Is Australian science ready for AI?

Skills and workforce

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Does Australia have the skills and workforce it needs?

The adoption of AI is impeded due to a shortage of diverse skilled people and insufficient understanding of AI across sectors.[1] Without targeted training programs and opportunities, Australia will fail to capture the full economic and strategic value of AI and risks being left behind. Other jurisdictions are coming to the same conclusions right now, so Australia must act quickly and decisively.

Australian research organisations and science agencies must offer competitive salaries and opportunities to be able to attract and retain AI talent, as they are often competing with attractive projects with domestic or international industry employers when hiring.

The ideal workforce will be built when education and training by schools, universities, TAFEs, and on-the-job learning are aligned with the evolving demands of industries and research, facilitating sustainable growth and innovation.

Education and data literacy

Supporting AI in education can improve talent, enhance data literacy, and ensure that educators are upskilled to teach future generations of students. Tools to equip Australians with notions of research integrity and responsible innovation must be integrated into the curricula to ensure we are not only equipped with knowledge and skills but also with the critical thinking and understanding of responsible innovation necessary to navigate complex issues, make informed decisions, and contribute positively to society.

Data literacy is an in-demand skill for employers. However, educators must be able to teach students of all ages these new skills, which may not have been part of their training. The Australian Human Rights Commission also recommends that "professional development and training be provided to teachers", and schools should introduce "programs to provide students with the skills needed, and to assist them in engaging with AI tools in a responsible and ethical way".[2]

Despite efforts by bodies like the Australian Research Data Commons and others, data literacy among scientists remains variable. Further, the changing geopolitical environment will require scientists to become data security literate.

Standards and policies must set clear requirements for data collection, storage and reporting, and ensure alignment with the FAIR[3] (Findable, Accessible, Interoperable, Reusable) and CARE[4] (Collective Benefit, Authority to Control, Responsibility, and Ethics) principles. Implementing FAIR and CARE data practices will enable broader adoption of AI in scientific disciplines.

When it comes to an AI specialist workforce, Jobs and Skills Australia projects that there will be a 14.7% increase in demand for computer network professionals in the coming five years (to 2029) and this will rise to a 25.1% increase in 10 years (to 2034).[5]

A diverse AI skilled workforce

Australia needs to build an AI-literate workforce that is technically literate and understands the design implications of various AI tools and LLMs. Developing diversity within this AI workforce is critical for effective training and gaining a better understanding of the positive and negative impacts arising from the adoption and diffusion of AI within the science system.[6] Only 20% of AI and computer science PhD students are female, while female authors account for only 12% of all relevant peer-reviewed articles in Australia.[7] Female talent only makes up 19% of the total pool available with skills in AI and automation in Australia.[8]

Gender inequality in AI

Gender inequality in AI reflects broader patterns across STEM, where data indicates that girls begin to opt out of STEM once subject choices are introduced in the curriculum.[20] Addressing this early disengagement through targeted initiatives such as Day of AI Australia is critical to building a diverse and inclusive future AI workforce. Such initiatives are essential to sustaining progress, particularly as Australia currently leads globally in gender diversity among new AI talent, with women making up 44% of those entering the AI workforce, however the numbers of women in AI research are far lower.[8]

There is no systematic assessment of the participation of First Nations people in AI. As a consequence, issues of importance to First Nations people do not receive adequate attention.

Ethical and responsible progress cannot occur with such narrow talent driving the future of AI, especially when the tools begin from a condition of substantial inbuilt bias. Building diverse teams is the most effective approach to ensuring responsible and ethical AI development and deployment.[6] Organisations should prioritise diversity and inclusion by training and hiring talent from under-represented communities to foster inclusion and amplify under-represented voices in AI models.[9]

Citizen participation

Science has not always reflected the diversity of humanity. Inequalities can often affect the record of science. For example, a 2022 report in *Nature Medicine* estimated that 86% of genomic research in the world is carried out on genes of people with white European ancestry, roughly 12% of the global population.[10] Such bias in who is represented in the data results in unfair advantages in medications and therapies as well as preferential treatment in hiring practices[11] and a higher likelihood of being incorrectly identified by facial recognition software.[12]

AI is no different. AI systems are trained on the available data, which can result in these biases being perpetuated, such as discrimination against non-white and/or non-male[13,14] individuals, which was part of the training of early AI systems and persists today. These biases result in high levels of distrust of AI among people who are under-represented or marginalised, including women, people in regional areas, First Nations people, people who are unemployed or underemployed, and people with a disability.[15]

The use of AI in the science system needs to minimise biases and harm to marginalised communities through inclusive design, community engagement, robust testing, and transparency.

Citizen participation

Citizen participation in community-designed decisions is recommended to inform the performance of AI devices used by diverse communities.[16] For instance, via the Indigenous data sovereignty movement, AI is being used in Kakadu to care for Country, resulting in the return of thousands of magpie geese through the collection and analysis of data, identification, and drone monitoring.[17] Researchers are also using AI to co-design systems to improve assisted-living privacy for people living with disability[18] and to advance monitoring technology for individuals living with chronic mental illness.[19]

One effective way to ensure AI reflects the whole community is to involve people across the social spectrum to participate in its development.

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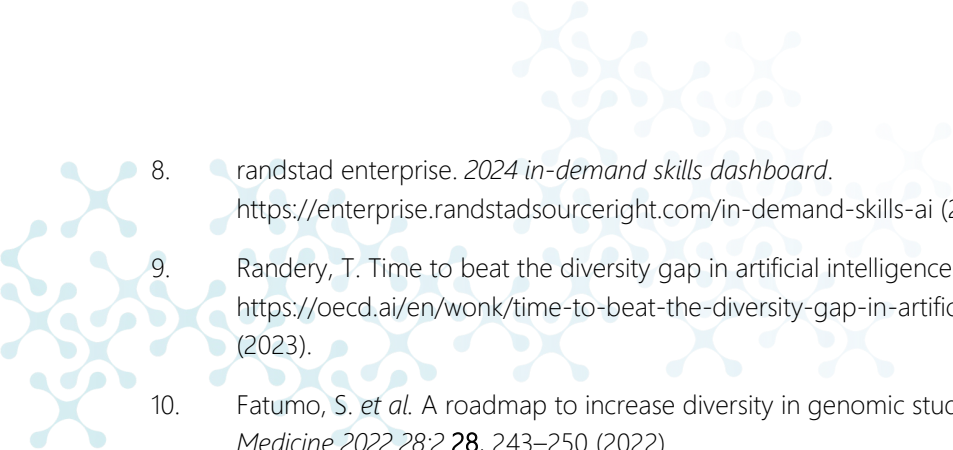
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Acknowledgements

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