Inquiry into the use of generative artificial intelligence in the Australian education system.

Submission by Deakin University

July 2023

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Introduction

Deakin University is an established global leader in artificial intelligence (AI) research, development and application. We are also recognised for world-class expertise in digital education and educational research regarding the use of generative artificial intelligence and assessment in higher education. Seeing the opportunities that AI may deliver for Australia's economic and social infrastructure, Deakin is committed to being at the forefront of engaging and partnering to drive positive opportunities via AI, while working to address those areas where AI may be abused.

Deakin has been pleased to share this expertise during 2023 for the benefit of the sector through a *series of joint webinars* held in partnership between Deakin's *Centre for Research in Assessment and Digital Learning (CRADLE)* and the Tertiary Education Quality and Standards Agency (TEQSA).

Deakin welcomes the opportunity to share our knowledge and advice on the approach we are taking to the evolving technology of generative AI within our institution. This submission:

- provides some initial considerations on the benefits and risks of AI to higher education
- describes the approach Deakin has been taking to safeguard academic integrity through the guidance we are providing for staff and students working in a teaching and learning environment
- sets out Deakin's approach on generative AI in relation to academic assessment.
- provides considerations regarding the use of commercial generative AI products
- outlines the development and current availability of some potentially more reliable products available to researchers
- highlights Deakin University's recently guidance publications:
    - *CRADLE Suggests: Assessment and genAI*
    - *Guidance on the use of commercial generative AI tools for university researchers*
- provides some high level advice on the important AI research, development and application that is being advanced for the benefit of societies by our *Applied Artificial Intelligence Institute (A2I2)*.

Benefits and risks of generative artificial intelligence (AI) to higher education

The ways that generative AI will embed into social practices, both for education and employment, will rapidly evolve. Their benefits and risks are not fully known. Universities must continue to inform and respond to the ways that our students, communities and industry partners are working with generative AI, as with all digital tools to enable benefits while limiting inappropriate applications and adverse consequences. In so doing we must be mindful of the already substantial research in the field, including our own from the *Centre for Research in Assessment and Digital Learning (CRADLE)*, the cross-institutional *Centre for the Digital Child* and the *Learners in a Digital World* research group.

Deakin's practice and research suggest that responses to AI in higher education need to move beyond 'doom' or 'hype'. Deakin's work also indicates that such technologies are already integrated into the way school students write and create, but also warn against the considerable power of corporations to shape how we think through digital platforms. In a separate submission complied by CRADLE and the Research for Educational Impact (REDI) Strategic Research Centre, our researchers highlight the risks that the 'big data' underpinning generative AI pose, urge the integration of critical digital literacies into the curriculum across the lifespan, and point to education systems that emphasises the human: criticality, creativity and joy in learning. In higher education, Deakin's practice and research also suggest that it is key that university students must be able to deal with ambiguity and uncertainty as they cannot be certain of the 'truth' and origins of generative AI outputs. Digital literacy, a capability expected of graduates by their employers, now includes using and evaluating generative AI.

Deakin notes the extremely fast pace of change in this area including the proliferation of generative AI tools, new combinations of tools and the recent data breach reported by Open AI. Research, advice and resources relating to generative AI are rapidly appearing globally. The response of professional accreditation bodies in recognising new professional practice and incorporating appropriate standards into accreditation will be crucial in managing higher education responses.

Safeguarding academic integrity through guidance and support for teaching and learning

Deakin University welcomes the opportunity to engage with emerging technologies in education. Despite much hype in the media, Deakin has not banned the use of generative artificial intelligence for learning but instead is working with students and staff to explore opportunities. As an innovative and proactive educator, Deakin encourages staff and students to develop their awareness, knowledge and skills to use these technologies ethically and responsibly as digitally fluent citizens.

Deakin's approach to the design of teaching, learning and assessment activities that leverage AI is underpinned by our principles of learning design and synthesised in our '5A Framework':

- Build staff and *student* **awareness** of the technology – what they can and can't do, limitations and biases of the technology.
- Ensure **acknowledgement** of the use of the technology in all documented work. Ask students to *acknowledge* when and how they have used generative AI technology.
- Review and improve **assessment** to focus on specific contexts and resources such as class materials and discussions. Also focus on human and relational skills that are not so easily replaced by a bot.
- Increase **authenticity** of assessment tasks to prepare students and graduates for the realities of an AI-enabled world and build these assessments across a course of study.
- Consider **accessibility** to ensure students and staff are not disadvantaged by the availability or cost, while recognising that AI has great potential to promote accessibility, enabling people who have difficulty writing or reading complex materials in their studies or work.

Assessment and academic integrity in higher education

Generative AI has had an impact upon assessment as it is now considerably harder for institutions to assure that students have met learning objectives. Deakin University has a substantial investment in managing academic integrity at the institutional level and this has led us to determine not to quickly assume that platforms such as Turnitin can easily detect AI-generated plagiarism.

The Centre for Research in Assessment in Digital Learning (CRADLE) has provided *assessment advice for staff*. This emphasises that it is key to maintain principles of good assessment but suggesting that educational teams may have to assure assessment when across a program, with many opportunities for formative assessment and feedback but fewer grade-bearing assessments, allow resource intensive assurance processes mediated by educators such as orals. In addition, the CRADLE team suggest to:

- have open conversations about generative AI with students
- review rubrics and other forms of assessment criteria to take account of generative AI
- specify assessment situations when it is appropriate or inappropriate to use generative AI

- design assessment tasks to promote students' portrayal of their unique achievements
- develop and assess critical digital literacies.

Advancing opportunities presented by AI for research requires interest in and understanding of the technology, and effective risk management and mitigation

Deakin University is positioned at the forefront of research, development and application of artificial intelligence (AI) technology, including generative AI. As such, Deakin is seeking to ensure the potential benefits can be maximised while mitigating inappropriate applications in academic endeavours, by providing guidance to its students, academics and researchers on the acceptable uses of this rapidly evolving technology.

Noting there is need to manage and mitigate risk, there is obvious potential for the research community to harness commercial and non-commercial generative AI products to enhance, accelerate and grow their academic research and research outputs, and more broadly, for the technology to assist and uplift the lives of individuals and our society. While widely available and rapidly evolving generative AI tools such as ChatGPT have risen to prominence, generative and other AI applications tailored or suitable for academic research, have been available for some time. Equally, bespoke and powerful specialist machine learning and AI tools to accelerate various aspects of research and development have also emerged.

Commercial and other entities are marketing generative AI courses and training workshops to researchers for applications such as automated literature reviews, academic publishing and automated grant applications, which claim to include responsible use and to address ethical, accuracy, bias, copyright and other concerns. Review and as required, revision of research ethics and integrity guidelines and frameworks to strengthen appropriate generative AI use in research may be needed.

Generative and related AI tools that appear to mitigate or avoid concerns raised in relation to research by tools such ChatGPT, include *Consensus*, *Elcit.org*, *Scite.ai*, *Research Rabbit*, *ChatPDF* and others; these specialist AI generative tools can be made more visible and promoted to the academic community, including HDR students, provided robust and useable guidelines as to their transparent use are also provided.

These reflect the recognition by researchers and the wider research and development sector that generative AI and related tools can help improve efficiency and productivity by streamlining critical analysis, synthesis, design and writing processes, including preparation of grant, fellowship and project proposals and publications.

Supporting our researchers to safely capture the benefits of commercial generative AI products

In part driven by our commitment to safe and ethical development of AI in research, we have been proactive in seeking to support our researchers and higher degree by research (HDR) students to understand the potential benefits and their obligations when integrating commercially available generative AI products, both general and specialist, into their activities. Deakin University recognises these tools come with varying and evolving risk which should be appropriately and actively managed to ensure our high standards, principles and integrity, including compliance, are maintained.

To build on the existing suite of guidance to academic staff and students, on 30 June 2023 Deakin released the *guidance on the use of commercial generative AI tools for university researchers*. In developing this, Deakin has drawn together advice from those with expertise on research integrity, early adopters of commercial generative AI products and those with discipline expertise in generative AI. We believe Deakin's guidance on the use of commercial generative AI products for various aspects of research is one of the first, if not the first, of its kind in Australia.

We regard developing the high-level principles and expectations contained in the guidance as essential to supporting our researchers to realise the benefits and avoid pitfalls in their work through understanding when and how it is appropriate and beneficial to use commercial generative AI products. At a high level, the guidance provides researchers with:

- Advice that the training data sets and methods underlying generative AI tools such as ChatGPT are unknown and therefore limit their appropriate use in research per se, whereas specialist tools such as Consensus and others (see above) are more transparent and by their construct, often more suitable.
- Advice on why researchers need to take considerable care when uploading information into the interfaces of commercial generative AI tools, noting that individuals and their employers lose control over any information uploaded to commercial AI interfaces.
- Directions on what kinds of data should **not** be input to these tools including third party copyrighted materials, confidential or sensitive data, human research data and private or personal information.
- Information on the important ethical and legal obligations researchers must adhere to when interacting with generative AI tools; including but not limited to, preparation of grant fellowship and project proposals and publications. This notes that Deakin University's researchers are required to adhere to our *Research Conduct Policy* and to the *Australian Code for the Responsible Code of Conduct, 2018 (Code)*.

- Advice to researchers that commercial generative models can perpetuate biases present in their design, build and in their training data.
- Direction that it is incumbent upon researchers to always consciously identify, critically interrogate, and mitigate biases, including through a considered assessment of the unconscious or conscious bias, accuracy, relevance and veracity of the generative AI system's outputs.
- Additional direction to Deakin's higher degree by research (HDR) students in their thesis preparation. HDR students, in preparing content for their theses, are restricted to using generative AI for copyediting and proofreading purposes only.

Deakin University will be updating this guidance regularly as generative AI technology and best practice for the use of commercially available products evolves, including the promotion and provision of access to more appropriate platforms and tools. The guidance has been made publicly available on our website to assist our colleagues across the higher education sector and the research community.

Deakin's next phase of work will be to establish a repository of resources for our researchers that will include specialist generative AI tools, both external and internal, together with more specific guidelines for the use of particular products. The resources and associated guidance material will augment this high-level guidance.

Through the Applied Artificial Intelligence Institute (A^{2}I^2), Deakin University is a leading contributor to the responsible development and application of AI technology

Through our *Applied Artificial Intelligence Institute (A^{2}I^2)*, Deakin University is tackling real-world problems using methods grounded in machine learning, deep learning and software engineering practices to make discoveries and explore new frontiers in AI and implementing safe, ethical and effective AI solutions to transform industries and improve people's lives.

At the forefront of the technological, industry, and civic applications and implications of AI, A^{2}I^2 is at the heart of considering and navigating how Australia responds to an AI activated world. Critically, and in line with considerations made in the Chief Scientist's report into AI, how does Australia position to reap significant benefits from AI, whether economic, civil, civic or social? Simultaneously, acknowledge those risks and challenges that nascent AI holds, how does Australia develop and apply meaningful guidelines, regulation and ethical apparatus?

The institute is respected for its important work in pioneering methods and approaches for AI and machine learning to accelerate scientific discovery and experimental design, build durable learning systems and create platforms that seek to help solve societies' most pressing and intransigent problems. This highlights that growth in AI based bespoke research enabling AI platforms and tools is also occurring and warrants guidance and scrutiny as well.

One example of this is a collaboration between A^{2}I^2 and Deakin's Centre for Social and Early Emotional Development (SEED) to make available our *'Living Knowledge Review System'*. This platform uses AI to enable ongoing continuous learning searches of the global literature, to capture, summarise and synthesise the most contemporary evidence for applied policy and practice end users.

Conclusion

Deakin University is forging ahead in its work as a leader on the development and application of AI to benefit our community, while providing continuing leadership on of the use and effective management of this technology in an educational and research context. Deakin would welcome the opportunity to further discuss our AI related expertise and activities should the House Inquiry require any additional advice.