

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

Submission by the University of Technology Sydney



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Introduction

Thank you for the opportunity to provide a submission in response to the House Standing Committee on Employment, Education and Training's inquiry into the use of generative artificial intelligence (AI) in the Australian education system.

As a university and teaching community, at the University of Technology Sydney (UTS) we are giving deep and considered thought to the implications of generative AI, from teaching practice to assessment, academic integrity and governance, and the future of work. Our graduates will enter a world of work where working with AI will be an expected competency. Our responsibility is to equip them to learn with such tools effectively and ethically, deepening their understanding and improving their capability in authentic professional conditions. Students and educators must learn how to collaborate with AI, much as we learn to what degree we trust other people in different contexts. This will be a critical literacy for lifelong learning, as the capability and application of AI will always be changing.

Accordingly, UTS's approach to generative AI in higher education is one of [effective ethical engagement](#), which includes a focus on complying with the law and promoting a culture of [academic integrity](#).

UTS recognises the enormous, long-term potential to boost humanity's value creation by accelerating human cognitive processes and be more discerning in our application of knowledge to highly diverse and complex contexts. UTS also recognises that the development and use of generative AI raises questions of responsible and trustworthy use of these tools and therefore a curious but cautious approach to generative AI is prudent.

This submission begins with our recommendations for consideration by the House Standing Committee, followed by an overview of our AI expertise and capability, then consideration of some of the Terms of Reference contemplated by the House Standing Committee.

Recommendations

It is evident from this submission that the Australian education system would benefit from the enormous expertise offered by the higher education sector given that Australia is home to many of the world's leading researchers in AI in education, Learning Analytics, and higher education researchers in teaching, feedback and assessment design. This expertise must be woven together.¹

This could be achieved in several ways and UTS recommends consideration of the following models:

- An extension of the model proposed by Ms Loble AM (described below as the *Australian Forum on Quality Digital Education*) to include, where relevant, a partnership with the higher education sector.
- If separate from Ms Loble's model, a National Centre for AI in education or an ARC Centre of Excellence tuned to the needs of not only researchers advancing knowledge and innovation technologically, but serving practitioners in co-designing, testing and evaluating what works in diverse contexts. Australian Indigenous educational innovation and challenges must also be a hallmark of this centre.²
- The adoption of national guidelines to maximise opportunities while safeguarding against legal risks. These guidelines should support public and private sector organisations to comply with relevant laws and encompass co- and self-regulatory measures. The consultation underway by the Commonwealth Department of Industry, Science and Resources Safe and responsible AI in Australia is a positive step in this direction.

Other complementary **recommendations** to the models proposed above include:

- Convene generative AI challenges to catalyse applied research and cross-sector collaboration. Teams of academia, industry partners, and educational institutions would be funded to explore the

¹ An example from UTS work is building on research into [teachers' feedback literacy](#) to inform our understanding of [fluency with automated feedback tools](#), and similarly, building on [student feedback literacy](#) research to build students' [automated feedback literacy](#).

² We note that AI is clearly also relevant to adult lifelong learning, but the features of professional, workplace and informal learning are often quite distinct from formal education. The U.S. National Science Foundation has established 5 different AI research centres in recognition of these and other focii: [Engage AI Institute](#) • [National AI Institute for Adult Learning and Online Education](#) • [Student AI Teaming](#) • [AI Institute for Exceptional Education](#) • [Inclusive Intelligent Technologies for Education](#).

potential applications of generative AI in education. These projects would focus on developing innovative solutions, evaluating their effectiveness, and addressing specific challenges faced in different educational contexts.

- Hold annual conferences on generative AI in Education. Annual conferences would bring together thought leaders and the strongest examples of practice, as a way to build Australia's capability. These could be specialised for different stakeholders and agendas (e.g., pedagogical, technical, ethical, governance) as well as ensuring there was productive knowledge integration. A strong emphasis on translating into practice will promote innovation diffusion.
- Establish a generative AI educational impact evidence hub to foster both domestic and international collaboration and knowledge sharing among researchers, practitioners, and policymakers. Resource the development of a collective intelligence website that assists the community in sharing, finding, and debating the emerging evidence as generative AI is evaluated in different educational contexts. UTS has experience in prototyping such infrastructures.
- Convene an expert panel to review options for national generative AI infrastructure. Amidst concerns that generative AI is owned and driven by technology companies, we should consider developing a national capability for both research and public services, with the possibility of increased fairness, accountability, transparency and ethics when the infrastructure is completely under our own control.
- Develop comprehensive ethical guidelines and frameworks specifically tailored for the use of generative AI in education. These guidelines should encompass aspects such as data privacy, algorithmic transparency, fairness, and accountability. They should also consider the unique ethical considerations related to student data and learner outcomes.

UTS's expertise and capabilities in artificial intelligence

UTS is the #1 ranked university in Australia and #3 in the world for artificial intelligence research, according to the US Best Global Universities ranking.

Of note is our world-leading [Australian Artificial Intelligence Institute](#), led by Distinguished Professor [Jie Lu](#); the [Data Science Institute](#), led by Distinguished Professor [Fang Chen](#); and the [Human Technology Institute](#) (HTI) which provides independent expert advice, policy development, tools, training, and data science solutions to support human-centred technology. HTI is led by Industry Professors [Edward Santow](#), [Nicholas Davis](#), and [Sally Cripps](#). We bring specific expertise in AI for teaching and learning with the [Connected Intelligence Centre](#) (CIC) led by Professor [Simon Buckingham Shum](#), an internationally leading centre in Learning Analytics and AI in Education (AIED). CIC has been inventing and evaluating automated feedback tools with UTS faculties since 2015, documenting how educators come to trust such tools, and students' usage and personal responses to such tools. In addition, the cross-faculty [Centre for Research on Education in a Digital Society](#) (CREDS) led by Dr [Simon Knight](#), comprises a team of researchers with expertise across the education sector, whose work interrogates the new ways in which technologies enhance learning, and the changing learning needs of a digital society.

UTS places students at the heart of the learning experience, combining technology with creative practice and innovation (for which we are so well regarded) into our curriculum, research-led teaching, industry experience and community relationships to develop graduates that are ready for the future of work. This is documented through our [Student Partnership Agreement](#) and primarily achieved in partnerships between faculties and our central learning and teaching unit – the [Institute of Interactive Media and Learning](#) – which offers teaching staff a comprehensive package of learning and teaching support in a range of modes including via its 'shop front', the [Learner Experience Lab](#), known as LX.lab and public website, LX Resources.

For example, the LX.lab hosted forums to upskill staff in how generative AI tools can be used as a learning technology throughout June ahead of Spring session. All material generated to support these activities (guiding principles, videos, resources and opportunities to connect) is publicly accessible from the LX Resources website. Direct support for students outside their classes is provided via the Library and HELPS, our student academic support team. There is a range of [online advice](#) available to students directly, drawing connections between [use of generative artificial intelligence tools](#) and academic integrity.

Accordingly, UTS is well positioned to provide advice to the House Standing Committee regarding the use of generative AI in education and is willing to convene roundtables with our experts including:

- Professor [Simon Buckingham Shum](#) who brings expertise on automated feedback, and human-centered, participatory models for engaging students and staff with AIED. He is a founding member of the [Society for Learning Analytics Research](#), and the [Empowering Learners in the Age of AI](#) annual conference.
- Industry Professor [Leslie Loble AM](#) who recently published the influential report [Shaping AI and EdTech to Tackle Australia's Learning Divide](#).
- Dr [Simon Knight](#) who can speak to how learners judge trustworthiness of information, assessment design, and dialogue for learning.
- Associate Professor [Jane Hunter](#) who can speak to the effective integration of educational technologies in schools, based on her ground-breaking work on [High Possibility Classrooms](#).
- Associate Professor [Jan McLean](#), Director of the Institute for Interactive Media and Learning, who can speak to supporting higher education assessment redesign.

UTS's responses to the Terms of Reference

No. 2

The future impact generative AI tools will have on teaching and assessment practices in all education sectors, the role of educators, and the education workforce generally.

Generative AI is a system-level shock to educational institutions, which have come to rely on artifacts as proxies of evidence of student learning. Now that generative AI is capable of performing complex tasks to produce these artifacts in multiple media spanning many disciplines, assessment must evolve to be (i) resilient to cheating with verification of students' identity built in at appropriate junctures, (ii) assure learning via rich and complementary evidence, and (iii) harness the new possibilities of learning with AI.

Assuring and certifying learning is a primary function of universities. The gravest risk from generative AI is that universities cannot assure student learning, because they depend excessively on student artifacts which may now have unknowable levels of AI-synthesised content. We therefore envisage a shift to programmatic assessment and accelerated adoption of robust assessment design principles, which increase resilience to generative AI. This will enable a transition from a product-centric model of assessment to process, with students documenting and reflecting on how they have tackled a task, aided by analytics that capture activity traces, and enable novel forms of personalised feedback.

We consider it a positive development that face-to-face assessment may once again need to be a hallmark of higher education, in which educators challenge students to think on their feet and defend their work. However, sustainable ways to scale direct observation (e.g., with many hundreds of students) need to be developed. A programmatic approach to assessment can contribute to this, together with other possible strategies including the use of educational technologies and combining educator and peer feedback with automated feedback.

Universities must equip graduates to use state-of-the-art AI tools expertly, understanding their limitations, or they risk becoming uncompetitive in the job market. The educational challenge is to ensure that students' foundational learning is not undermined through the inappropriate or premature use of generative AI. To date there is a weak evidence base of what works, and why, in different contexts.

In our view, generative AI can assist teaching. However, this requires ongoing learning by academics and tutors to understand (i) the evolving capabilities of these tools, (ii) how students may use them, and (iii) how to harness their power as productivity aids for designing curricula, resources and assessments.

No. 3

The risks and challenges presented by generative AI tools, including in ensuring their safe and ethical use and in promoting ongoing academic and research integrity.

At UTS we are possibly the first university to publish an institution-wide statement on the [ethical principles and procedures underpinning our use of AI](#), demonstrating the value of consulting students and staff in depth using a [deliberative democracy](#) model, to build and sustain trust. We have also shared all our resources publicly to assist with the university sector's response, including 5 student-centred principles, an AI-resilience diagnostic for reviewing assessments, and numerous case studies of [AI-integrated assessment](#). Collectively, these support UTS and the university sector more broadly to address the key risks and challenges before it.

"[FATE of AIED](#)", which refers to implementing Fairness, Accountability, Transparency & Ethics for AI in education, is a framework worth considering for the Australian education system as a whole. A debate is under way as to whether public education should be dependent on the agendas of the big technology companies, or whether nations should partner to develop transparent, accountable models. Equitable

access to the leading-edge technology for all students remains a concern, with the risk that the privileged will retain access to the most advanced tools.

Other comprehensive approaches to managing risks and challenges while encouraging the use of generative AI in the Australian education system include:

- Emphasising the need for creation of comprehensive guidelines and policies to ensure responsible and ethical use of AI technologies in educational settings in the areas of privacy, data security, algorithmic bias, and the potential impact on student well-being.
- Providing adequate training and professional development opportunities for teachers to effectively utilise generative AI tools in their classrooms. This includes training on the use of AI tools, understanding their limitations, and developing pedagogical strategies to integrate them into teaching practices.
- Prioritising student learning and engagement when integrating generative AI tools. Discuss how these tools can be used to personalize learning experiences, provide targeted feedback, and foster student creativity and critical thinking skills.
- Encouraging collaboration among educational institutions, researchers, and developers to minimise duplication, share best practices, research findings, and innovations related to the use of generative AI in education.
- Emphasising the importance of iterative improvement and the ability to adapt AI tools to changing educational needs.

No. 4

How cohorts of children, students and families experiencing disadvantage can access the benefits of AI.

The report by UTS's Industry Professor Leslie Loble AM, [Shaping AI and EdTech to Tackle Australia's Learning Divide](#), specifically examines this area for school education. In short, the report concludes that high-quality edtech (such as AI) can, in the right environment, be used to improve outcomes for disadvantaged students (e.g., low SES, students with a disability and migrants from NESB) but only if this edtech is well-designed, well-used and well governed. Ms Loble cautions against an overreliance on edtech as a 'magic bullet' that can solve the wicked problem of education disadvantage and sets out ten recommendations to give educators, governments, industry and others the information they need to achieve an equitable use of edtech applications now and into the future.

Arranged under four themes, Ms Loble's recommendations are reproduced below for the convenience of the House Standing Committee and are supported by UTS.

Partnership for positive change: Establish the Australian Forum on Quality Digital Education to help shape the strategic agenda for using technology to target educational disadvantage and boost student outcomes and wellbeing. The Forum would create a network of Australian leaders across education, industry, social purpose and philanthropic organisations, government and researchers, and provide an independent source of ideas and solutions to help develop and deliver safe, effective edtech that can reduce education disadvantage.

Best practice use:

- Work with schools to test, develop and showcase best practice integration of teaching and learning technology tools for disadvantaged and special needs students, building a network of peer based support.
- Provide extra resources to disadvantaged schools to access high quality edtech learning tools, with linked implementation support and professional development, alongside investment to secure equitable access to essential technological infrastructure.
- Commission the Australian Education Research Organisation (AERO) to provide expertise and advice on what works best when using edtech to support teachers and improve student outcomes.

Quality and impact:

- Include evidence standards for education interventions, including edtech, in the next quadrennial national school funding agreement, along the lines of the U.S. Every Student Succeeds Act (ESSA) federal funding guidelines.

- Accelerate high quality, independent research and evaluation of teaching and learning tools to investigate:
 - Impact on learning progress for students facing educational disadvantage;
 - Features that amplify positive outcomes, including implementation factors.
- Catalyse a world-leading Australian social benefit edtech sector by investing in promising systems that meet high standards for evidence, efficacy, ethics and equity. Novel forms of capital should be considered, such as impact investing, social enterprises, leveraging or partnering with venture capital funds, as well as direct public or philanthropic funding.

Governance and information:

- Create an accessible repository of trustworthy information on the quality and safety of available edtech tools so that schools, education systems and parents can make more informed choices.
- Develop education-specific standards covering product design, data use, and life cycle governance and accountability to guide purchasing decisions and assist industry access to the sector.
- Build public-private partnerships to safely share data for better traction on solving education challenges, and to apply advanced data techniques to help optimise outcomes for students at risk.

UTS adds that the legal implications for generative AI in education cannot be understated and urges government to consider establishing an expert panel with industry and the academy for the assessment of the principal legal implications such as intellectual property, privacy and other laws governing the collection and use of data.

No. 6

Managing the risks, seizing the opportunities, and guiding the potential development of generative AI tools including in the area of standards.

The use of generative AI in education is an ongoing conversation and arguably has triggered an outbreak of creativity among educators sharing and debating ways to actively embrace the new possibilities of AI in all its applications. However, the education sector urgently needs robust responses to the following questions:

- What are proven approaches to transitioning assessment practices and curriculum renewal at scale? For instance, are direct observation/oral defence sessions scalable (e.g., for hundreds of students in a cohort), does it cost more than current assessments, and if more, is this justified by the rigour of assurance of learning they provide? Does a switch to program-level assessment create the staff time and curriculum space to introduce the triangulation of student evidence now required?
- How well do different ways of using generative AI tools translate across different teaching and learning contexts, and do we understand why there is inevitably variation? There are now myriad, educationally-grounded proposals for how ChatGPT might be used — what is missing is the coordinated tracking of evidence of how well these work across different contexts.
- How do we build critical AI literacy among students of different ages and stages, such that it becomes a lifelong capability, and does not age rapidly with technical advances?
- What are the most effective ways to upskill academics, short and longer term? Every university has a centre for teaching innovation bringing wide expertise, including Academic Language and Literacies, Library, Course Program Design, Assessment Design. All of these have been engaged in the rapid response to generative AI over the last 6 months, but there has not yet been time to consolidate, share and discuss innovations.
- How do we tune generative AI for learning? The dominant Large Language Models and conversational interfaces were not developed for education. These can be further tuned with *in-depth disciplinary texts*, and prompt engineering to shape *learning conversations*. Some universities are beginning to build the infrastructure to conduct such applied R&D, while others will depend on them sharing the outputs in forms they can adopt and adapt, open source or via commercial products.

Conclusion and contact details

In conclusion, the emergence of generative AI represents a turning point in education. We must stay engaged, look forward and contemplate learning ecosystems in a significantly different way to what we grew up with, and still experience today. Strategic investment is required to ensure that the inertia that so often cripples educational systems does not hold Australia back, in what is an exciting window of opportunity.

UTS appreciates the opportunity to contribute and would welcome future engagement regarding this inquiry. Please do not hesitate to contact Ellen Goh, Manager, Government Affairs should you wish to discuss this submission further.