worked were:

- Environmental Scientists (18.8%)
- Life Scientists (16.6%)
- Medical Laboratory Scientists (12.4%)

Figure 5.4: Proportion of employed 2011 Higher Education graduates with a STEM qualification who worked in selected university STEM-qualified occupations, by gender, 2020-21(a)



(a) Proportion denominators exclude people who did not have a PIT record in 2020-21.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR analysis population.

5.2.4 STEM-qualified occupation pathways

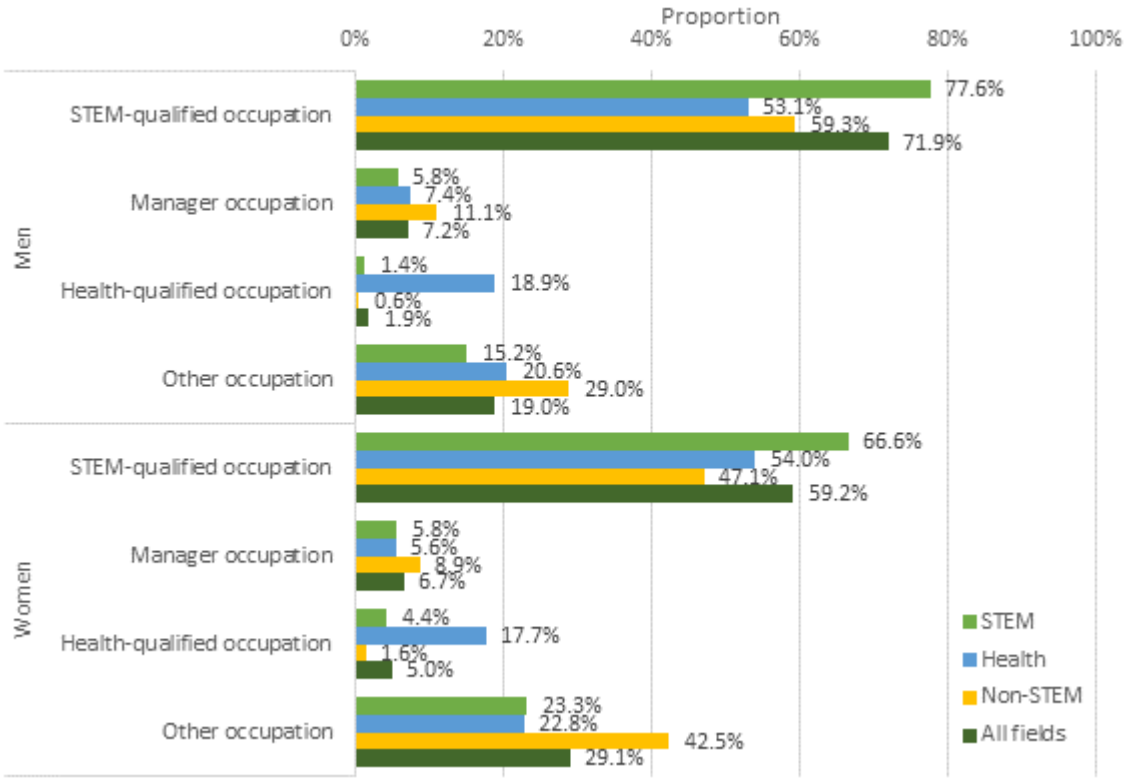
Figure 5.1 showed that the proportion of male and female 2011 STEM graduates who worked in a STEM-qualified occupation rose from graduation until 2013-14 and then declined. This section considers all graduates who worked in a STEM-qualified occupation between 2010-11 and 2020-21, summarising the occupations they worked in in 2020-21.

Around 24,100 graduates worked in a STEM-qualified occupation in at least one year between 2010-11 and 2020-21. In 2020-21, occupation data was available for 81.5% of these graduates, or approximately 19,600 people (13,300 men and 6,300 women). The majority of this group were STEM graduates (69.9% of men and 58.1% of women).

Of the graduates who had worked in a STEM-qualified occupation between 2010-11 and 2020-21, figure 5.5 shows the proportion of men and women in selected occupation categories in 2020-21.

- 71.9% of men and 59.2% of women worked in a STEM-qualified occupation. The proportion was higher among men (77.6%) and women (66.6%) with a STEM qualification.
- 7.2% of men and 6.7% of women worked as a manager.
- 5.0% of women and 1.9% of men worked in a health-qualified occupation.

Figure 5.5: Proportion of 2011 Higher Education graduates who worked in a STEM-qualified occupation between 2010-11 and 2020-21, by gender, field of education and occupation in 2020-21(a)



(a) Proportion denominators exclude people who did not have a PIT record for that year
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR analysis population.

5.3 Occupation of graduates in key population groups

This section describes the proportion of employed 2011 STEM graduates who worked in a STEM-qualified occupation in 2020-21, for key population groups. Some population groups represent a small proportion of 2011 STEM graduates. Caution should be exercised when interpreting proportions based on small population groups.

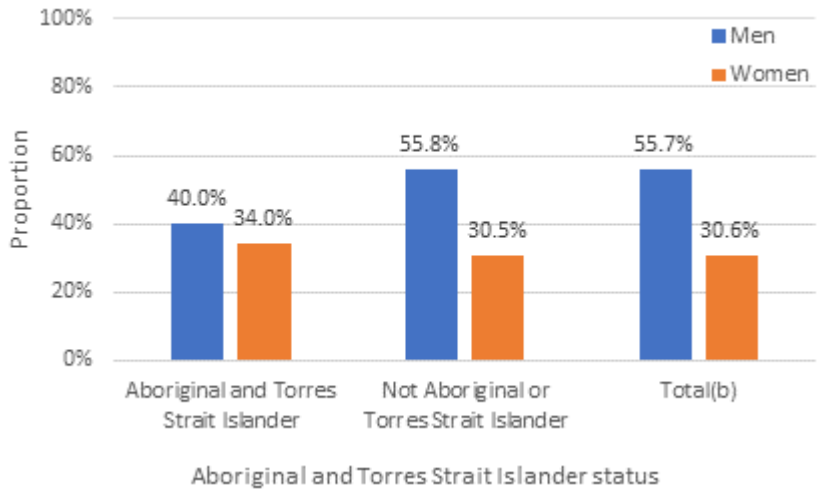
5.3.1 Aboriginal and Torres Strait Islander graduates

Aboriginal and Torres Strait Islander graduates made up 0.6% of STEM graduates in the 2011 Higher Education graduate analysis population. Occupation data in 2020-21 is available for 80.9% of Aboriginal and Torres Strait Islander STEM graduates and 81.7% of STEM graduates of other descent.

Figure 5.6 shows the proportion of employed 2011 STEM graduates working in a STEM-qualified occupation in 2020-21, for Aboriginal and Torres Strait Islander graduates and graduates of other descent, by gender, in 2020-21.

- Among men, 40.0% of Aboriginal and Torres Strait Islander graduates were employed in a STEM-qualified occupation, compared with 55.8% of graduates of other descent.
- Among women, 34.0% of Aboriginal and Torres Strait Islander graduates were employed in a STEM-qualified occupation, compared with 30.5% of graduates of other descent.

Figure 5.6: Proportion of employed 2011 Higher Education graduates with a STEM qualification working in a STEM-qualified occupation, by gender and Aboriginal and Torres Strait Islander status, 2020-21(a)



(a) Occupation proportions exclude people who did not have a PIT record in 2020-21.
(b) Total includes people with unknown Aboriginal and Torres Strait Islander status.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR analysis population.

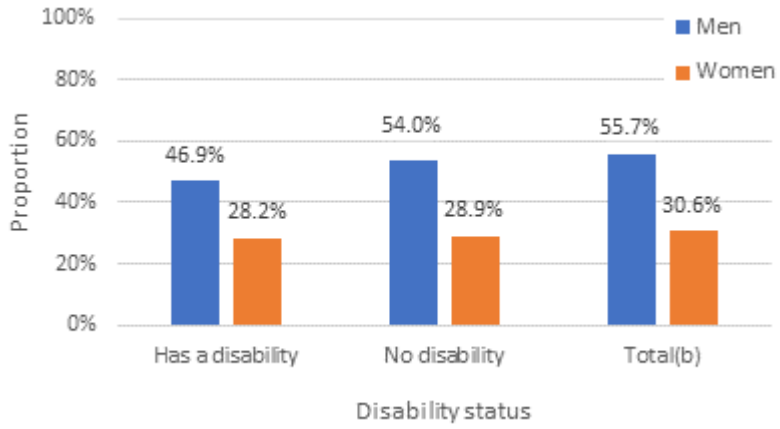
5.3.2 Graduates with disability

Among 2011 STEM graduates, 5.4% of men and 7.7% of women reported having a disability, impairment or long-term health condition up to 2020. In 2020-21, occupation data was available for

74.7% of STEM graduates with a disability, compared with 79.8% of STEM graduates without a disability.

Among male STEM graduates who were employed in 2020-21, a smaller proportion of graduates with a disability worked in a STEM-qualified occupation (46.9%), than those with no disability (54.0%). However, for employed female STEM graduates, the proportion working in a STEM-qualified occupation was similar for those with (28.2%) and without a disability (28.9%) (Figure 5.7).

Figure 5.7: Proportion of employed 2011 Higher Education graduates with a STEM qualification who worked in a STEM-qualified occupation, by disability status and gender, 2020-21(a)



(a) Occupation proportions exclude people who did not have a PIT record in 2020-21.
(b) Total includes disability status not stated.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR analysis population.

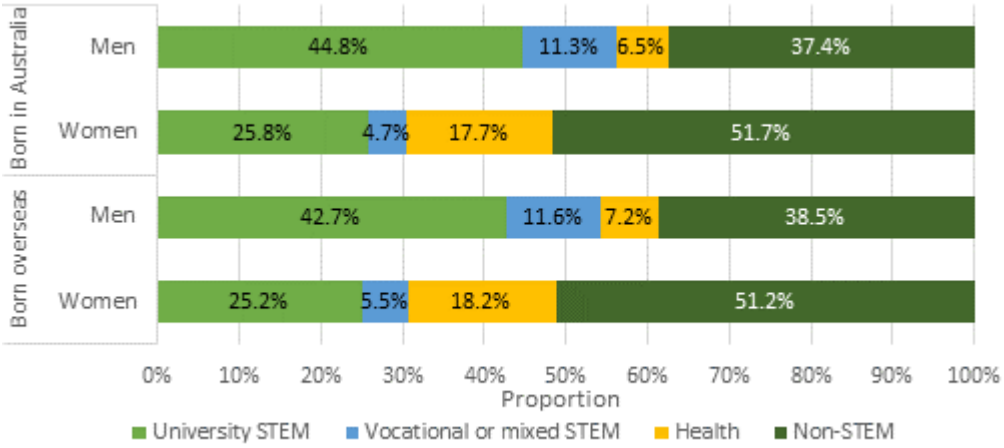
5.3.3 Graduates born overseas

Around one in five 2011 STEM graduates were born overseas (23.1% of men and 22.3% of women). Occupation data for 2020-21 was available for fewer overseas-born STEM graduates (72.9% of men and 74.9% of women) than graduates born in Australia (78.9% of men and 81.2% of women).

Among employed STEM graduates, graduates born overseas worked in similar occupations in 2020-21 to those born in Australia (Figure 5.8).

- One-quarter (25.2%) of overseas-born women worked in a university STEM-qualified occupation in 2020-21, similar to the corresponding proportion (25.8%) of Australian-born women.
- 42.7% of overseas-born men worked in a university STEM-qualified occupation in 2020-21, similar to the corresponding proportion (44.8%) of Australian-born men.

Figure 5.8: Proportion of employed 2011 Higher Education graduates with a STEM qualification, by gender, country of birth and occupation, 2020-21(a)(b)



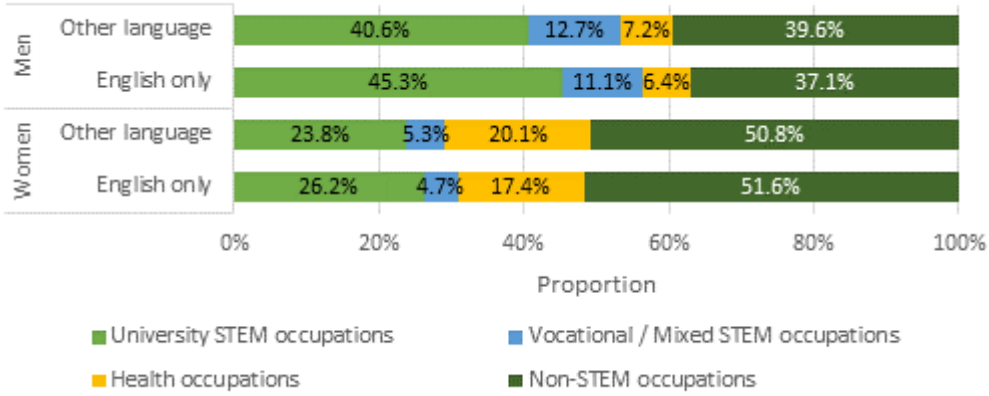
(a) Proportion denominators exclude people who did not have a PIT record in 2020-21.
(b) Born in Australia includes not stated.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR analysis population.

5.3.4 Language used at home

One in five STEM graduates (20.9% of men and 19.1% of women) used a language other than English at home. Occupation data for 2020-21 was available for 79.8% of male and 80.1% of female STEM graduates who used a language other than English at home, and for 85.0% of male and 82.4% of female STEM graduates who used English only.

Figure 5.9 shows the occupations of employed STEM graduates in 2020-21, by language used at home and gender. Among women who used a language other than English at home, 29.1% worked in a STEM-qualified occupation, compared with 31.0% of women who only used English at home.

Figure 5.9: Proportion of employed 2011 Higher Education graduates with a STEM qualification, by gender, language spoken at home and occupation, 2020-21(a)(b)



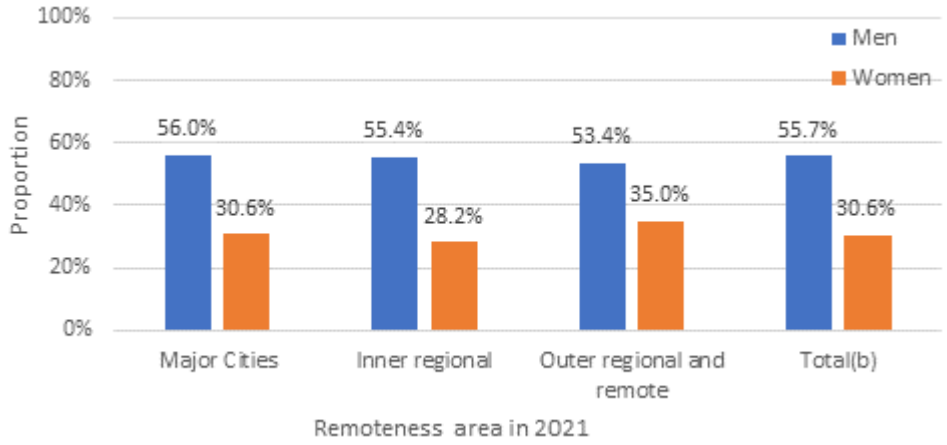
(a) Occupation proportions exclude people who did not have a PIT record in 2020-21.
(b) English only includes those with not stated language spoken at home.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR and 2021 Census.

5.3.5 Remoteness Area

Remoteness area was available for 88.2% of 2011 STEM graduates linked to PIT ITR. Of these STEM graduates, 81.8% lived in a major city, 12.2% lived in inner regional areas, and 6.0% lived in outer regional or remote areas in 2021.

The proportion of employed 2011 STEM graduates working in a STEM-qualified occupation in 2020-21 was similar across remoteness areas (Figure 5.10).

Figure 5.10: Proportion of employed 2011 Higher Education graduates with a STEM qualification working in STEM-qualified occupations, by remoteness area and gender, 2020-21(a)



(a) Occupation proportions exclude people who did not have a PIT record in 2020-21.
(b) Total includes people who did not have remoteness area data in 2021.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR analysis population.

5.3.6 SEIFA Index of Relative Socioeconomic Advantage and Disadvantage

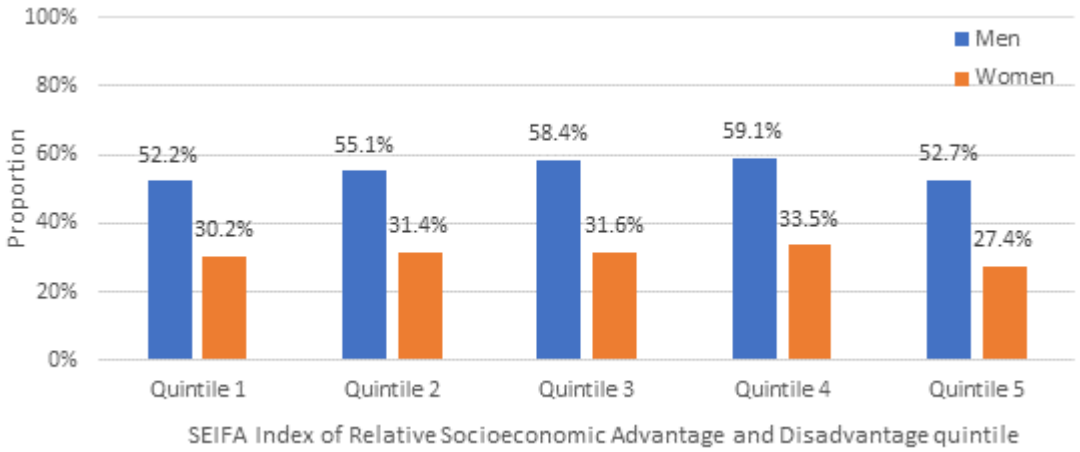
In 2021, a SEIFA IRSAD quintile was available for 88.1% of 2011 STEM graduates linked to PIT ITR. Of these graduates:

- 7.9% lived in areas in quintile 1
- 14.0% lived in areas in quintile 2
- 18.9% lived in areas in quintile 3
- 26.6% lived in areas in quintile 4
- 32.5% lived in areas in quintile 5.

Figure 5.11 shows the proportion of employed 2011 STEM graduates working in a STEM-qualified occupation in 2020-21, by SEIFA IRSAD quintile and gender. The distribution of employment in STEM-qualified occupations was similar across SEIFA IRSAD quintiles.

Over half of male STEM graduates across all SEIFA quintiles worked in a STEM-qualified occupation Among female STEM graduates, a smaller proportion of those residing in areas in the fifth quintile (27.4%) worked in a STEM-qualified occupation, compared with other quintiles.

Figure 5.11: Proportion of employed 2011 Higher Education graduates with a STEM qualification working in STEM-qualified occupations, by SEIFA IRSAD quintile and gender, 2020-21(a)



(a) Occupation proportions exclude people who did not have a PIT record in 2020-21.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR analysis population.

CHAPTER 6: INCOME OF 2011 HIGHER EDUCATION GRADUATES, 2020-21

6.1 Analysis population

The information in this chapter is based on analysis of the 2011 Higher Education graduates linked to PIT, which consists of 161,534 people. This chapter also includes analysis of some characteristics from the 2021 Census, such as labour force status and language spoken at home, and when looking at these characteristics, the analysis population is restricted to those with Census data.

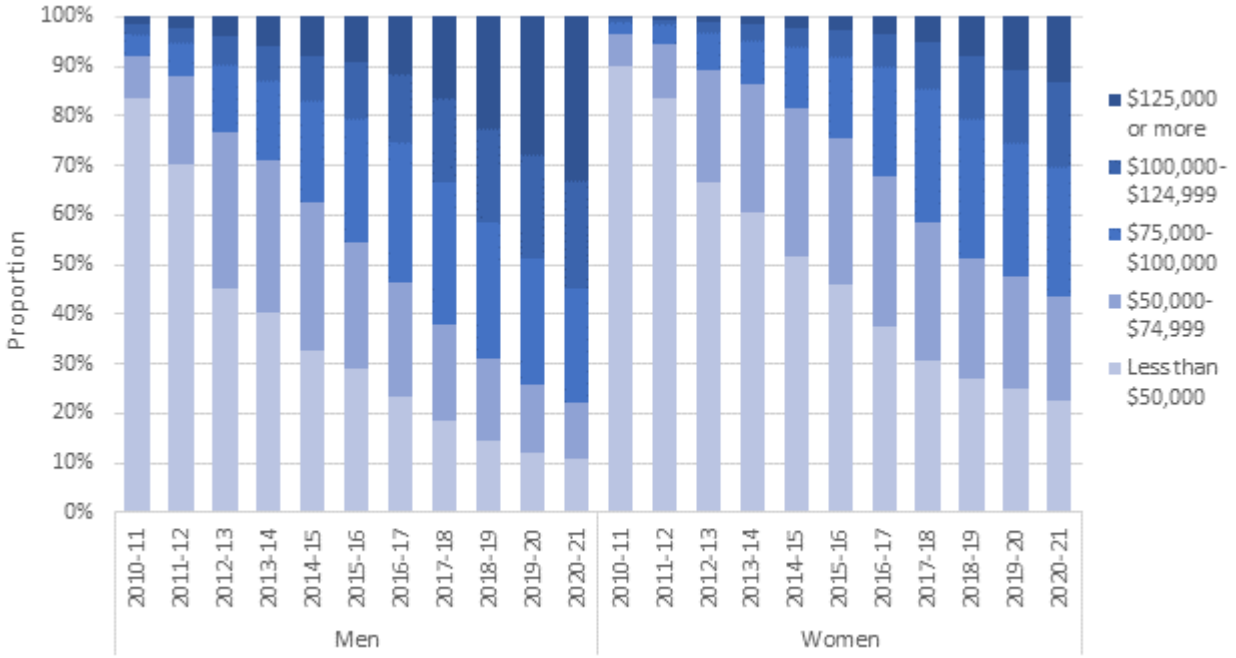
6.2 Income of 2011 STEM graduates

6.2.1 Income of STEM graduates over time

Figure 6.1 shows the income distributions of male and female STEM graduates from 2010-11 to 2020-21. Although initially the income distributions of men and women were similar, men's incomes grew more than women's during the period.

- In 2010-11, most employed STEM graduates had an annual income below $50,000 (83.6% of men and 90.2% of women).
- In 2012-13, less than half of men (45.3%) earned less than $50,000, and 23.1% earned $75,000 or more. In contrast, two-thirds of women (66.6%) earned less than $50,000 in 2012-13, and 10.7% earned $75,000 or more.
- By 2015-16, 29.0% of men and 46.1% of women earned less than $50,000, while the proportion of employed men who earned $75,000 or more (45.5%) was 1.9 times higher than the proportion of women with that income (24.4%).
- In 2020-21, the proportion of men in the lowest income category was much smaller than that of women, while the proportion of men in the higher income categories was much larger than that of women.
    - One in ten men (10.8%) and two in ten women (22.5%) earned less than $50,000.
    - Over half of men (54.8%) earned more than $100,000, compared with three in ten women (30.2%).
    - In the highest income category, one-third of men (33.1%) and almost one in seven women (13.3%) earned $125,000 or more.

Figure 6.1: Proportion of employed 2011 Higher Education graduates with a STEM qualification, by income and gender, 2010-11 to 2020-21(a)



(a) Proportion denominators exclude people who did not have a PIT record for that year.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR analysis population.

6.2.2 Income and full-time and part-time employment in 2020-21

Full-time or part-time labour force status from the 2021 Census and income from 2020-21 PIT ITR data were available for approximately 18,000 STEM graduates in the 2011 Higher Education graduate cohort linked to Census and PIT. Of these graduates, 90.2% of men and 72.5% of women worked full-time and the remainder worked part-time.

Figure 6.2 shows the income distribution of employed STEM graduates who worked full-time or part-time in 2020-21, by gender.

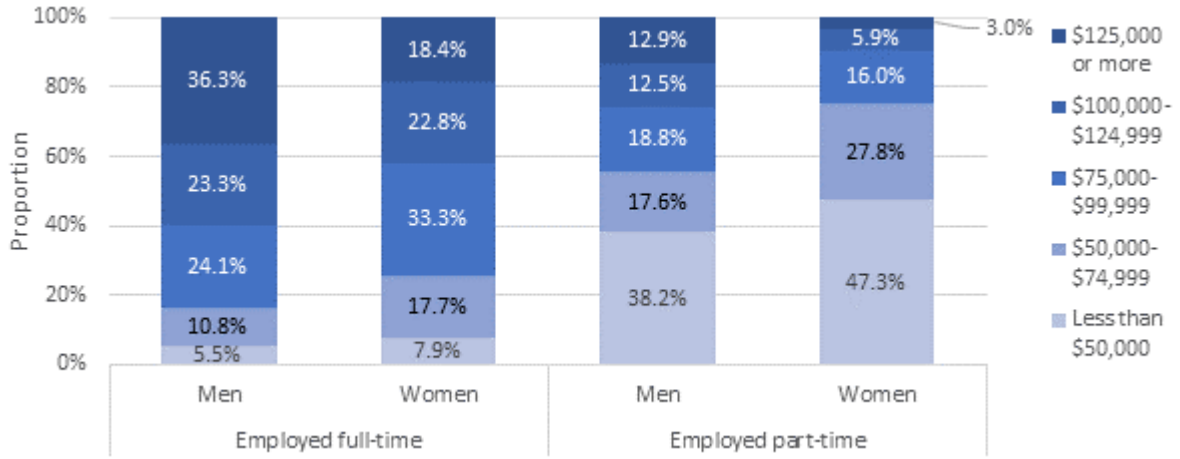
Among STEM graduates who worked full-time in 2021:

- The proportion of men (36.3%) who earned $125,000 or more was almost double that of women (18.4%).
- A larger proportion of women than men were in the two lowest income categories:
    - 17.7% of women earned $50,000 - $75,000, compared with 10.8% of men
    - 7.9% of women earned less than $50,000, compared with 5.5% of men.

Among STEM graduates who worked part-time in 2021:

- A larger proportion of men than women were in the two highest income categories:
    - 12.9% of men earned $125,000 or above, compared with 3.0% of women
    - 12.5% of men earned $100,000 - $125,000, compared with 5.9% of women.
- Almost half (47.3%) of women earned less than $50,000, compared with 38.2% of men.

Figure 6.2: Proportion of employed 2011 Higher Education graduates with a STEM qualification, by gender, labour force status and income, 2020-21(a)



(a) Proportion denominators exclude people with no PIT record in 2020-21 and those with not stated full-time or part-time employment status in the 2021 Census.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to the 2021 Census and PIT ITR analysis population.

6.3 Income of graduates in key population groups

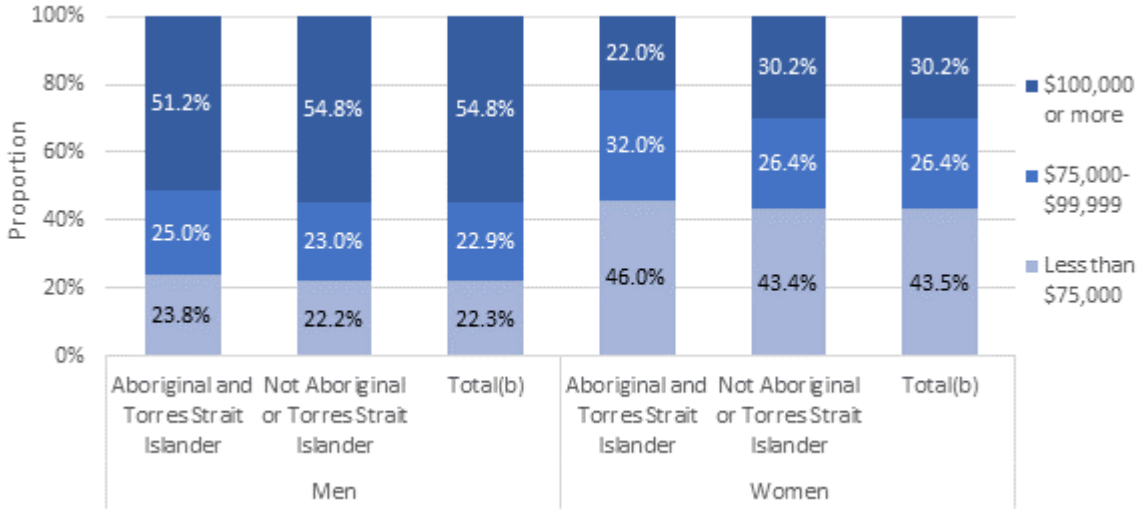
This section describes the income distribution of employed 2011 STEM graduates in 2020-21, for key population groups. Some key population groups represent a small proportion of 2011 STEM graduates. Caution should be exercised when interpreting proportions based on small population groups.

6.3.1 Aboriginal and Torres Strait Islander graduates

Figure 6.3 presents the income distribution of employed STEM graduates in 2020-21, by Aboriginal and Torres Strait Islander status.

Among male STEM graduates, the income distribution was similar among Aboriginal and Torres Strait Islander graduates and those of other descent. A smaller proportion of female Aboriginal and Torres Strait Islander STEM graduates (22.0%) earned $100,000 or more in 2020-21, compared with graduates of other descent (30.2%).

Figure 6.3: Proportion of employed 2011 Higher Education graduates with a STEM qualification, by gender, Aboriginal and Torres Strait Islander status and income, 2020-21(a)



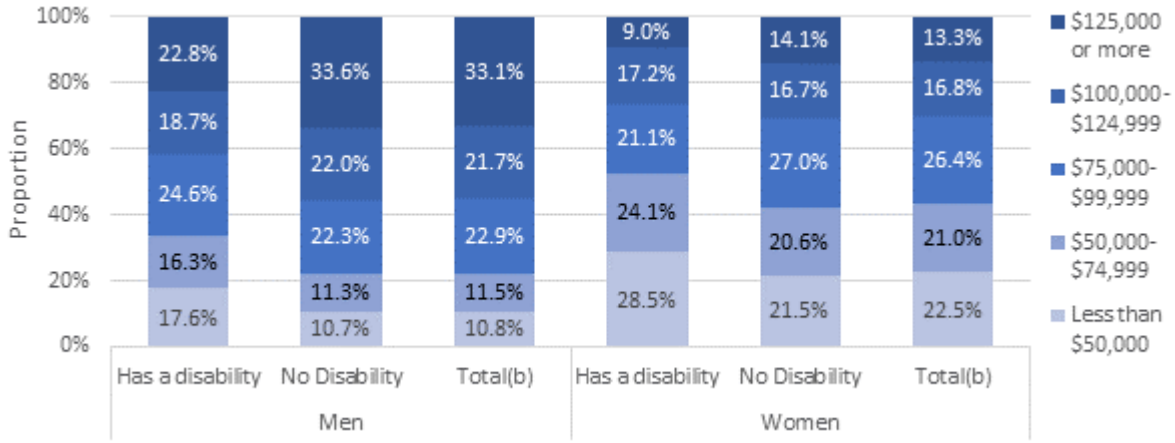
(a) Proportion denominators exclude people who did not have a PIT record in 2020-21
(b) Total includes people with unknown Aboriginal and Torres Strait Islander status.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR analysis population.

6.3.2 Graduates with disability

Figure 6.4 presents the income distribution of employed STEM graduates in 2020-21, by gender and disability status. Employed STEM graduates with a disability tended to earn lower incomes in 2020-21 than those with no disability. For example:

- 9.0% of women with a disability earned $125,000 or more, compared with 14.1% of women without a disability.
- 22.8% of men with a disability earned $125,000 or more, compared with 33.6% of men without a disability.
- Nearly three in ten employed female STEM graduates with a disability (28.5%) earned less than $50,000 in 2020-21, compared with 21.5% of those without a disability.
- 17.6% of male STEM graduates with a disability earned less than $50,000, compared with 10.7% of those without a disability.

Figure 6.4: Proportion of employed 2011 Higher Education graduates with a STEM qualification, by gender, disability status and income, 2020-21(a)

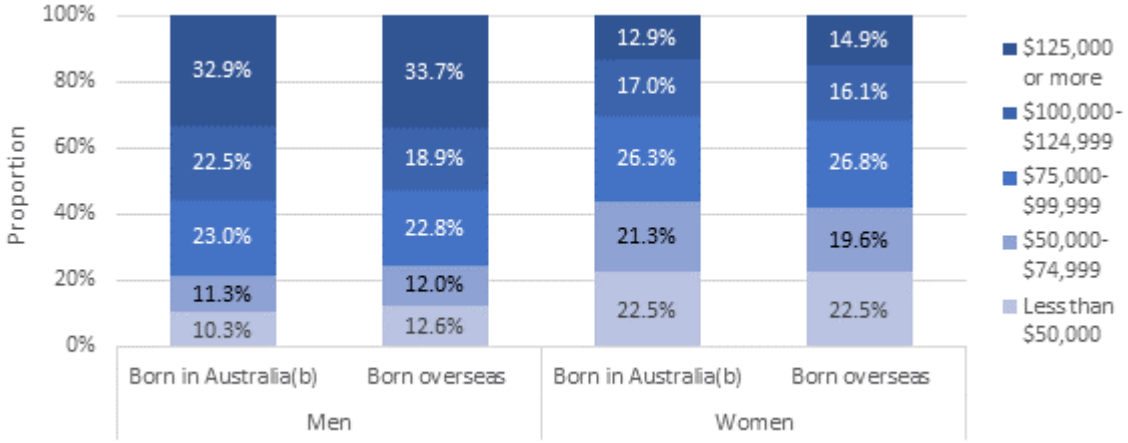


(a) Proportion denominators exclude people who did not have a PIT record in 2020-21.
(b) Total includes disability status not stated.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR analysis population.

6.3.3 Graduates born overseas

The distribution of income in 2020-21 was similar for employed STEM graduates born overseas and those born in Australia (Figure 6.5).

Figure 6.5: Proportion of employed 2011 Higher Education graduates with a STEM qualification, by gender, country of birth and income, 2020-21(a)

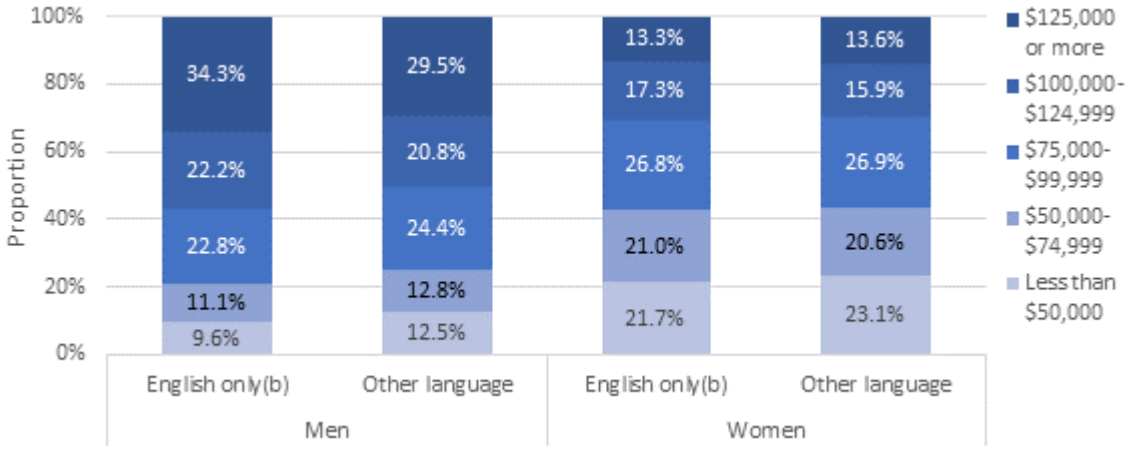


(a) Proportion denominators exclude people who did not have a PIT record in 2020-21 year.
(b) Born in Australia includes country of birth not stated or unknown.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR analysis population.

6.3.4 Language used at home

Figure 6.6 shows the income distribution of employed STEM graduates in 2020-21 by language used at home. Among male STEM graduates, a slightly smaller proportion of those who used a language other than English (29.5%) earned $125,000 or more than those who only used English at home (34.3%). Among female STEM graduates, the distribution of income was similar among those who used a language other than English and those who used English only.

Figure 6.6: Proportion of employed 2011 Higher Education graduates with a STEM qualification, by gender, language spoken at home and income, 2020-21(a)

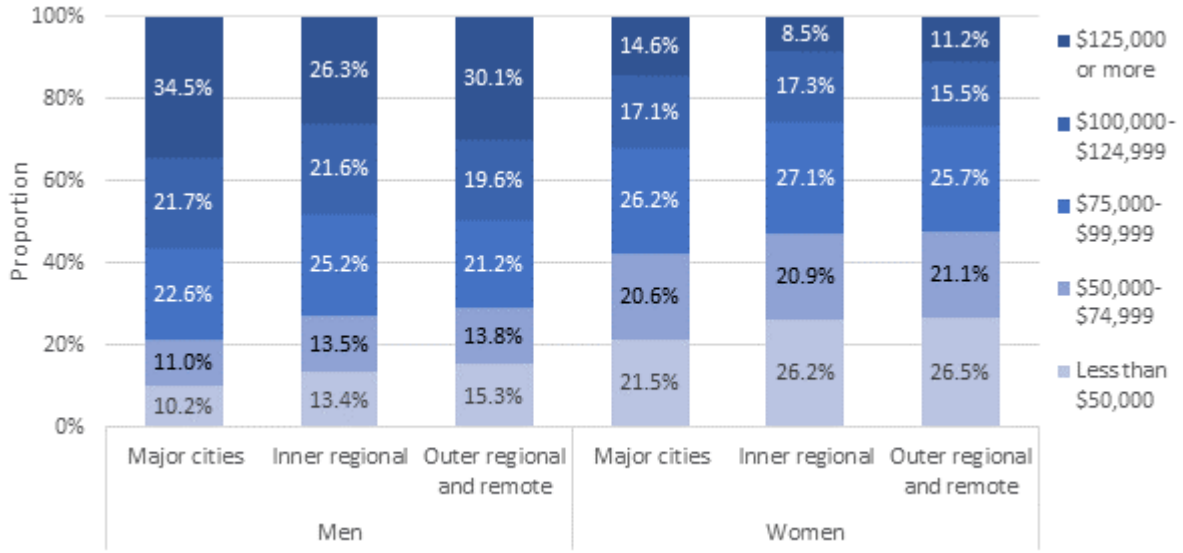


(a) Proportion denominators exclude people who did not have a PIT record for that year.
(b) English only includes language used at home not stated.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR and 2021 Census analysis population.

6.3.5 Remoteness area

Figure 6.7 shows the income distribution of employed STEM graduates by gender and remoteness area. A smaller proportion of STEM graduates living in inner regional areas (26.3% of men and 8.5% of women) earned $125,000 or more in 2020-21, compared with those living in major cities (34.5% of men and 14.6% of women), and outer regional, remote, or very remote areas (30.1% of men and 11.2% of women).

Figure 6.7: Proportion of employed 2011 Higher Education graduates with a STEM qualification, by gender, remoteness and income, 2020-21(a)



(a) Proportion denominators exclude people who did not have a PIT record in 2020-21 and people whose remoteness was unknown.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR analysis population

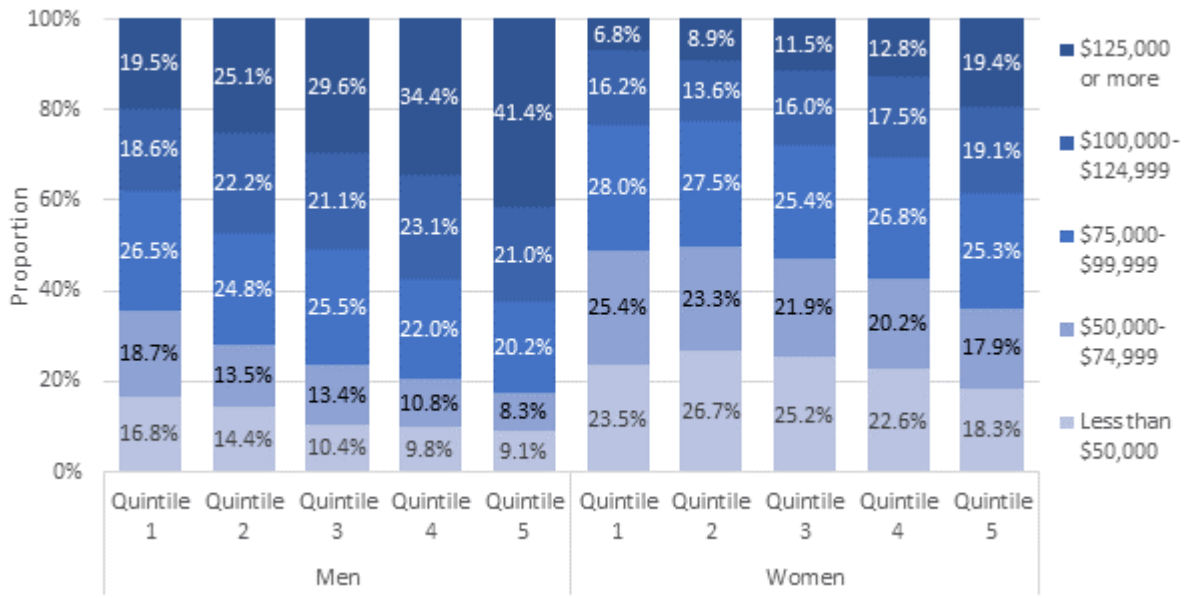
6.3.6 SEIFA Index of Relative Socioeconomic Advantage and Disadvantage

Figure 6.8 shows the income distribution of employed STEM graduates in 2020-21, by gender and SEIFA IRSAD quintile in 2021. STEM graduates living in more advantaged and less disadvantaged areas tended to earn higher incomes than those living in less advantaged and more disadvantaged areas. This is unsurprising as income is one of several factors used to calculate the index.[17] Women tended to earn less than men across all SEIFA quintiles.

Among STEM graduates living in areas in quintile five, two in five men (41.4%) and one in five women (19.4%) earned $125,000 or more. In contrast, one in five (19.5%) men and one in eleven (8.9%) women living in areas in quintile 1 earned $125,00 or more in 2020-21.

Among employed STEM graduates living in areas in quintile five, less than one in ten men (9.1%) and one in five women (18.3%) earned less than $50,000. This compares with one in six men (16.8%) and nearly one quarter of women (23.5%) living in areas in quintile one.

Figure 6.8: Proportion of employed 2011 Higher Education graduates with a STEM qualification, by gender, Index of Relative Socioeconomic Advantage and Disadvantage, and income, 2020-21(a)



(a) Proportion denominators exclude people who did not have a PIT record in 2020-21 and people whose IRSD quintile was unknown.
Source: ABS (unpublished) Women in STEM integrated datasets, 2011-2021; 2011 Higher Education graduates linked to PIT ITR analysis population.

[17] For further information, see: Socio-Economic Indexes for Areas (SEIFA), Australia, 2021 | Australian Bureau of Statistics (abs.gov.au).

APPENDIX 1: REFERENCES

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APPENDIX 2: DATA ITEM LIST

Variable name	Variable description	Dataset	Used in
Aboriginal and / or Torres Strait Islander status	"EVER_INDIGENOUS_PERSON" is a flag that indicates if the individual has ever recorded being of Aboriginal and/or Torres Strait Islander descent in any of the PLIDA combined demographics component datasets.	PLIDA combined demographics	Tables 3, 20
Age	Age as at August 2011. Derived from PLIDA combined demographics MONTH_OF_BIRTH and YEAR_OF_BIRTH.	PLIDA combined demographics	Tables 2, 6, 9
Attendance type	Classifies student attendance as full-time or part-time in a calendar year.	Higher Education enrolments	Tables 5 & 6
Course type	Indicates the level of qualification, based on the Australian Standard Classification of Education (ASCED), 2001. Grouped into postgraduate, bachelor, and other undergraduate degrees in this analysis.	Higher Education completions	Table 7
Country of birth	Country of birth of student.	Higher Education enrolments	Table 19
Disability (2011)	Indicates whether a student recorded having a disability, impairment or long-term health condition in any enrolment record to 2011. Derived from the first digit of the eight-character "DISABILITY" variable.	Higher Education enrolments	Table 4
Disability (2020)	Indicates whether a student recorded having a disability, impairment or long-term health condition in any enrolment record to 2020. Derived from the first digit of the eight-character "DISABILITY" variable.	Higher Education enrolments	Table 22
Field of education	Field of education, Australian Standard Classification of Education (ASCED), 2001. In this analysis, four broad fields of education are used to define STEM qualifications: 01 Natural and Physical Sciences, 02 Information Technology, 03 Engineering and Related Technologies, 05 Agriculture, Environmental and Related Studies. Health qualifications are defined using the broad field of education, 06 Health. Non-STEM includes qualifications in all other fields of education. This definition is consistent with the STEM Equity Monitor (Methodology | STEM Equity Monitor | Department of Industry Science and Resources).	Higher Education completions	Tables 1-26
Gender	Gender of student. In higher education enrolment records, gender has been collected using various definitions over time. For further information, see section 2.3.4 Gender and Gender code | TCSI Support.	Higher Education enrolments	Tables 1-26
Labour force status (LFSP)	Records a person's labour force status for the week prior to Census Night. For further information, see Labour force status (LFSP) | Australian Bureau of Statistics (abs.gov.au).	Census of Population and Housing, 2021	Tables 8, 9, 11, 13
Language used at home (LANP)	Records whether a person uses a language other than English at home and if so, records the main non-English language which is used. For further information, see Language used at home (LANP) | Australian Bureau of Statistics (abs.gov.au).	Census of Population and Housing, 2021	Table 17

Variable name	Variable description	Dataset	Used in
Income	Salary or wages gross payment amount (GRS_PMT_TOTL_CA) from 2011-12 to 2020-21. For further information, see 1 Salary or wages 2021 | Australian Taxation Office (ato.gov.au).	PIT ITR (2011-12 – 2020-21)	Table 25
Industry of employment (INDP)	Describes the industry of the main job held by the employed person in the week prior to Census night. In the 2021 Census, INDP is coded to the Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006 (Revision 2.0). For further information, see Industry of employment (INDP) | Australian Bureau of Statistics (abs.gov.au).	Census of Population and Housing, 2021	Table 12
Occupation	Main salary and wage occupation code(IDV_OCPTN_CD) from 2011-12 to 2020-21. For further information, see Salary and wage occupation codes 2021 | Australian Taxation Office (ato.gov.au).	PIT ITR (2011-12 – 2020-21)	Tables 14, 15, 17, 23, 24
Remoteness area	Remoteness area of graduates' Statistical Area Level 1(SA1) of residence in 2021. Remoteness Areas divide Australia and the states and territories into 5 classes of remoteness (Major Cities of Australia; Inner Regional Australia; Outer Regional Australia; Remote Australia and Very Remote Australia) on the basis of their relative access to services. Remoteness area is defined according to the Australian Statistical Geography Standard (ASGS) Edition 3 (2021-2026). Further information is available at Remoteness Areas | Australian Bureau of Statistics.	PLIDA combined locations	Table 18
Socio-Economic Indexes for Area Index of Relative Socio-Economic Advantage and Disadvantage (SEIFA IRSAD)	SEIFA IRSAD quintile of graduates' Statistical Area Level 1 (SA1) of residence in 2021. The SEIFA IRSAD summarises information about the economic and social conditions of people and households within an area (SA1). It is defined using 2021 Census of Population and Housing data. Quintile 1 represents the 20% of areas with the highest relative disadvantage or lowest relative advantage. Quintile 5 represents the 20% of areas with the lowest relative disadvantage or highest relative advantage.	PLIDA combined locations	Table 21
Status in employment (SIEMP)	Defines a person's employment status for the main job held in the week prior to Census Night. In this analysis, responses have been grouped into employee, owner / manager of an incorporated or unincorporated business or contributing family worker, and not stated. For further information see Status in employment (SIEMP) | Australian Bureau of Statistics (abs.gov.au).	Census of Population and Housing, 2021	Table 16
Unpaid child care (CHCAREP)	Records people who, in the two weeks prior to Census Night, spent time caring for a child or children aged under 15 years without pay. It includes people: • caring for their own children, whether they usually live with them or not • looking after other children in a family, such as grandchildren or children of relatives • looking after children of friends or neighbours. For further information, see Unpaid child care (CHCAREP) | Australian Bureau of Statistics (abs.gov.au).	Census of Population and Housing, 2021	Tables 13, 14
Unpaid domestic work: number of hours (DOMP)	Records the number of hours people spent in the previous week doing domestic work without pay. Domestic work is work for the individual or household, whether in the household or in other places. Unpaid domestic work can include: • meal preparation, service and clean-up • washing, ironing and managing clothes • any other housework	Census of Population and Housing, 2021	Table 15

Variable name	Variable description	Dataset	Used in
	• gardening, mowing and yard work • home maintenance • car/bike maintenance • household shopping and managing household financial affairs • maintaining home internet connections and computer systems. For further information, see Unpaid domestic work: number of hours (DOMP) | Australian Bureau of Statistics (abs.gov.au).		
Year of arrival in Australia (YARP)	Applicable to persons born overseas and records the year they first arrived in Australia to live for one year or more. For further information see Year of arrival in Australia (YARP) | Australian Bureau of Statistics (abs.gov.au).	Census of Population and Housing, 2021	Table 10
Year of completion	Year of completion of qualification.	Higher Education completions	Tables 1-26

APPENDIX 3: DATA DEFINITIONS

3.1 Field of Education, ASCED, 2001

Table A3.1 shows the groupings of fields of education into STEM, non-STEM and Health, at the broad (2 digit) and narrow (4 digit) levels, as used in this analysis. Table A3.1 also shows how the different types of STEM fields – Science, Technology, Engineering, Mathematics and Agriculture and Environmental Science – are defined.

Table A3.1: Field of education grouping, ASCED, 2001

Broad Field	Narrow Field	Field of education name	Grouping	Detailed grouping
01	NATURAL AND PHYSICAL SCIENCES		STEM	
	0101	Mathematical Sciences	STEM	Mathematics
	0103	Physics and Astronomy	STEM	Science
	0105	Chemical Sciences	STEM	Science
	0107	Earth Sciences	STEM	Science
	0109	Biological Sciences	STEM	Science
	0199	Other Natural and Physical Sciences	STEM	Science
02	INFORMATION TECHNOLOGY		STEM	Technology
	0201	Computer Science	STEM	Technology
	0203	Information Systems	STEM	Technology
	0299	Other Information Technology	STEM	Technology
03	ENGINEERING AND RELATED TECHNOLOGIES		STEM	Engineering
	0301	Manufacturing Engineering and Technology	STEM	Engineering
	0303	Process and Resources Engineering	STEM	Engineering
	0305	Automotive Engineering and Technology	STEM	Engineering
	0307	Mechanical and Industrial Engineering and Technology	STEM	Engineering
	0309	Civil Engineering	STEM	Engineering
	0311	Geomatic Engineering	STEM	Engineering
	0313	Electrical and Electronic Engineering and Technology	STEM	Engineering
	0315	Aerospace Engineering and Technology	STEM	Engineering
	0317	Maritime Engineering and Technology	STEM	Engineering
	0399	Other Engineering and Related Technologies	STEM	Engineering
04	ARCHITECTURE AND BUILDING		Non-STEM	
	0401	Architecture and Urban Environment	Non-STEM	
	0403	Building	Non-STEM	
05	AGRICULTURE, ENVIRONMENTAL AND RELATED STUDIES		STEM	Agriculture & Environmental Science
	0501	Agriculture	STEM	Agriculture & Environmental Science
	0503	Horticulture and Viticulture	STEM	Agriculture & Environmental Science
	0505	Forestry Studies	STEM	Agriculture & Environmental Science
	0507	Fisheries Studies	STEM	Agriculture & Environmental Science
	0509	Environmental Studies	STEM	Agriculture & Environmental Science
	0599	Other Agriculture, Environmental and Related Studies	STEM	Agriculture & Environmental Science
06	HEALTH		Health	
	0601	Medical Studies	Health	
	0603	Nursing	Health	
	0605	Pharmacy	Health	
	0607	Dental Studies	Health	
	0609	Optical Science	Health	
	0611	Veterinary Studies	Health	
	0613	Public Health	Health	
	0615	Radiography	Health	

Broad Field	Narrow Field	Field of education name	Grouping	Detailed grouping
	0617	Rehabilitation Therapies	Health	
	0619	Complementary Therapies	Health	
	0699	Other Health	Health	
07	EDUCATION		Non-STEM	
	0701	Teacher Education	Non-STEM	
	0703	Curriculum and Education Studies	Non-STEM	
	0799	Other Education	Non-STEM	
08	MANAGEMENT AND COMMERCE		Non-STEM	
	0801	Accounting	Non-STEM	
	0803	Business and Management	Non-STEM	
	0805	Sales and Marketing	Non-STEM	
	0807	Tourism	Non-STEM	
	0809	Office Studies	Non-STEM	
	0811	Banking, Finance and Related Fields	Non-STEM	
	0899	Other Management and Commerce	Non-STEM	
09	SOCIETY AND CULTURE		Non-STEM	
	0901	Political Science and Policy Studies	Non-STEM	
	0903	Studies in Human Society	Non-STEM	
	0905	Human Welfare Studies and Services	Non-STEM	
	0907	Behavioural Science	Non-STEM	
	0909	Law	Non-STEM	
	0911	Justice and Law Enforcement	Non-STEM	
	0913	Librarianship, Information Management and Curatorial Studies	Non-STEM	
	0915	Language and Literature	Non-STEM	
	0917	Philosophy and Religious Studies	Non-STEM	
	0919	Economics and Econometrics	Non-STEM	
	0921	Sport and Recreation	Non-STEM	
	0999	Other Society and Culture	Non-STEM	
10	CREATIVE ARTS		Non-STEM	
	1001	Performing Arts	Non-STEM	
	1003	Visual Arts and Crafts	Non-STEM	
	1005	Graphic and Design Studies	Non-STEM	
	1007	Communication and Media Studies	Non-STEM	
	1099	Other Creative Arts	Non-STEM	
11	FOOD, HOSPITALITY AND PERSONAL SERVICES		Non-STEM	
	1101	Food and Hospitality	Non-STEM	
	1103	Personal Services	Non-STEM	
12	MIXED FIELD PROGRAMMES		Non-STEM	
	1201	General Education Programmes	Non-STEM	
	1203	Social Skills Programmes	Non-STEM	
	1205	Employment Skills Programmes	Non-STEM	
	1299	Other Mixed Field Programmes	Non-STEM	

Source: STEM workforce report, 2016 (Appendix A).

3.2 STEM-qualified industries of employment

STEM-qualified industries in the Australian and New Zealand Standard Industry Classification (ANZSIC) are defined by identifying industries in which the majority (more than 50%) of people employed in these industries report a STEM qualification from VET or university in the Census of Population and Housing (DISR, 2023). Table A3.2 lists the industries defined as STEM-qualified over time, based on data from the 2016 and 2021 Censuses.

Table A3.2: STEM-qualified industries of employment over time, STEM Equity Monitor

Code	Industry of employment	STEM-qualified industry (2016 Census)	STEM-qualified industry (2021 Census)
051	Forestry support services	Mixed STEM-qualified	Non-STEM
070	Oil and gas extraction	Mixed STEM-qualified	Mixed STEM-qualified
221	Iron and steel forging	Mixed STEM-qualified	Non-STEM
223	Metal container manufacturing	VET STEM-qualified	Non-STEM
239	Other transport equipment manufacturing	VET STEM-qualified	Mixed STEM-qualified
246	Specialised machinery and equipment manufacturing	Mixed STEM-qualified	Mixed STEM-qualified
249	Other machinery & equipment manufacturing	Mixed STEM-qualified	Mixed STEM-qualified
261	Electricity generation	Mixed STEM-qualified	Mixed STEM-qualified
262	Electricity transmission	Mixed STEM-qualified	Non-STEM
263	Electricity distribution	Mixed STEM-qualified	Mixed STEM-qualified
691	Scientific research services	Mixed STEM-qualified	Mixed STEM-qualified
692	Architectural, engineering & technical services*	VET STEM-qualified	VET STEM-qualified
700	Computer system design & related services	Mixed STEM-qualified	Mixed STEM-qualified
941	Automotive repair and maintenance	VET STEM-qualified	VET STEM-qualified
942	Machinery & equipment repair & maintenance	VET STEM-qualified	Mixed STEM-qualified

Source: Methodology | STEM Equity Monitor | Department of Industry, Science and Resources (DISR, July 2023).
*Not identified as a STEM industry based on the definition, but included due to recognition that core STEM skills are required for this industry.

In both the 2016 and 2021 Censuses, industry was coded using ANZSIC 2006 revision 2.0 (ABS, 2013). There are several differences between the industries defined as STEM-qualified based on the 2016 and 2021 Census analysis. The following three industries are no longer classified as STEM:

- Forestry support services (code 051)
- Iron and steel forging (code 221)
- Metal container manufacturing (code 223)

Some industries changed type, for example, from VET STEM-qualified in 2016 to Mixed STEM-qualified in 2021. There are no university STEM-qualified industries, based on the definition.

3.3 STEM-qualified and health-qualified occupations

3.3.1 STEM-qualified occupations

According to the STEM Equity Monitor Methodology, STEM-qualified occupations were defined by identifying occupation classes in which more than 50% of people reported a STEM qualification from VET or university, based on analysis of data from the Census of Population and Housing. Table A3.3 lists the occupations defined as STEM-qualified, according to the 2016 and 2021 Censuses.

Table A3.3: STEM-qualified occupations over time, STEM Equity Monitor.

Code	Occupation name	STEM-qualified occupations (2016 Census)	STEM-qualified occupations (2021 Census)
1332	Engineering Managers	University STEM-qualified	University STEM-qualified
1351	ICT managers	Non-STEM	Mixed STEM-qualified
2241	Actuaries, mathematicians and statisticians*	University STEM-qualified	University STEM-qualified
2300	Design, Engineering, Science and Transport Professionals, nfd*	Mixed STEM-qualified	Mixed STEM-qualified
2310	Air and Marine Transport Professionals, nfd	Mixed STEM-qualified	Mixed STEM-qualified
2311	Air Transport Professionals	Mixed STEM-qualified	Mixed STEM-qualified
2312	**Marine Transport Professionals**	VET STEM-qualified	VET STEM-qualified
2322	Surveyors and Spatial Scientists	Mixed STEM-qualified	University STEM-qualified
2330	Engineering Professionals, nfd	University STEM-qualified	University STEM-qualified
2331	Chemical and Materials Engineers	University STEM-qualified	University STEM-qualified
2332	Civil Engineering Professionals	University STEM-qualified	University STEM-qualified
2333	Electrical Engineers	University STEM-qualified	University STEM-qualified
2334	Electronics Engineers	University STEM-qualified	University STEM-qualified
2335	Industrial, Mechanical and Production Engineers	University STEM-qualified	University STEM-qualified
2336	Mining Engineers	University STEM-qualified	University STEM-qualified
2339	Other Engineering Professionals	University STEM-qualified	University STEM-qualified
2340	Natural and Physical Science Professionals, nfd	University STEM-qualified	University STEM-qualified
2341	Agricultural and Forestry Scientists	University STEM-qualified	University STEM-qualified
2342	Chemists, and Food and Wine Scientists	University STEM-qualified	University STEM-qualified
2343	Environmental Scientists	University STEM-qualified	University STEM-qualified
2344	Geologists, Geophysicists and Hydrogeologists	University STEM-qualified	University STEM-qualified
2345	Life Scientists	University STEM-qualified	University STEM-qualified
2346	Medical Laboratory Scientists	University STEM-qualified	University STEM-qualified
2347	Veterinarians	University health-qualified	University health-qualified
2349	Other Natural and Physical Science Professionals	Mixed STEM-qualified	Mixed STEM-qualified
2600	ICT Professionals, nfd	Mixed STEM-qualified	Mixed STEM-qualified
2610	Business and Systems Analysts, and Programmers, nfd	University STEM-qualified	University STEM-qualified
2611	ICT Business and Systems Analysts	Mixed STEM-qualified	University STEM-qualified
2612	Multimedia Specialists and Web Developers	Mixed STEM-qualified	Mixed STEM-qualified
2613	Software and Applications Programmers	University STEM-qualified	University STEM-qualified
2621	Database and Systems Administrators, and ICT Security Specialists	Mixed STEM-qualified	Mixed STEM-qualified
2630	ICT Network and Support Professionals, nfd	Mixed STEM-qualified	Mixed STEM-qualified

Code	Occupation name	STEM-qualified occupations (2016 Census)	STEM-qualified occupations (2021 Census)
2631	Computer Network Professionals	Mixed STEM-qualified	University STEM-qualified
2632	ICT Support and Test Engineers	Mixed STEM-qualified	Mixed STEM-qualified
2633	Telecommunications Engineering Professionals	University STEM-qualified	University STEM-qualified
3100	Engineering, ICT and Science Technicians, nfd	Mixed STEM-qualified	Mixed STEM-qualified
3110	Agricultural, Medical and Science Technicians, nfd	Mixed STEM-qualified	University STEM-qualified
3111	Agricultural Technicians	Mixed STEM-qualified	Mixed STEM-qualified
3113	Primary Products Inspectors	Mixed STEM-qualified	Non-STEM
3114	Science Technicians	Mixed STEM-qualified	Mixed STEM-qualified
3120	Building and Engineering Technicians, nfd	Mixed STEM-qualified	Mixed STEM-qualified
3122	Civil Engineering Draftspersons and Technicians	Mixed STEM-qualified	Mixed STEM-qualified
3123	Electrical Engineering Draftspersons and Technicians	VET STEM-qualified	VET STEM-qualified
3124	Electronic Engineering Draftspersons and Technicians	VET STEM-qualified	VET STEM-qualified
3125	Mechanical Engineering Draftspersons and Technicians	VET STEM-qualified	VET STEM-qualified
3129	Other Building and Engineering Technicians	VET STEM-qualified	Mixed STEM-qualified
3130	ICT and Telecommunications Technicians, nfd	Mixed STEM-qualified	Mixed STEM-qualified
3131	ICT Support Technicians	Mixed STEM-qualified	Mixed STEM-qualified
3132	Telecommunications Technical Specialists	Mixed STEM-qualified	Mixed STEM-qualified
3200	Automotive and Engineering Trades Workers, nfd	VET STEM-qualified	VET STEM-qualified
3210	Automotive Electricians and Mechanics, nfd	VET STEM-qualified	VET STEM-qualified
3211	Automotive Electricians	VET STEM-qualified	VET STEM-qualified
3212	Motor Mechanics	VET STEM-qualified	VET STEM-qualified
3220	Fabrication Engineering Trades Workers, nfd	VET STEM-qualified	VET STEM-qualified
3222	Sheetmetal Trades Workers	VET STEM-qualified	VET STEM-qualified
3223	Structural Steel and Welding Trades Workers	VET STEM-qualified	VET STEM-qualified
3230	Mechanical Engineering Trades Workers, nfd	VET STEM-qualified	VET STEM-qualified
3231	Aircraft Maintenance Engineers	VET STEM-qualified	VET STEM-qualified
3232	Metal Fitters and Machinists	VET STEM-qualified	VET STEM-qualified
3233	Precision Metal Trades Workers	VET STEM-qualified	VET STEM-qualified
3234	Toolmakers and Engineering Patternmakers	VET STEM-qualified	VET STEM-qualified
3240	Panelbeaters, and Vehicle Body Builders, Trimmers and Painters, nfd	VET STEM-qualified	VET STEM-qualified
3241	Panelbeaters	VET STEM-qualified	VET STEM-qualified
3242	Vehicle Body Builders and Trimmers	VET STEM-qualified	Non-STEM
3243	Vehicle Painters	VET STEM-qualified	VET STEM-qualified
3400	Electrotechnology and Telecommunications Trades Workers, nfd	VET STEM-qualified	Mixed STEM-qualified
3411	Electricians	VET STEM-qualified	VET STEM-qualified
3421	Airconditioning and Refrigeration Mechanics	VET STEM-qualified	VET STEM-qualified
3422	Electrical Distribution Trades Workers	VET STEM-qualified	VET STEM-qualified
3423	Electronics Trades Workers	Mixed STEM-qualified	Mixed STEM-qualified
3424	Telecommunications Trades Workers	Mixed STEM-qualified	Mixed STEM-qualified
3620	Horticultural Trades Workers, nfd	Mixed STEM-qualified	Mixed STEM-qualified

Code	Occupation name	STEM-qualified occupations (2016 Census)	STEM-qualified occupations (2021 Census)
3923	Printers	VET STEM-qualified	Non-STEM
3933	Upholsterers	VET STEM-qualified	Non-STEM
3941	Cabinetmakers	VET STEM-qualified	VET STEM-qualified
3991	Boat Builders and Shipwrights	VET STEM-qualified	Mixed STEM-qualified
3992	Chemical, Gas, Petroleum and Power Generation Plant Operators	VET STEM-qualified	VET STEM-qualified

Source: Methodology | STEM Equity Monitor | Department of Industry, Science and Resources (DISR, July 2023).
*Not identified as STEM-qualified based on the above definition, but included due to recognition that core STEM skills are required for these occupations.

Occupations are defined using the Australian and New Zealand Standard Classification of Occupations (ANZSCO). In the 2016 Census, occupation was coded using ANZSCO 2013 version 1.2, while in the 2021 Census, occupation was coded using ANZSCO 2013 version 1.3.

There are several differences between the occupations defined as STEM-qualified based on the 2016 and 2021 Censuses. The following four occupations were no longer identified as STEM in 2021:

- primary product inspectors (code 3113)
- vehicle body builders and trimmers (code 3242)
- printers (code 3923)
- upholsterers (code 3933)

In addition, a small number of the occupations remained STEM occupations but moved between categories. For example, in 2016, some occupations were VET STEM-qualified and in 2021 changed to mixed STEM-qualified.

3.3.2 Health-qualified occupations

Health fields are included in the monitor, but reported separately from STEM fields. They are recognised as fields that rely heavily on the application of STEM skills and knowledge, but do not meet the definition of STEM used in the monitor.

Health-qualified occupations are occupations where 50% or more of the workforce reported a 'Health' (ASCED code 06) qualification in the Census of Population and Housing. Table A3.4 lists the occupations listed as health-qualified according to this definition, based on the 2016 and 2021 Censuses.

Table A3.4: Health-qualified occupations over time, STEM Equity Monitor

Code	Occupation name	Occupation type (2016 Census)	Occupation type (2021 Census)
2500	Health Professionals, nfd	Mixed health-qualified	Mixed health-qualified
2511	Nutrition Professionals	University health-qualified	University health-qualified
2512	Medical Imaging Professionals	University health-qualified	University health-qualified
2514	Optometrists and Orthoptists	University health-qualified	University health-qualified
2515	Pharmacists	University health-qualified	University health-qualified
2519	Other Health Diagnostic and Promotion Professionals	Mixed health-qualified	Mixed health-qualified
2521	Chiropractors and Osteopaths	University health-qualified	University health-qualified
2522	Complementary Health Therapists	Mixed health-qualified	University health-qualified
2523	Dental Practitioners	University health-qualified	University health-qualified
2524	Occupational Therapists	University health-qualified	University health-qualified
2525	Physiotherapists	University health-qualified	University health-qualified
2526	Podiatrists	University health-qualified	University health-qualified
2527	Audiologists and Speech Pathologists \ Therapists	University health-qualified	University health-qualified
2530	Medical Practitioners, nfd	University health-qualified	University health-qualified
2531	General Practitioners and Resident Medical Officers	University health-qualified	University health-qualified
2532	Anaesthetists	University health-qualified	University health-qualified
2533	Specialist Physicians	University health-qualified	University health-qualified
2534	Psychiatrists	University health-qualified	University health-qualified
2535	Surgeons	University health-qualified	University health-qualified
2539	Other Medical Practitioners	University health-qualified	University health-qualified
2540	Midwifery and Nursing Professionals, nfd	University health-qualified	University health-qualified
2541	Midwives	University health-qualified	University health-qualified
2542	Nurse Educators and Researchers	University health-qualified	University health-qualified
2543	Nurse Managers	University health-qualified	University health-qualified
2544	Registered Nurses	University health-qualified	University health-qualified
3613	Veterinary Nurses	VET health-qualified	VET health-qualified
4111	Ambulance Officers and Paramedics	Mixed health-qualified	University health-qualified
4112	Dental Hygienists, Technicians and Therapists	VET health-qualified	Mixed health-qualified
4114	Enrolled and Mothercraft Nurses	VET health-qualified	VET health-qualified
4116	Massage Therapists	VET health-qualified	Mixed health-qualified
4232	Dental Assistants	Mixed health-qualified	Mixed health-qualified

Source: Methodology | STEM Equity Monitor | Department of Industry, Science and Resources (DISR, July 2023).