Submission in response to the House Standing Committee on Employment, Education and Training's inquiry into the use of generative artificial intelligence in the Australian education system

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Thank you for the opportunity to provide a submission to the House of Representatives Standing Committee on Employment, Education and Training Inquiry into the issues and opportunities presented by generative Artificial Intelligence (AI) in the Australian education system.

My recent report *Shaping AI and edtech to tackle Australia's learning divide* (PDF attached) canvasses the opportunities and risks of AI-enabled edtech in schooling, how these tools are used to support students, teachers and systems, the evidence of their impact (or lack thereof), and actions underway in other nations. The report makes recommendations to enable Australia to influence the direction of edtech so that it helps lift learning outcomes, particularly for disadvantaged and vulnerable students, and is safe, fair and equitable. Indeed, Australia has a significant opportunity to lead internationally through a comprehensive approach to the design, implementation and governance of edtech in schools.

The issues surrounding artificial intelligence and education have been a key part of my work since 2016, when as then Deputy Secretary in the NSW Department of Education, I established Education for a Changing World, a major initiative to address the impact and implications of AI on learning. That work led to publication of *Future Frontiers: Education for an AI World*, a series of global research, curriculum and assessment publications, and the creation of the Catalyst Lab, which brought teachers and school leaders directly into co-designing education innovations.

Comments aligned to the committee's terms of reference follow. *Shaping AI and edtech to tackle Australia's learning divide* contains useful additional evidence and examples.

The strengths and benefits of generative AI tools for children, students, educators and systems and the ways in which they can be used to improve education outcomes

Edtech applications can help lift student outcomes and learning engagement, including for students that are falling behind and need a bit of extra help. Teachers find edtech can help them with lesson planning, assessments, adapting instruction to different student needs, and reducing administrative tasks that take them away from direct student engagement. Schools and systems use AI-backed tools to generate more specific insights and trends when looking at education and related social and economic data.

One of the biggest challenges within Australia's education system is how to support educators in providing targeted, effective and compelling instruction, particularly to disadvantaged, complex-need students. Edtech – if designed, used and monitored properly – can be a useful element in enhancing personalisation and addressing education disadvantage.

Three categories of advanced edtech currently have the most promise and supporting evidence for lifting learning outcomes:

- Student-oriented applications – Intelligent tutoring systems can create personalised learning paths for students that adapt as they progress and encourage them to reflect on their learning. Existing literature shows these systems can have a statistically significant positive impact on student outcomes, especially for lower achieving students

- Teacher-oriented applications – 'Smart' curriculum tools use AI to bring evidence-based and 'proven in practice' resources directly to teachers for lesson planning. Beyond standard search engines, AI-enabled tools built on evidence-based pedagogy and teacher-focused support can provide faster and more targeted access to quality materials that connect to required learning content and to data informed student insights. Specific purpose platforms can also focus on certain types of students, such as enabling early detection of special needs like dyslexia and dysgraphia. Adaptive assessment systems adjust questions to ascertain a student's level of understanding and capability, offering better insight into learning areas needing attention and, in some cases, linking to targeted remediation resources

- System-oriented applications – AI based modern data techniques (such as machine learning) can empower schools and systems to more accurately identify students at risk of disengagement and enable support in a timely and targeted way. These tools also provide useful insights about longitudinal and systemic trends for better policy and program design

Other forms of AI-enabled education technology are available – such as facial recognition, biometric devices and robots -- but they currently rely on more experimental methodologies, raise thornier ethical questions, and have weaker evidence of effectiveness in classroom settings.

Chapters 2 and 3 of *Shaping AI and edtech* outline these tools and the evidence.

The future impact generative AI tools will have on teaching and assessment practices

AI has the potential to amplify educators' professional capacity for the benefit of student learning, when well-designed and safe to use.

OECD research found less than 40% of school educators felt ready to use digital technologies in teaching. Tips and suggestions are circulating through blogs, forums and media but there is little systematic, evidence-based advice. Research into best practice and investment in

professional development therefore will be crucial to ensuring these tools successfully enhance student outcomes. This professional development should be equitably distributed to prevent disadvantaged schools and students from falling behind. Professional support to promote AI literacy also will be essential to ensure students can confidently and effectively understand and use AI, now and in their future.

Generative AI particularly raises questions about assessment, given its capacity to mimic human writing and the growing evidence that AI-detection tools have [limited effectiveness](). Educators are adapting quickly, with alternatives ranging from a return to in-class written examinations to organising assessment tasks like debates or oral and visual presentations. Some educators also have explicitly incorporated generative AI into their assessments; for example by providing a generative AI-produced essay and assessing students on their ability to evaluate and improve it with their own work.

Importantly, assessment will need to become more meaningful and less transactional, and the most useful protective factor against inappropriate use of AI tools will be the intrinsic value of learning. Students will need to value assessment's role in recording and monitoring their progress and showing them where they need to focus more and what they need to do next.

Fortunately, research suggests the factors that best guard against cheating are also the hallmarks of quality education. Students are less likely to cheat when they feel a sense of belonging to a community that values their integrity and effort, where they believe the teacher cares about their learning and where they feel invested in building their own knowledge and skills and see the purpose of assignments in helping them to do so.

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

AI-based systems introduce significant risks without close control over their design and use. These risks include bias and ethical harm, inaccurate or false information, privacy and intellectual property violations, amongst others.

Some AI-based education technology also can carry specific risks to learning outcomes and to children and young people, which underscores the critical importance of ensuring educators, not technology, shape and drive teaching and learning and that parents of school-age children also have information and agency.

Not all edtech is created equal. As with any technology, educational AI applications can be useful, or not, and there is a critical responsibility to establish the governance and evaluation systems that can help educators find what works – and what doesn't. Most importantly, educators must retain authority and control over edtech used in classrooms.

When considering edtech, three key factors affect whether any given tool can be useful:

- the quality of the tools – are they based on established learning science and aligned to Australian curriculum and values? Co-designed with teachers and affected

communities? Independently evaluated? Poor quality tools not only will be less effective, they risk baking in poor learning and potentially worsen learning gaps.

- effective use and integration into teacher-led instruction – should these systems be used at all? Under what circumstances and in what optimal way? How can they support teachers and preserve teacher agency? Too much or inappropriate use of technology can undermine effective teaching and learning.

- the network of policies, institutions and incentives that shape and govern the wider edtech market – do educators have sufficient information to make well-informed decisions about which tools to use? Are education and ethical standards firmly embedded, with sufficient ongoing oversight? What protections are in place for student and educator privacy and safety, including from inappropriate advertising?

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

A persistent digital divide exacerbates education inequality as disadvantaged students and schools can struggle to access the digital learning opportunities that increasingly are a day to day part of contemporary education.

Looking at Australia's digital inclusion index, we've made progress but there remains a significant gap between those at the lowest income levels and those better off. Digital inclusion is driven by lack of access, affordability and digital skills, and more than a quarter of Australians still face digital participation obstacles.

The digital divide extends beyond devices and internet availability. Access to high quality learning applications is set to become the next frontier of the digital – and learning – divide as better off families and schools are able to use the best edtech assets, thus compounding an already significant advantage.

The business model behind AI-enabled education technology is built on subscription. Fees can be quite steep for top tier applications while free or reduced cost versions can expose students to advertisement, or weaker learning features. A single ChatGPT account currently costs $240 a year, severely stretching the budgets of disadvantaged families and schools. [The free version has fewer usage options and information connections.] Without equitable pricing arrangements, a school of 1,000 students might face nearly a quarter of a million dollar annual bill for just one application – roughly equivalent to three new teachers.

Social benefit organisations like The Smith Family report that sometimes their mentored students were unable to access remote learning during COVID because of limited digital literacy – for example, they might have forgotten their password and no one in the household knew what to do. Digital capability is crucial and should extend to how to use and understand these tools, especially when it comes to generative AI. Generative AI requires significant digital literacy to know how to 'converse' with the tool, how to best prompt and interrogate, and, most importantly, how to evaluate and interpret the responses.

A second equity dimension involves the impact of AI on work, earnings and social cohesion. Through automation, AI can de-skill or replace parts of even very complex work, or it can make high level work accessible to people without specialist training, in jobs like website design, copy writing or software coding where generative AI can now contribute.

A University of Pennsylvania analysis predicts ChatGPT could impact 80% of the US workforce, with a fifth of workers finding half their tasks affected. Goldman Sachs estimates 300 million full-time jobs globally will be subject to automation in whole or part. Preparing students for this future will require both high levels of literacy and numeracy to access learning and strong 'thinking skills' like critical thinking, computational thinking and ethical reasoning to access knowledge and mastery of new information and innovations.

These equity dimensions of edtech require specific attention, including:

- shaping the market through investment in creating affordable, high quality tools, particularly for disadvantaged and special needs students
- targeted resourcing for disadvantaged students and schools to access the best available tools, develop digital skills, and build professional expertise for effective use
- working with the edtech industry to establish equitable pricing arrangements
- making sure edtech quality standards (and purchasing decisions) incorporate inclusive design and governance processes
- ensuring all students can access quality curriculum with rich content and mastery of both basic and higher order skills

International and domestic practices and policies in response to the increased use of generative AI tools in education

Australia currently lags other countries (like Singapore, the UK and the U.S.) in several areas, including:

- developing edtech locally and linking it to national learning goals
- evaluating its effectiveness
- understanding what factors really matter for teachers when using it
- directing it towards high-priority and disadvantaged students
- making sure it is accessible, safe and ethical

Three examples follow; further discussion can be found in Appendix C of *Shaping AI and Edtech.*

UK

The UK launched its Education Technology Strategy in 2019. As with similar blueprints, the government wants edtech to alleviate pressures on teachers' time and improve educational outcomes and sees integration of technology and classroom learning as consistent with trends in students' wider environment. A note of difference, however, is the plan's focus on better assistive technology for students with disabilities and other special needs.

Two government-backed entities help drive research and development of education technology:

- EEF – the Education Endowment Foundation has become a trusted source of education evidence, with a focus on helping teachers access and use this evidence. EEF commissions and reviews research on education technology, assessing both impact and implementation effectiveness. [The Australian Education Research Organisation (AERO) includes such functions.]

- NESTA – established in 1998 with a publicly-funded endowment, NESTA (National Endowment for Science, Technology and the Arts) is an independent innovation agency focused on social benefit. Having invested in emerging technologies and built research and policy expertise, NESTA joins EEF as a key contributor to both government policy and the wider industry environment. NESTA is explicitly charged with helping deliver the UK National AI Strategy (such as adaptive tech for students with disability), and partnered with the Department for Education to help schools effectively use edtech.

US

The U.S. Department of Education's Office of Educational Technology leads national edtech policy by:

- Promoting equity of access to technology-enabled learning;
- Supporting professional development for system officials, school leaders and teachers;
- Working with stakeholders in the edtech ecosystem, including entrepreneurs;
- Funding research and evidence collation

Advanced and emerging technologies are a specific priority, particularly to guide educators on impact, quality, procurement, and key issues for successful use. Funding also has been directed to intermediary institutions and research bodies to stimulate and diffuse evidence for advanced technology.

Local and state taxes fund most of U.S. school education, but federal government investment has substantial impact on state and local education decision-making. The main vehicle for federal education funding now incentivises states, local education bodies and schools to prioritise evidence-based learning. These evidence standards also apply to education technology, and analysts and edtech companies report a growing focus on independent evaluations and a shift toward proven quality. Related, government resources and philanthropic investment have developed public websites where evaluations of edtech helps educators and parents make informed decisions (e.g., the What Works Clearinghouse, Evidence for ESSA and EdReports).

Singapore's Smart Nation: National AI Strategy selects personalised education as one of five 'high value' national AI-related priorities. Its Education Technology Plan maps a ten-year series of interventions to address:

- Blended learning, with devices for every secondary school student, support for schools to build integrated instructional programs, and teacher and student access to an individualised digital Student Learning Space
- AI-enabled technology to support personalised student learning support, digital resources and learning analytics for teachers
- Formative assessment tools
- Greater digital literacy and collaborative learning opportunities

Recommendations to manage the risks, seize the opportunities, and guide the potential development of generative AI tools including in the area of standards

When we consider when and how to use edtech, the fundamentals of good teaching and learning must come first, and edtech second.

The critical factor is how we shape and use this technology to align with what works best in learning. Standards, oversight and investments will help ensure it serves to lift education outcomes, especially for those at risk, and to support effective teaching and learning, not weaken or undermine it.

Australian Education Ministers' commitment to ensuring generative AI and other AI-based edtech delivers widespread social benefit, protects human rights and values, and supports educators and learners is a welcome and important step forward.

The proposed national AI in schools framework will form a platform for further work; some recommendations, in addition to those already outlined, follow.

Quality design and impact

- Include standards for evidence to underpin education interventions, including edtech, in the National School Reform Agreement, along the lines of the U.S. Every Student Succeeds Act (ESSA) federal funding guidelines

- Accelerate high quality, independent research and evaluation of AI tools to investigate impact on learning progress for students and to identify 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 could be considered, such as impact investing, social enterprises, leveraging or partnering with venture capital funds and industry, as well as direct public funding

<u>Best practice use</u>

- Work with schools to test, develop and showcase best practice integration of teaching and learning technology tools, including for disadvantaged and special needs students

- Provide extra resources to disadvantaged schools to access high quality edtech learning tools, with linked implementation support and professional development, alongside investment for equitable access to essential technological infrastructure

- Commission the Australian Education Research Organisation (AERO), working with ACARA, AITSL and ESA, to provide expertise and advice on what works best when using edtech to support teachers and improve student outcomes

- Build cross-government agency and public-private partnerships to safely share de-identified data for better traction on solving education challenges

<u>Governance</u>

- 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, incorporated into procurement and (potentially new) public oversight systems, covering product design, data use, and life cycle governance and accountability. These standards should reflect: education evidence and learning science; privacy and other requirements to protect students and educators; transparent, explainable information about how the tool works, what data are collected and how data are used; and obligations to evaluate effectiveness and demonstrate impact on outcomes

- Establish an expert advisory body reflecting education, industry, social benefit, legal and other expertise to provide early insights and strategic solutions to help anticipate, develop and deliver safe, effective AI-based edtech

Australian students deserve the highest quality edtech, proven to deliver learning progress, aligned to curriculum, ethical and legal standards, and that meets or exceeds expectations for both learning outcomes and equity. Australia can become a global leader in shaping that direction for AI in education and this inquiry will make an important contribution toward that goal.