

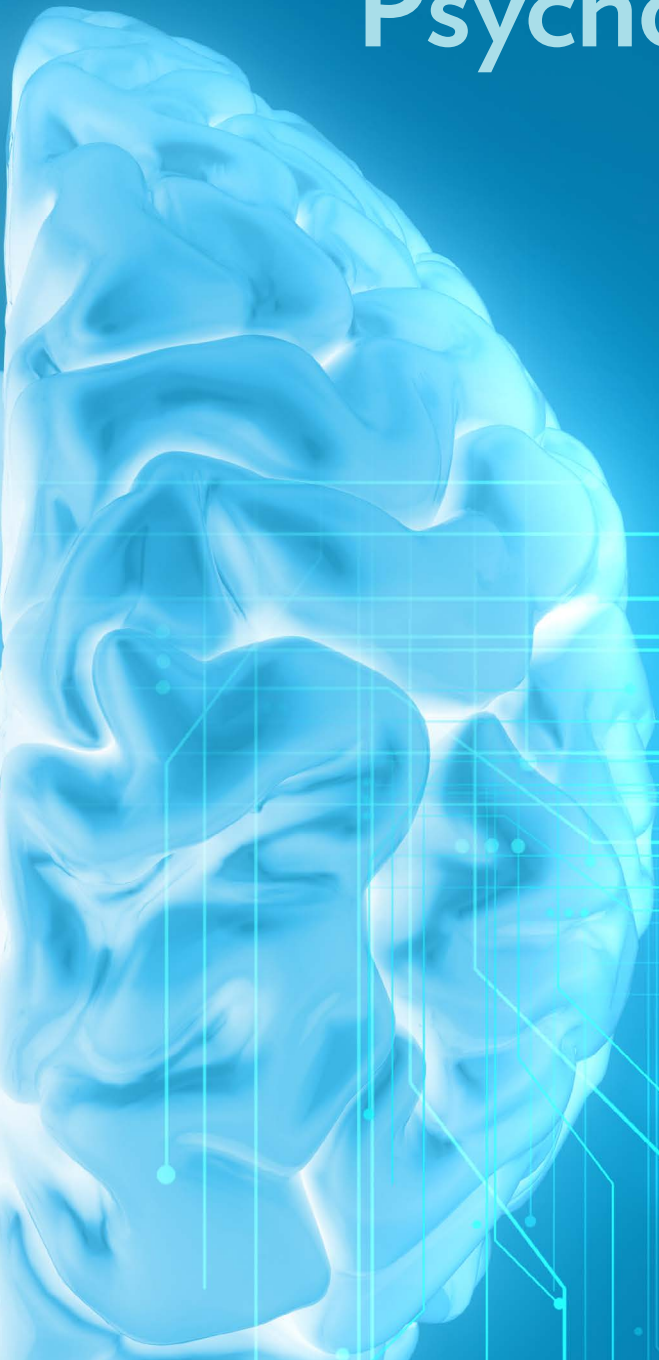


UNIVERSITY OF  
**CANBERRA**



Australian  
National  
University

# Understanding Industry Demand for Australia's Psychology Graduates



This report was created in collaboration between:

Discipline of Psychology, School of Health Sciences, Faculty of Health  
**University of Canberra**

Office of the Dean

Australian National Centre for the Public Awareness of Science, College of Science  
School of Computing, College of Engineering, Computing and Cybernetics  
**Australian National University**

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## Executive Summary And Recommendations

Three-year psychology degree graduates hold a broad range of skills and knowledge. These include, but are not limited to, human behaviour, research, communication, data analysis, mental health, society, ethics and cultural responsiveness. The sheer breadth of potential applications of these attributes in the workforce, paired with existing assumptions of both graduates and employers about a narrow ‘psychologist’ job pathway, means that career paths are currently vague for three-year psychology graduates. This impacts students and graduates, but also potential employers, as well as tertiary education. Clarification is needed as to how psychology graduates should approach the job market and what jobs might make most use of the skills and capabilities they have spent years developing.

This report explores the employment opportunities for psychology graduates using a ‘big data’ approach, specifically Machine Learning (ML) and Natural Language Processing (NLP). Our multidisciplinary team developed a ML/NLP algorithm that was applied to a dataset of 5.1 million job ads, allowing us to map industry demand for psychology graduates’ skills for the first time, and provide detailed identification of potential job roles for psychology graduates. This approach uses competency matching to identify where graduates’ skills and knowledge can place them within industry (i.e., where can graduates work?), hence avoiding reliance on historical data (i.e., where have graduates worked in the past?) or keyword search (i.e., only ads including the term ‘psychology’). This report contains our methods and results to answer the key question: Where can three-year psychology graduates find suitable work?

### Key findings:

- **We developed an algorithm which identified psychology-relevant jobs with a high degree of accuracy.** Our trained ML/NLP algorithm accurately coded job ads into four job relevance outcome categories with an accuracy rate of 82%, reflecting suitability for psychology graduates.
- **Around 25% of Australian and New Zealand jobs advertised in the last four years are potentially suitable for psychology graduates.** Our ML/NLP analysis of over five million Australian and New Zealand job ads from 2019 to 2022 revealed that while only 1% of job roles are explicitly identified for psychology graduates, a further 2% of advertised jobs are highly relevant, and another 22% are potentially relevant to psychology graduates.
- **Psychology degrees should not be viewed solely as a narrow, professional education suitable only for those who wish to work in health.** We identified a large number of relevant job roles in health, social, and welfare-related industries, as well as management, project administration, human resource and marketing fields. However, our results also identify significant demand for psychology graduate skills sets in other large industry sectors, including information technology, design, business, science and education.
- **Three-year psychology graduates hold skills that are in high demand across a wide range of destinations.** The shift to ‘degree-agnostic’ job requirements, in concert with the widespread applicability of psychology graduate skills and attributes, means there are potential job roles in almost all industries, with a very large and highly diverse set of job titles. Job mapping identified both workplace roles suitable for three-year graduates, and roles that required other qualifications, but were closely aligned with these skills.
- **ML/NLP technology is a suitable way to measure and track changes in demand for psychology skills in the Australian and New Zealand market.** The ML/NLP analysis can be used to identify potential job opportunities at industry, job category and role title level, as a ‘snapshot’ and mapped over time, and at national and local scale, providing both broad insight and detailed data on job roles for psychology graduates.



## Recommendations from this report:

- **A fundamental shift in the perceived purpose of a psychology degree is needed.** Psychology graduates hold a unique and valuable skillset required for roles in many employment sectors. This data provides a platform for reframing the narrow, health-focused perception of the psychology degree typically held by industry and the public. It provides further opportunities for psychology graduates to contribute across society.
- **Communicating with potential employers about the skills and attributes of psychology graduates and the specific ways in which they can support industry activity is crucial.** Making explicit where and how psychology graduates can work will enable employers to acquire desired skills and graduates to apply their learning and find fulfilling job opportunities.
- **Within Psychology, we need to recognise the breadth of job roles that can be held by graduates.**

Graduates can be employed in a myriad of roles and sectors, and this needs to be supported throughout and beyond the education of psychology students. Specifically, the findings support the potential redesign of curriculum and assessment for work-ready graduates from a three-year degree, including support for career planning and identification of skills and knowledge that can be translated into employment settings (e.g., this data can be utilised within capstone units, work-integrated learning placements, portfolios, reflection of competencies and industry-based assessment alignment).

- **The data in this report highlights the utility of the psychology degree in the current workplace environment, providing clear evidence of the viability and applicability of the three-year psychology degree in providing cross-sector employment-ready skills.** These findings can be used to provide a more informed understanding and positioning of psychology education within the tertiary sector and provide a basis for identifying and forging new psychology-industry relationships.



## Project Team

This interdisciplinary project is a collaboration between researchers at the University of Canberra and the Australian National University.



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## Key Partners

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### Partnerships:

All job advertisement data used for analysis was provided by Lightcast® (formerly Esmi Burning Glass Technologies) under a research agreement.

Data was analysed by PostAc® ML/NLP algorithms to text coding.

## Acknowledgements

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Note that this work builds on previous PostAc® research and development ([www.postac.com.au](http://www.postac.com.au)), we extend our appreciation to all those involved in that project.



## Aims and Background

A three-year psychology degree equips graduates with a wide range of skills and knowledge. Graduates studying a three-year psychology undergraduate degree develop an understanding of human society and culture and acquire diverse skills. Graduate capabilities include, but are not limited to, research methods, ethics and application of discipline knowledge (Cranney et al., 2022). Many psychology students cannot, or do not want to, undertake the further postgraduate study required to become professional psychologists, and exit at three years. These three-year graduates have long made significant contributions within a large range employment industries. However, there is a lack of clarity among students, graduates, educators and employers about where psychology graduates can apply their skills in the workforce.

There is a common misconception that undergraduate psychology is focused on preparing students for further study and training to become psychologists, with few other options (Machin et al., 2022a). While many students do aspire to become psychologists, this requires several years of postgraduate study and training (Australian Psychological Society, 2023). Like graduates of other degrees designed to produce a certain kind of professional, such as nursing or architecture, those psychology students who do not go on to the conventional postgraduate study step off a clearly mapped professional career path. The lack of a clear career path for three-year graduates can lead to confusion about specific potential career options following an undergraduate degree in psychology (e.g., Appleby, 2018; Hoare & Luke, 2022), despite recent efforts to clarify job pathways (Machin et al., 2022b). Identification of specific job opportunities for three-year graduates is needed and this is the key gap addressed by this report.

Psychology courses in Australia are accredited by the Australian Psychology Accreditation Council (APAC). APAC stipulates the foundational competencies of three-year graduates. These competencies are related to communication, analysis and critical thinking, teamwork and interpersonal skills, cultural reflexivity, values and ethics, scholarly inquiry, as well as the

application and comprehension of psychology-specific knowledge utilising a scientific approach, which includes research methods and statistics (APAC, 2019). Despite the broad applicability of such attributes, or perhaps due to their broad applicability, it can be challenging to identify suitable job opportunities for three-year graduates. As Landrum (2018) noted “the psychology bachelor’s degree qualifies a person for a large number of jobs, but the degree does not uniquely qualify a person for any particular job”. This is exacerbated by the difficulty graduates find using job search databases because ‘psychology’ as a keyword elicits primarily psychologist job positions which are not accessible for three-year graduates.

The limited evidence to date suggests the most common employment industry for psychology graduates is health care and social assistance, with many other typical jobs in professional, scientific and technical services, public administration and safety, and education and training (Graduate Careers Australia, 2015). However, such data does not identify specific job categories or titles. Nor does it tell us where graduates could be employed, only where they are currently employed. In addition, only 28.1% of psychology three-year/Honours graduates reported that they used their acquired knowledge and skills in their employment (Heads of Department and Schools of Psychology Association [HODSPA], 2022), further suggesting a lack of understanding of job suitability based on their education. This lack of clarity about the applicability of psychology skills to the workforce is not isolated to graduates; educators also need to understand the skills and attributes of a psychology undergraduate qualification (HODSPA et al., 2022). These recognitions align with an increased emphasis on work-integrated learning opportunities and/or capstone units across psychology degrees in Australia. Capstone units are designed to facilitate understanding of graduate attributes and how these align with career opportunities (Morris et al., 2013), consistent with the suggestion that students need support to identify and apply their acquired skills from studying psychology (Schweinsberg et al., 2021).

There is, therefore, a clear need to identify specific possible jobs for three-year graduates and map psychology-relevant jobs across the workforce.



This information will support not only students, graduates, educators and universities in job search, but employers seeking skilled employees with qualifications they might not have considered. Additionally, the government and the broader public benefit from understanding how these skills and knowledge can be used within our society. Educating people in psychology is a significant investment for all parties, not least the students themselves.

Therefore, the aim of this project was to use machine learning (ML) and natural language processing (NLP) approaches applied to job ads data to map the industry demand for the skills and attributes of three-year psychology graduates. The key outcome is the identification of job roles for three-year psychology graduates, at industry, job category and role title levels.

### **This analysis will allow:**

- 1.** Mapping of the demand for psychology graduate skills and attributes across the workforce and within industries.
- 2.** Identification of new job roles not previously profiled as appropriate for psychology graduates, particularly jobs suitable for three-year graduates without additional qualifications.
- 3.** Generation of insights, data and guidance into the current nature of the job search landscape for psychology graduates and those supporting them.
- 4.** Detection of a range of job roles in other fields that are closely aligned in terms of skills and attributes with the psychology degree, with potential for collaboration and partnerships within the tertiary sector and during employment.
- 5.** Analysis of job demand at national and local scales, providing both broad insight and detailed data on job roles for psychology graduates in Australia.



## A 'Big Data' Approach

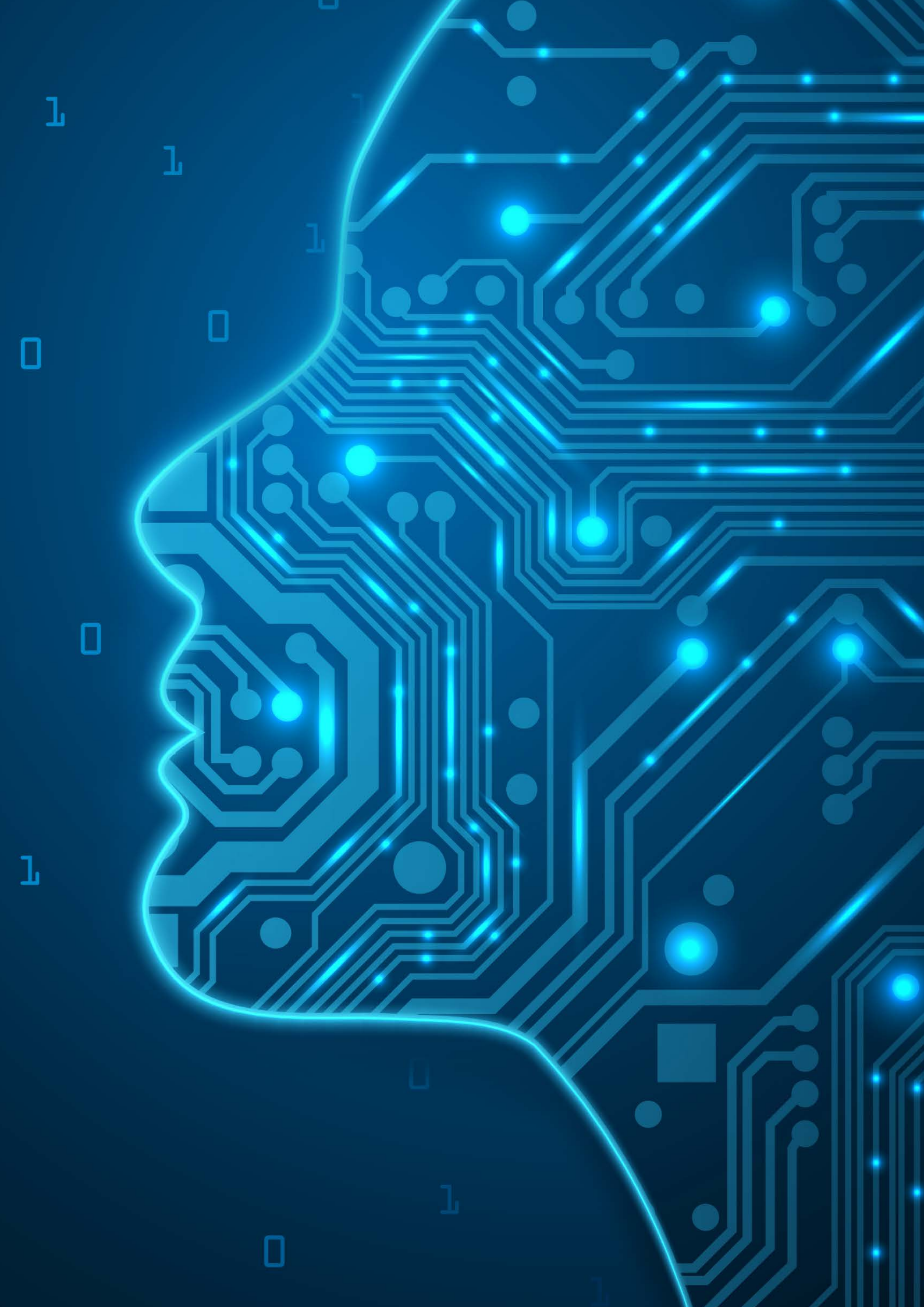
The recent availability of very large data sets, and the use of ML and NLP to identify patterns within such data sets, provides a novel means of answering complex questions that were previously impossible to answer due to the huge time commitments necessary. Job ads are a window into the workforce. As a 'wish list' from potential employers looking for new hires, job ads are a rich data set for potential analysis of employer needs and desires. Crucially, job ads provide a future-facing evaluation of potential job roles, by asking what jobs graduates could hold, rather than being restricted to jobs currently or previously held by graduates.

Members of the current research team (IM, WG, HS) previously developed an ML/NLP job ad sorting machine to identify the nature and extent of the job market for PhD graduates (PostAc<sup>®</sup>; Mewburn, Grant & Suominen, 2017). That project demonstrated that the machine was able to 'read' a large corpus of job ads and categorise them according to their degree of desired research skills, based on a custom-designed schema denoting skills and attributes of PhD graduates. The outcomes from that project included extensive mapping of industry demand for PhD graduates, identification of new 'hidden' job markets for PhD graduates and trends analysis of changes in industry demand for PhD graduates. The machine and associated outcomes have, and continue to be, instrumental in reshaping understanding of PhD skills and workforce opportunities both within the tertiary sector and beyond. Findings from the PostAc<sup>®</sup> project have been used to develop a tool for PhD students to explore their career options and assist universities to develop appropriate activities and opportunities to enhance employability.

They have also been widely cited in publications, thereby informing systematic reviews (e.g., Chen et al. (2023), Mezhoudi et al. (2023), Pinto et al., (2023) and Signore et al. (2023)) and original studies (e.g., Papoutsoglou et al. (2019), Conejero et al. (2021), Mantai & Marrone (2022), and O'Connor et al. (2023)), as well as university reforms and policy pieces in Australia (e.g., McGagh et al. (2016), McCarthy and Wienk (2019), and the 2020 white paper, titled "Redefining the ANU PhD", by the Australian National University, available at <https://services.anu.edu.au/planning-governance/planning-review/redefining-the-anu-phd-white-paper>).

Understanding the job market for psychology graduates involves addressing many of the same challenges that were successfully solved in the PostAc<sup>®</sup> project, including identifying jobs that align in terms of skills but not qualification keywords (PhD/psychology), mapping a range of graduate skills and attributes, and incorporating job roles across a wide range of potential industries.

**This project sought to design and deploy an ML/NLP algorithm that could learn from human experts to model what a 'psychology graduate-shaped job' looks like; highlight these jobs within a very large, complex dataset; provide analysis of those jobs in terms of broad industry groupings, narrow job categories and specific job titles; and interpret the findings in terms of contributions to the challenges facing the psychology discipline noted above. This report summarises the activities undertaken on the project to date, and the results obtained so far.**



## Methods

This project unfolded in four steps: 1) feasibility and user discussions, 2) development of an annotation schema with an advisory group, 3) expert coding to produce a 'gold standard' corpus of model solutions for the ML/NLP algorithms to learn from and 4) application of ML/NLP (including ML/NLP model training, the resulting model evaluation, and the deployment of the developed model for data analysis and reporting). The multidisciplinary project team worked collaboratively together during all steps, with the steps informing each other and recurring as required. The project steps are depicted in Figure 1.

**Feasibility and User Discussions.** Information on the skills and capabilities psychology graduates are expected to develop, perceptions of the jobs landscape for psychology graduates, employer and organisational expectations and the type of data required for forward planning, was obtained from a broad range of stakeholders including current psychology students, graduates, psychology tertiary teaching staff, course designers, career development specialists and a variety of employers. These user discussions were ongoing throughout the project and informed all steps.

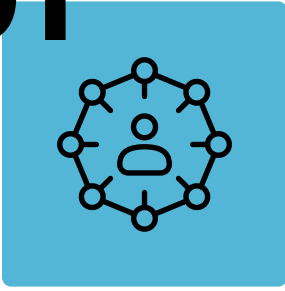
The feedback supported the **development of a bespoke Psychology Skills and Attributes Annotation Schema for ML and NLP**. This schema enabled jobs to be reliably coded for suitability for three-year graduates. An expert advisory group of experienced educators and researchers in psychology graduate skills, and psychology work-integrated learning was convened. The expert group worked with the project team to iteratively design the annotation schema, including pilot testing on job ads. The final schema enabled coders to identify suitable psychology graduate job ads from a large corpus of job ads. The focus of the annotation scheme development process was to identify skills and attributes unique to a three-year psychology degree. For example, while communication skills are acquired in the undergraduate psychology degree, they are learned in many university courses and thus are not a good discriminator of jobs suitable for psychology graduates. Attributes and skills that formed the schema were both unique to psychology and distinguished across jobs.

Once the annotation schema was agreed, the next step to an ML/NLP solution was **Expert Human Coding to Produce a Gold Standard Corpus**. Three human coders (JB, AG and IM) annotated an initial set of 200 job ads using a 1 to 5 suitability rating, with higher scores indicative of greater suitability for a psychology three-year graduate. Two coders (JB and AG) then undertook a series of coding rounds applying the schema to 1,273 job ads, including refinement of the schema using double-coding and resolution through discussion. Once agreement was reached, the 1,273 gold standard annotated job ads were provided for model training, with an additional 625 job ads re-annotated to correct model prediction after initial training. Concurrently, the coders provided a second coding indicator representing whether the job was potentially suitable for three-year graduates without additional training or qualifications. All job ads data was provided by Lightcast®, which was licensed to the University of Canberra team for research purposes. ML/NLP work was designed and conducted by HS and CX.

In the first iteration of **ML/NLP model training**, the 1,273 gold standard annotated jobs were divided into two batches, 1,000 for training and 273 for testing. Based on the model emerging from these datasets, a novel batch of jobs was generated, attached with model prediction, from which a further 625 jobs were re-annotated to provide GS feedback on model performance. For comparison, evaluation was conducted on the same 273 jobs in order to more finely tune the model settings, by incorporating these 625 jobs into the training set. Thus the second version of the model incorporated 1,625 training examples and 273 testing examples.

Concurrently, the domain experts provided detailed feedback on misaligned model prediction ratings, and these adjustments were incorporated into the new model. For each model generated, **ML/NLP model evaluation** assessed accuracy of predictions. The evaluation included two protocols; one using ratings from 1 to 5, and the other collapsing both categories of 'unsuitable' jobs (1-2) into a single rating. The first protocol revealed an increase in initial to subsequent model accuracy from 72.89% to 75.82%. Incorporating the second protocol improved initial and subsequent model accuracy from 81.05% to 82.42%. Thus, the second model using the four-level ratings was used as the final model for subsequent **data analysis** (the findings are in the next section - Figure 1 does not describe the findings, just the process).

01



### Feasibility and user discussions

Australia-wide stakeholder evaluation and feedback. Current psychology students, graduates, psychology tertiary teaching staff, course designers, career development specialists and employers

02



### Development of the annotation schema

Expert advisory group worked with project team to develop and refine psychology skills and attributes schema that allowed coding of job advertisements. Focus on unique skills that discriminate across jobs.

03



### Expert coding to produce the gold standard corpus

Project team used schema to code 1273 job advertisements into suitability ratings. Additional 675 jobs recoded after Model 1 training to provide further feedback.

04



### ML/NLP model training

Model 1: 1000 training examples, 273 testing examples. Model 2: Additional 625 recoded examples. Incorporated additional coder feedback.

### ML/NLP model evaluation

Evaluated two models across two protocols. Final model 82.42% accuracy.

### ML/NLP model data analysis and reporting

The best-performing ML/NLP model was applied to all job advertisements in the corpus (>5 million).

Stakeholder discussions continued throughout all steps of the project, informing schema design, coding, model evaluation, analysis and reporting.

FIGURE 1. STEPS IN UNDERSTANDING INDUSTRY DEMAND FOR AUSTRALIA'S PSYCHOLOGY GRADUATES PROJECT

## Analysis of Australian Industry Demand for Three-Year Psychology Graduate Skills

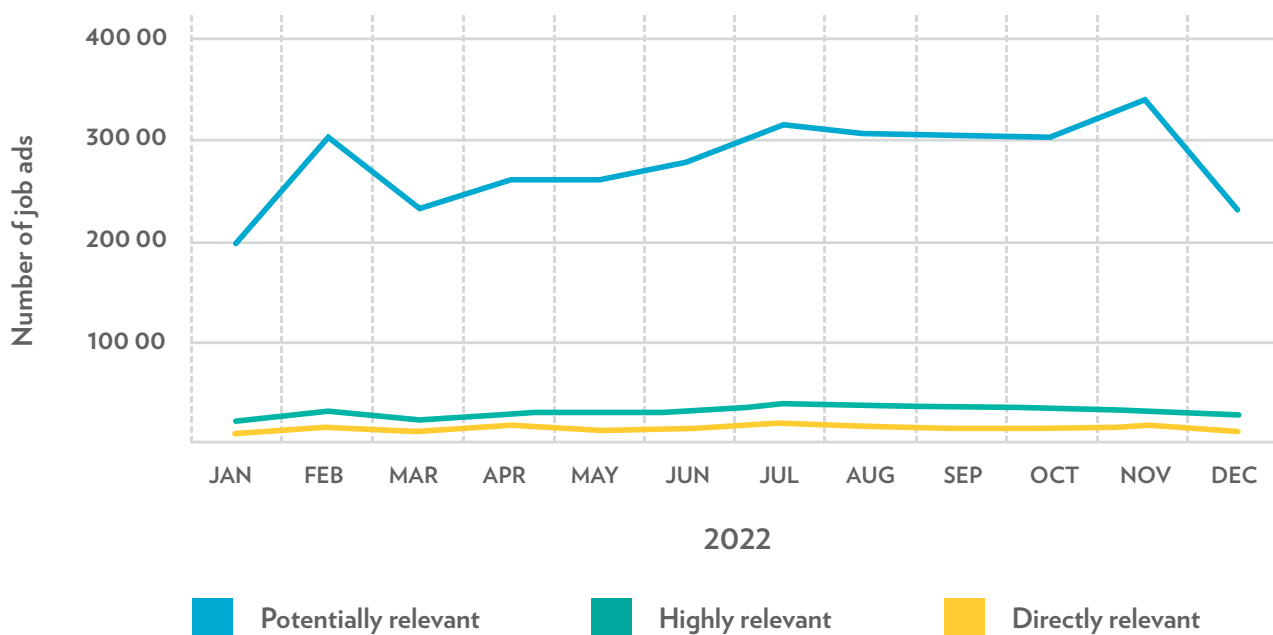
The ML/NLP final model was applied to a data set of Australian and New Zealand job ads spanning 2019 to 2022, with a total corpus of 5,101,708 ads. Between 2019 and 2022 there were between 904,000 (2020) and 1,644,000 (2022) jobs advertised each year captured by Lightcast®. The vast amount of data generated by the ML/NLP modelling of the 5.1 million job ads can be analysed in wide variety of permutations. These include being mapped across time (patterns across months or years) or temporal snapshots of specific years, examination of all four coding outcomes or collapsed into a relevance binary, specification of only those jobs that require additional qualification or do not (see below), analysis at any of six different industry/category/title Australian and New Zealand Standard Classification of Occupations (ANZCO) levels, and at different levels of locality. The following outcomes briefly summarise data addressing some of the most immediately relevant issues in the field.

Table 1 provides the number and percentage of job ads over each yearly period that were coded into each of the four categories generated by the coding schema (not relevant, potentially relevant, highly relevant, and directly relevant). Each year just over 1% of job ads were categorised by the ML/NLP as directly relevant to graduates with a psychology degree (i.e., used the term ‘psychology’ in the job ad, asked for a psychology degree or were otherwise directly aligned with psychology graduate skills). A further 2% were coded by the algorithm as highly relevant (skills in the job ad largely aligned with the psychology undergraduate curriculum outcomes). An additional 20% were assessed as potentially relevant (they cited many of the key skills associated with a psychology degree).

**TABLE 1.** ML/NLP ALGORITHM RATINGS OF JOB ADS 2019-2022, CODED AS NOT RELEVANT, POTENTIALLY RELEVANT, HIGHLY RELEVANT AND DIRECTLY RELEVANT.

|                      | 2019             |             | 2020           |             | 2021             |             | 2022             |             |
|----------------------|------------------|-------------|----------------|-------------|------------------|-------------|------------------|-------------|
|                      | N                | %           | N              | %           | N                | %           | N                | %           |
| Not relevant         | 868,773          | 75.29%      | 660,173        | 73.03%      | 1,054,096        | 75.32%      | 1,256,227        | 76.40%      |
| Potentially relevant | 249,608          | 21.63%      | 211,823        | 23.43%      | 300,064          | 21.44%      | 333,147          | 20.26%      |
| Highly relevant      | 22,772           | 1.97%       | 20,493         | 2.27%       | 30,684           | 2.19%       | 37,345           | 2.27%       |
| Directly relevant    | 12,815           | 1.11%       | 11,471         | 1.27%       | 14,563           | 1.04%       | 17,654           | 1.07%       |
| <b>Total</b>         | <b>1,153,968</b> | <b>100%</b> | <b>903,960</b> | <b>100%</b> | <b>1,399,407</b> | <b>100%</b> | <b>1,644,373</b> | <b>100%</b> |

Across each year, there was only a small degree of variation in the proportion of job ads coded in each category, with 2020 showing a slightly higher proportion of jobs coded overall as relevant (26.97%) compared with the other years (23.60%, 24.68%, 24.71%). This rise in relevant jobs and the overall drop in job ads is likely attributable to the changes in the job market due to Covid-19. Figure 2 depicts the number of job ads coded as potentially, highly and directly relevant each month in 2022, showing some seasonal variation in number of ads, reflecting a drop in advertising for new jobs across all sectors in December and January.



**FIGURE 2.** NUMBER OF JOB ADS CODED BY THE ALGORITHM AS POTENTIALLY RELEVANT, HIGHLY RELEVANT AND DIRECTLY RELEVANT EACH MONTH IN 2022.

## Mapping Jobs within Industries

The job ads coded by the ML/NLP algorithm into relevance categories were analysed by ANZSCO 2-digit codes, to identify in which broad industries psychology graduates are most likely to find relevant jobs. Table 2 lists the industries with the highest proportions of relevant roles. The top three industries with the highest proportion of directly relevant roles were ‘legal, social and welfare professionals’, ‘health professionals’, and ‘health and welfare support workers’. When more broadly relevant job ads were examined, other industries such as ‘business and human resources’, ‘marketing’ and other types of managerial roles also demonstrated high proportions of relevant jobs. Note that even in the most relevant industry categories, due to their broad definitions, only a relatively small proportion of jobs are relevant to psychology graduates. For example, among ‘legal, social and welfare professionals’ only 17% were coded directly relevant, 21% highly relevant and 20% as potentially relevant. Most other industry categories were substantially lower.

Given that industries vary widely in overall numbers of job ads, proportional data only give part of the picture. That is, industries with a very large number of job ads, even if only proportionally small numbers relevant to psychology graduates, also provide many opportunities. Table 2 also presents industry categories that have high raw numbers of psychology-relevant roles. Industries such as ‘design, engineering, science and transport professionals’ and ‘ICT and science technicians’ are shown, even if, proportionally, there are fewer job ads there than other sectors. For example, while the industry category ‘design, engineering, science and transport professionals’ was not high proportionally in psychology-relevant roles (0.2% directly relevant, 0.3% highly relevant and 7% potentially relevant), the total number still equates to 3,728 potential psychology graduate jobs over a single year in 2022, with 241 of these being highly relevant or directly relevant.

It is important to note that psychology-relevant jobs were identified in almost all industry categories. For example, the industry category ‘arts and media professionals’ listed author, technical writing and journalism jobs that specifically requested skills very closely aligned with psychology graduate skills. Similarly, the ‘other technicians and trade workers’ category includes library technicians, which requires many psychology-relevant skills.

**TABLE 2.** BROAD INDUSTRY CATEGORIES CODED AS HAVING THE HIGHEST PROPORTIONS AND NUMBER OF PSYCHOLOGY-RELEVANT ROLES.

| <b>Top industries <i>proportionally</i> for relevant jobs ads</b> | <b>Top industries <i>numerically</i> for relevant jobs ads</b> |
|---|--|
| Legal, Social and Welfare Professionals                           | Legal, Social And Welfare Professionals                        |
| Health Professionals  | Health Professionals   |
| Health and Welfare Support Workers                                | Carers And Aides   |
| Carers and Aides  | Health And Welfare Support Workers                             |
| Sports and Personal Service Workers                               | Education Professionals  |
| Education Professionals   | Specialist Managers  |
| Clerical and Office Support Workers                               | Business, Human Resource And Marketing Professionals           |
| Office Managers and Program Administrators                        | Office Managers And Program Administrators                     |
| Protective Service Workers  | Design, Engineering, Science And Transport Professionals       |
| Specialist Managers   | Engineering, ICT And Science Technicians                       |
| Business, Human Resource and Marketing Professionals              | Office Managers And Program Administrators                     |
| Chief Executives, General Managers and Legislators                | Clerical And Administrative Workers                            |
| Arts and Media Professionals                                      | Sports And Personal Service Workers                            |
| Personal Assistants and Secretaries                               | ICT Professionals  |

## Analysis of Job Categories

Individual job categories were also examined using ANZSCO 4 digit codes. Table 3 lists the 20 job categories with the highest proportion of relevant jobs in each algorithm-coded category when applied to the 2022 corpus. Those in the directly relevant column typically reflect jobs explicitly aligned with the psychology degree, such as psychologists, counsellors, and social and welfare workers. Expanding the criteria slightly, highly relevant roles included human resource roles, information and organisational analysts, intelligence and policy analysts and social professionals. Potentially relevant roles are those which cite many skills associated with the psychology degree, and are wide-spanning, including educators, advertising and marketing professionals, training and development professionals and Information and Communication Technology analysts.

While many of the categories listed in Table 3 are distinct disciplines or professions, with separate training and qualification processes, the ML/NLP algorithm identified strong alignment between the underlying skills and knowledge taught in the psychology degree and those needed in these job categories. This means that some jobs in these categories might be appropriate for graduates willing to do further training (see next section), and/or psychology degree attributes will closely support these job roles.



These job categories, including social work, occupational therapy, nursing, and teaching, are candidates for further discussion of potential partnerships, in terms of co-teaching and joint degrees within the tertiary sector, and closer collaboration and upskilling once in the workforce. More explicit recognition of shared, valued skills and attributes between job roles could enhance communication and outcomes across these disciplines.

**TABLE 3.** MOST FREQUENT JOB CATEGORIES IDENTIFIED BY ALGORITHM IN CODES DIRECTLY, HIGHLY AND POTENTIALLY RELEVANT (NOTE: JOBS ARE LISTED ONLY ONCE, IN THE HIGHEST CATEGORY IDENTIFIED).

| Directly relevant                                   | Highly relevant                                     | Potentially relevant  |
|---|---|---|
| Psychologists                                       | Human Resource Professionals                        | Secondary School Teachers   |
| Counsellors   | Contract, Program and Project Administrators        | Primary School Teachers   |
| Occupational Therapists                             | Human Resource Managers                             | Education Aides   |
| Social Workers                                      | Human Resource Clerks                               | School Principals   |
| Welfare, Recreation and Community Arts Workers      | Enrolled and Mothercraft Nurses                     | Midwives  |
| Psychiatrists                                       | General Clerks                                      | Mathematical Science Professionals                                |
| Registered Nurses                                   | Sports Coaches, Instructors and Officials           | Child Carers  |
| General Practitioners and Resident Medical Officers | Practice Managers                                   | Other Education Managers  |
| Aged and Disabled Carers                            | Other Information and Organisation Professionals    | Advertising, Public Relations and Sales Managers                  |
| Welfare Support Workers                             | Nurse Managers                                      | Advertising and Marketing Professionals                           |
| Physiotherapists                                    | Intelligence and Policy Analysts                    | Database and Systems Administrators, and ICT Security Specialists |
| University Lecturers and Tutors                     | Receptionists                                       | Nurse Educators and Researchers                                   |
| Occupational and Environmental Health Professionals | Social Professionals                                | Training and Development Professionals                            |
| Health and Welfare Services Managers                | Diversional Therapists                              | Medical Technicians   |
| Other Medical Practitioners                         | Other Health Diagnostic and Promotion Professionals | Special Education Teachers  |
| Nursing Support and Personal Care Workers           | Management and Organisation Analysts                | Secretaries   |
| Specialist Physicians                               | Information Officers                                | Other Clerical and Office Support Workers                         |
| Indigenous Health Workers                           | General Managers                                    | Nutrition Professionals   |
| Audiologists and Speech Pathologists / Therapists   | Medical Scientists                                  | Child Care Centre Managers  |
| Early Childhood (Pre-primary School) Teachers       | Solicitors  | ICT Business and Systems Analysts                                 |

It is important to note that psychology-relevant jobs were identified in almost all industry categories. For example, the industry category 'arts and media professionals' listed author, technical writing and journalism jobs that specifically requested skills very closely aligned with psychology graduate skills. Similarly, the 'other technicians and trade workers' category includes library technicians, which requires many psychology-relevant skills.

## Focusing on Three-Year Graduates

One key driver of this project is the need to identify job roles that are potentially relevant for graduates of an undergraduate psychology degree without further qualifications. Many of the roles identified above explicitly require postgraduate study (e.g., psychologists) or another degree (e.g., allied health roles such as occupational therapists, primary and secondary teachers, nurses).

To address this need, an additional rating system was introduced during expert coding to indicate which jobs required further qualifications, to support the ML/NLP algorithm to identify those job roles where a further qualification was not necessary. This filter is inexact, as many job ads do not explicitly ask for a particular degree, but may imply one via the job title. There are also many job ads where a specific degree may be preferred, but additional experience may enable an applicant to be successful. The recent trend towards 'degree agnostic' job ads (e.g., statements such as 'any relevant degree') also opens opportunities for graduates to apply for a wider range of jobs. Specific jobs with the same title may also differ in requirements, for example some social worker roles require a social work degree, whereas others cite a psychology degree with case worker role experience as potentially suitable.

Given these caveats, Table 4 uses the ML/NLP algorithm with the 'no further qualification required' filter, plus additional hand coding, to identify the most common jobs in each relevance category which likely do not require extra qualifications. This means some of the job roles in this category in the dataset are described as potentially suitable for three-year psychology graduates and entry points to the job market. This table provides a key starter resource for graduates and educators looking for job roles.

Listed qualifications for these 'no further study' jobs vary widely, including between jobs with the same title. Often these job ads simply state a 'relevant qualification' and/or experience, others cite a qualification (such as human resources) appended with 'or similar,' while others want a combination of skills that suit a psychology graduate with an additional experience or skill set (e.g., experience in finance or IT). Some roles are specifically relevant in some domains – an evaluation analyst within a health system for example. Note that Table 4 is only a listing of the most common options identified by the algorithm.

## Exemplar Job Ad

Join an innovative, multidisciplinary health care team. We evaluate health services and programs, with a focus on improving patient experience and system outcomes. The Evaluation Analyst will work closely with the team and relevant stakeholders to plan, develop, and undertake evaluations of programs, pathways and guidelines across the health industry.

### Selection Criteria

- Tertiary qualifications in a relevant field or health-related discipline.
- Demonstrated understanding of, and experience in qualitative and quantitative data collection and analysis.
- Ability to interpret complex information rapidly and accurately and to present information to a range of audiences using a variety of mediums to support decision making.
- High level verbal and written communications, interpersonal and negotiation skills with the ability to build, maintain, and use relationships with diverse stakeholders to achieve outcomes.

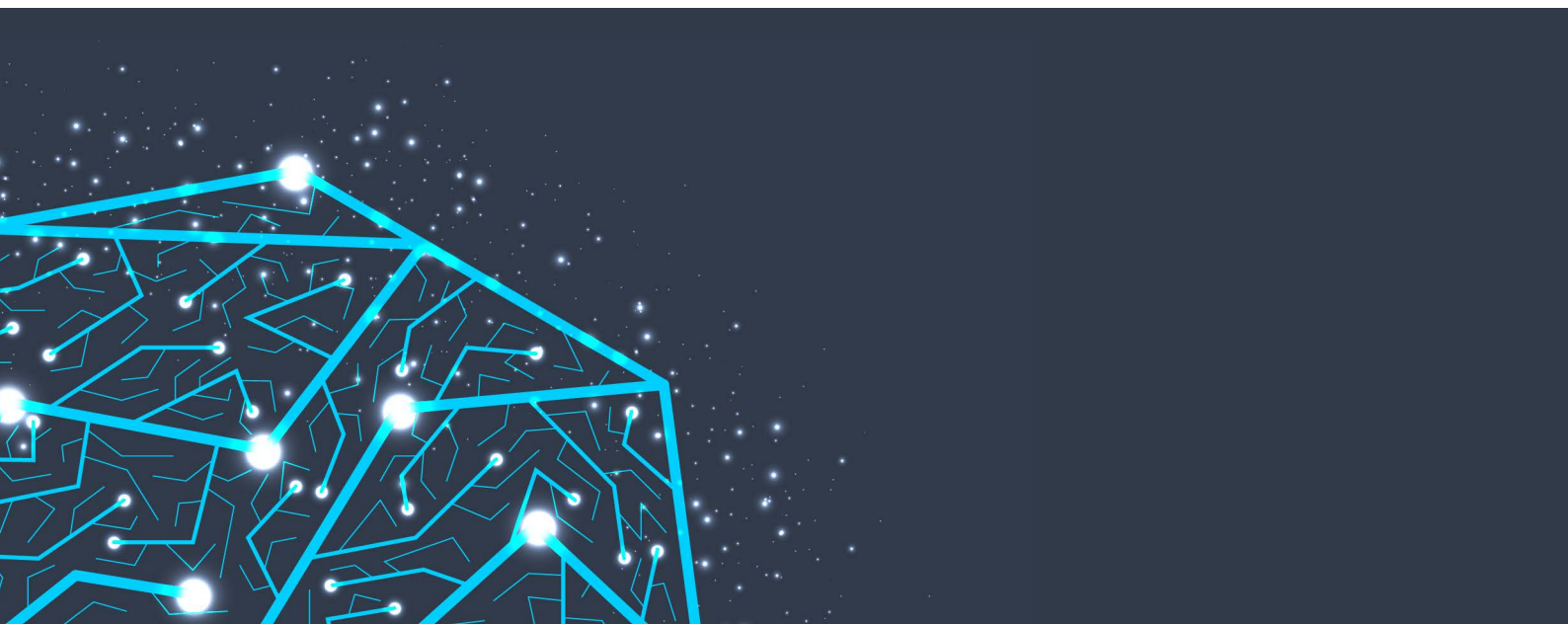
**TABLE 4.** ML/NLP-IDENTIFIED POTENTIAL JOB ROLES FOR THREE-YEAR GRADUATES – A SELECTION OF COMMON JOB CATEGORIES AND EXEMPLAR JOB TITLES (WHERE SOME NAMED ROLES ARE ADVERTISED AS SUITABLE WITHOUT ADDITIONAL QUALIFICATIONS).

*Table Use Notes:*

- Some of these job titles may be unfamiliar to most readers, and may superficially seem unrelated to psychology graduate skills. Further exploration of job ad text reveals psychology-relevant attributes, although different industry sectors may use a variety of terminology for the same skills.
- Listed qualifications for the jobs below vary widely, including between jobs with ostensibly the same job title. The phrases 'relevant qualification', 'or similar' and/or reference to experience is common, and in some cases 'willingness to obtain' an additional qualification once hired.
- It is critical to recognise that individual psychology graduates hold not only the skills learned during their degree, but additional experience, interests and attainments. Not every job will suit every graduate; the aim is to provide broad opportunities for graduates to identify roles that match their skills, interests and personal circumstances.

| Job Categories  | Exemplar Job Titles   |
|---|---|
| Welfare, Recreation and Community Arts Workers          | Community arts worker; recreation officer; welfare worker; hostel parent  |
| Advertising and Marketing Professionals                 | Advertising specialist; market research analyst; marketing specialist; marketing advisor  |
| Software and Applications Programmers                   | UX designer; software tester; app tester; service designer  |
| Occupational and Environmental Health Professionals     | Environmental health officer; occupational health and safety advisor; safety officer; health regulatory officer; complaints officer; health and safety superintendent |
| Health Diagnostic and Promotion Professionals           | Community development officer; health promotion co-ordinator; electorate officer; liaison officer; health promotion officer   |
| Intelligence and Policy Analysts                        | Intelligence officer; policy analyst; policy and planning manager   |
| Sports Coaches, Instructors and Officials               | Sports development officer; sports official; sports coach or instructor   |
| Training and Development Professionals                  | Training and development officer; learning and development specialist; instructional systems specialist   |
| Diversional Therapists                                  | Diversional therapist; lifestyle officer; resident services co-ordinator  |
| Contract, Program and Project Administrators            | Program administrator; project manager; program co-ordinator  |
| Human Resource Professionals                            | Human resource adviser; recruitment consultant; workplace relations adviser; people and culture administrator; human resource clerk                                   |
| Social Professionals                                    | Transport analyst; heritage specialist; cultural heritage advisor; community support officer  |
| Information and Organisation Professionals and Analysts | Organisation development administrator; organisation and methods analyst  |
| Information Officers and Analysts                       | Information officer; Information analyst; evaluation analyst; data analyst  |
| Counsellors   | Drug and alcohol counsellor; family and marriage counsellor; student counsellor; careers counsellor; rehabilitation counsellor  |
| Authors, Journalists and Other Writers                  | Author; technical writer; journalist  |
| Security Officers and Investigators                     | Private investigator; security consultant; security officer   |

| Job Categories   | Exemplar Job Titles  |
|--|--|
| Indigenous Health Workers  | Aboriginal and Torres Strait Islander Health Worker; Kaifāwhina (Hauora) (Māori Health Assistant)  |
| Welfare Support Workers  | Family support worker; youth worker; parole officer, probation officer; residential care officer; welfare worker; community worker; disability services officer; case manager; child and family practitioner; housing officer  |
| Education Aides  | Integration aide; Aboriginal and Torres Strait Islander Education Worker; teacher's aide   |
| Education Advisers, Reviewers, Managers                                      | Education advisor; education consultant; education recruitment consultant; education manager   |
| ICT Business and Systems Analysts; Security Specialists; Support Technicians | ICT systems analyst; security vulnerability researcher; ICT customer support officer   |
| Sales Representatives  | Sales representatives; sales executive; product manager; product examiners; marketing specialist   |
| Public Relations Professionals   | Engagement officer; communications co-ordinator  |
| Purchasing and Supply Logistics Managers and Clerks                          | Supply and distribution manager; warehouse manager logistics administrator; purchasing clerk; stock clerk  |
| Social Research Workers  | Survey interviewer; survey officer; market research interviewer  |
| Librarians and Gallery Technicians   | Librarian; library technician  |
| Social Workers   | (Some roles will accept a psychology degree plus specific experience)  |
| Aged and Disabled Carers   | Personal care assistant; aged or disabled carer; therapy aide  |
| Archivists, Curators and Records Managers                                    | Records manager; health information manager; archivist; records officer  |
| Medical Administrators   | Medical administrator; medical superintendent; medical receptionist  |
| Managers and Directors   | (Most managerial roles call for specific experience plus psychology-related capacities and skills.) Relevant roles include education manager, HR manager, health and welfare services managers, health practice manager, policy and planning manager, corporate services manager, customer services manager, health information manager. |



## Applications and Future Opportunities

The development and application of the ML/NLP algorithm described in this report demonstrates that the unique skills and attributes acquired during the psychology undergraduate degree can be successfully identified, and an ML/NLP system can be trained to reliably identify relevant job ads based on those skills. This makes possible a host of potential analyses and new insights into the industry demand for psychology graduates. Crucially, this analysis is: (a) divorced from the reliance and restriction of psychology as a keyword, and (b) forward-facing, in that it can identify roles where psychology graduates have not yet held jobs, but are potentially suitable hires.

**This mapping clearly demonstrates widespread demand for the skills and attributes of psychology graduates across a range of industries, providing evidence-based support for the real-world applicability of the degree as taught in Australian universities.**

### This data can enable:

- Reworking of career support and job search targeting for psychology graduates;
- Redesigned marketing, outreach and communication for the psychology degree;
- New collaborations with novel sectors, including internships and workplace training;
- Development of more targeted job-focused course and assessment design;
- Identification of aligned degrees and industry roles, supporting collaboration; and
- Reframing the contribution of the psychology discipline to industry and society, distinct from current limiting assumptions about clinical practice.

### Further application of the ML/NLP algorithm and analyses can:

- Map potential job opportunities at diverse regional scales and temporal frames, and could be applied to identify job demand in specific cohorts as sought by institutions or government bodies, and be used to answer complex questions about the changing workplace and psychology skills (e.g., digitisation, remote work); and
- Develop a live web job search portal for psychology graduates, providing job search support and raising within-degree visibility of key skills and outcomes.

## Exemplar Job Ad

### Learning and Development Specialist

As a Learning and Development Specialist you will work closely with stakeholders to understand their learning needs. You will work within the team to design, facilitate, and implement high quality learning programs to meet organisational and employee needs, and facilitate engaging training sessions.

You will conduct in-house research and data analysis to identify competency gaps, evaluate research in the field to develop targeted interventions, and provide ongoing reporting and analysis of Learning and Development activities.

#### Qualifications

Tertiary qualified in learning and development, HR or similar.

### **Warehouse Management Administrator**

We are looking for a Warehouse Management Systems Administrator to join our team. Their main role will involve management of data integrity, system performance, and user activity, creating reports and data analysis. They will work with the team and external stakeholders to ensure continuous improvement.

#### **Selection Criteria**

- Expertise in data monitoring, analysis and creation of reports.
- Attention to detail and commitment to ensuring data accuracy.
- Experience with similar systems.
- Solutions-orientated with a collaborative, team-based approach.
- Excellent communication (written and oral) and interpersonal skills.
- Demonstrated capacity for analytical and conceptual thought.

### **Community Development Officer**

The Community Development Officer supports the development, delivery and evaluation of our children-focused community programs, including local and regional health promotion advocacy. The role requires ensuring continuous improvement, and development and maintenance of strong external stakeholder relationships.

#### **Selection Criteria**

- Relevant qualifications in Community Services, Youth Work, Health Promotion, Social Sciences, Social Work, Education, Health and Fitness or related disciplines.
- Experience working with disadvantaged/vulnerable communities.
- Understanding and awareness of trauma-informed practices and principles.
- Experience in program facilitation, including the ability to manage difficult behaviours.
- Experience in program review and evaluation.
- Excellent communication skills, empathy and reflective listening.

### UX Designer

The UX designer will ensure outstanding user experiences through supporting the end-to-end design process, from user research and ideation through to prototyping and final design. The UX designer will conduct user research, including interviews, surveys, usability testing and analytics, to understand user behaviours, needs and pain points. They will advocate for human-centred design principles, and translate and communicate user insights to the wider team. They will build effective working relationships with team members, engage with relevant stakeholders and understand their expectations and concerns.

#### Highly Desirable

- Experience in UX/UI design, including knowledge of user-centred design principles.
- Training and experience in conducting user research including interviews and surveys.
- Experience with data analysis including quantitative and qualitative data.
- Excellent communication and collaboration skills.
- A focus on user advocacy.

### Sexual Health Outreach Presenter

We are looking for someone who loves presenting and performing, and has a keen interest in educating young people about health behaviours. You want to make a difference! You are an outgoing person but also have high emotional intelligence, and recognise and flexibly respond to changing interpersonal contexts. You are knowledgeable about the health and wellbeing issues affecting young people.

#### Selection Criteria

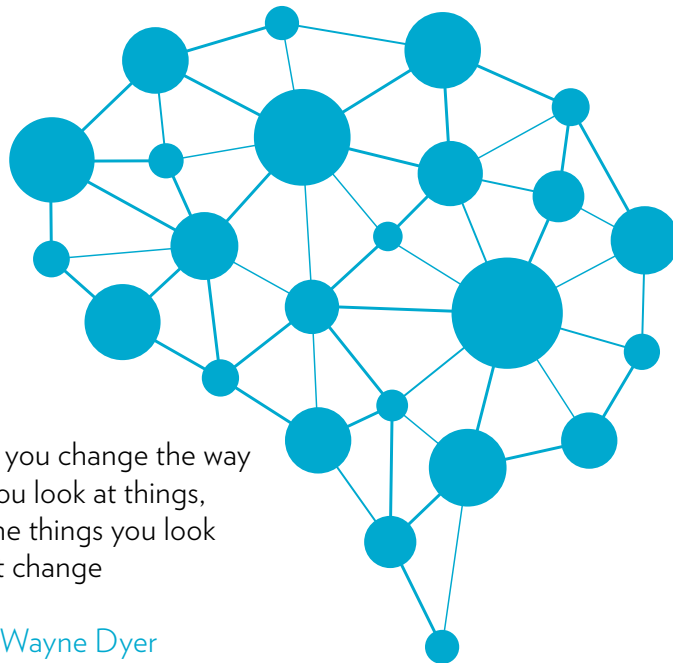
- Confident public speaker.
- Ability to manage large groups.
- Passionate about working with young people to improve health and wellbeing.
- High level of communication and interpersonal skills
- Qualifications in Health or related field.



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“ If you change the way  
you look at things,  
the things you look  
at change

- Wayne Dyer





