The pace of change, particularly wrought by advancing technologies, has galvanised the NSW Department of Education to plan for the future of education and ensure that young children today are prepared to live and work in a radically different world. The symposium is part of the Department's initiative to lead a conversation about the challenges of an artificial intelligence (AI)-enabled world for education and how education can best equip young people for the future.

Day one featured talks and a panel discussion about how AI and related technologies are affecting our lives and the challenges they pose for education. On day two, delegates explored in more depth the implications of these changes for students, teachers and schools. Delegates heard from experts in a range of fields and participated in a design thinking workshop to develop and pitch their own ideas in response to challenges facing education in an AI world.

Speakers at the symposium included: Rob Stokes (NSW Minister for Education), Mark Scott (Secretary, NSW Department of Education), Genevieve Bell (Professor and Director, 3A Institute), Gauri Bhalla (Design Thinking facilitator, Curious Collective), Attila Brungs (Vice-Chancellor, UTS), Andrew Charlton (Director, AlphaBeta Advisors), Fang Chen (Research Group Manager, CSIRO), Marita Cheng (Founder and CEO of aubot), Peter Corke (Distinguished Professor of Robotic Vision, QUT), Catherine Livingstone (UTS Chancellor and Chairman, CBA), Leslie Loble (Deputy Secretary, NSW Department of Education), Rose Luckin (Professor of Learner Centred Design, University College London), Daniel Petre (Investor and Philanthropist), Commodore Chris Smallhorn (Commander Fleet Air Arm, Australian Navy), Marc Tucker (President, National Centre on Education and the Economy, US), and Toby Walsh (Professor of AI, UNSW).

The Education for a Changing World symposium was a major event hosted by the NSW Department of Education. The symposium explored the strategic implications that advances in technology will have for life, work and education. It was attended by over 200 practitioners and policy makers from education, academia and industry.
KEY THEMES
The symposium explored many themes concerning the nature of an AI world and its implications for education.

THE FUTURE WE INHERIT IS THE ONE THAT WE BUILD
The symposium kicked off with discussion about the relationship between humans and AI systems.

Humans will play a critical role in building the systems that will manage, operate and regulate AI technologies. A lively panel on the opening day of the symposium debated the types of jobs that would be affected by AI – whether these would be low skilled jobs or white-collar jobs, and which parts of the population it would affect the most. Despite the uncertainty, speakers agreed that it is society that has the responsibility for designing the systems that will house the new technologies and jobs that come with it.

“How do we embrace technology, but manage the distortion, displacement and risk that comes with it?”
- MARK SCOTT

Likewise, smart technologies today will not exist as discrete, isolated pieces of technology for long – soon the technologies will start to resemble a system. The key question becomes who will manage those systems, what infrastructure we will need, and what regulations and standards we want to establish.

There remains uncertainty about what AI will be capable of doing in the future. The possibilities, limitations and opportunities of these technologies were highlighted by a number of speakers. Although we cannot know exactly what an AI future will look like, we need to ask provocative questions about the future while having realistic expectations of AI technology.

“This is where, as a society, we need to start thinking and deciding collectively what our values are... because the technology is going to do those things. We get to choose.”
- TOBY WALSH

Speakers from academia explored the important ethical decisions that will need to be made about which jobs in society should be outsourced to AI technologies. During the panel there was debate over whether AI would be better than humans at aged care, for example. Does the empathic nature of the job make aged care workers immune to automation? Or would AI technologies be better at exhibiting “infinite patience and infinite grace”, making it ideal for aged care work? Humans, not AI, will be responsible for deciding what regulations need to be imposed on AI systems (and their designers) to ensure they behave ethically.

As Genevieve Bell explained, at each technological ‘revolution’ in history there has been immense pressure for industry and education systems to produce people who will manage, operate and regulate the new technologies. For instance, the invention of the steam engine during the industrial revolution produced people who would build and operate not only steam engines, but also steam trains, rail roads and eventually entire transportation systems.
Audience poll:
How do you feel about an AI future?

At the end of day one, delegates were asked to choose one word that best represents how they feel about an AI future. This was their response:

THE ROLE OF EDUCATION WILL BE INCREASINGLY IMPORTANT IN AN AI WORLD

There was general agreement that education should take an active role in responding to an AI future. Indeed, there are few professions that need to have eyes more fixed on the future than education. Student-centred school systems should be obsessed about understanding as much as possible about the future world students will enter and how best to prepare them for it.

Keynote speaker, Marc Tucker, stressed the increasing importance of education in an AI world. If the job market is set to become more and more like the ‘gig’ economy, with fewer and fewer workers in full-time employment, employers may have little incentive to invest in training their workers. Young people will have to come from initial education fully equipped to do highly complex work, in an array of areas and in quick succession.

“Invest in yourself as a citizen of Australia, not just a consumer.”

- GENEVIEVE BELL

Having empathy, warmth, courage, sensitivity, and be good at managing and supporting others.

The teaching of democracy and citizenship in schools was highlighted as critical. In an AI world, it is more important than ever for future citizens to understand the historical forces that produced democracy and liberty – how important it is, how fragile it is and what it takes to sustain it.

“Embrace AI. It is our assistant, not our master.” - ROSE LUCKIN

AI and education will also come together. Rose Luckin urged educators to be involved in designing the AI technologies that will be used in schools. Data by itself is crude – it cannot power AI effectively unless it is refined in a way that is meaningful for educators. Educators must therefore be the ones to decide how AI is best deployed and what questions should be asked of student data, so that the outcome is meaningful for students and teachers.
HIGH QUALITY EDUCATION FOR ALL

The rise of AI technologies raises multiple challenges for education. As Marc Tucker pointed out, in a world where information is ubiquitous and cheap, education will need to do more than just inject information into students – schools will need to create experiences in and out of the classroom that will give students the qualities they need to thrive in an AI world.

“Deep conceptual mastery of the disciplines, constantly applied to the unexpected will be the watchword.”

- MARC TUCKER

Education will need to be about learning to learn and about learning how to apply what you learn to unexpected real world problems. Marc Tucker suggested that high quality school education will need to be a mixture of formal learning and applying that to real, unanticipated problems. This approach is reflected in a T-shaped curriculum – the horizontal bar being a first-rate liberal arts curriculum, and the vertical bar an equally first rate technical speciality. Students will need a deep conceptual mastery of the disciplines, constantly applied to the unexpected.

Rose Luckin spoke about the need for education to ensure students develop the self-efficacy that will set them aside from their AI ‘peers’. That is, a combination of meta-cognitive knowledge and awareness about learning (how do I know what I know?) and having the appropriate confidence and motivation to apply that knowledge. Accurately assessing your own learning is difficult and it is easy for students to overestimate how much they know. This is where AI and data can help. For Rose, the real power of AI is that it can help students to understand themselves better.

INNOVATION IN CLASSROOMS AND SCHOOLS WILL BE CRITICAL

In order to prepare young people for a changing world, education must be willing to try new ideas, to be innovative, and then scale those ideas well. Education systems need to continue to explore and foster ideas and practices from within classrooms and schools, but also be outward looking to ideas from other sectors and around the world.

“We need a broad education and a conception of education as a process and relationship that continues forever.”

- ROB STOKES

Participants were inspired by Commodore Chris Smallhorn’s efforts to encourage innovative thinking in the Australian Navy. For the Commodore, innovation enables teams to do things differently; empowering everyone to develop innovative ideas embeds innovation and enables the whole organisation to benefit.

Delegates were also guided through a design thinking session which sought to explore further the innovations that will be needed to better prepare young people for a rapidly changing world. Design
thinking principles were used to generate, develop and pitch ideas in response to the challenges for education in the time of AI. The delegates explored three challenges:

**Challenge 1:** How might we ensure that students can both master core concepts and rigorously apply knowledge and skills (such as critical thinking and problem solving) in meaningful ways?

**Challenge 2:** How might we better support students to develop important ‘non-cognitive’ skills such as growth mindset and self-efficacy, and ensure they have opportunities to demonstrate them?

**Challenge 3:** How might we shape the development of, and better leverage, new technologies and tools to suit the context of NSW schools and support teachers to improve the learning outcomes of every student?

The winning one-minute pitch for Challenge 3, titled ‘Siri Goes to School’:

“You know how teachers never have enough time?

Well imagine: face recognition removing roll marking, computer marking of summative assessments... voice to text recognition turning your conversation into report comments...

We’ve designed an interactive AI ecosystem called ‘Siri Goes to School’.

She manages routine admin tasks and student data to enable teachers to exercise their expertise, design rich learning tasks... inspire, guide and invest emotionally into what matters most – our students.”
CONTINUING THE CONVERSATION...

It was agreed that the conversations started at the symposium need to continue. The NSW Department of Education is continuing its exploration of the strategic implications that advances in technology will have for education by:

- Continuing our research and policy work as part of the Education for a Changing World initiative with a focus on the themes discussed at the symposium.
- Developing a community of interested teachers and education professionals to help shape future directions.
- Establishing a ‘Catalyst Lab’ to explore innovative educational practices with fresh eyes, in partnership with schools and other partners.

The Education for a Changing World symposium was held in Sydney on 9-10 November 2017. You can watch part of the symposium and download more information about the Education for a Changing World initiative at: https://education.nsw.gov.au/our-priorities/innovate-for-the-future/education-for-a-changing-world/events

FUTURE FRONTIERS: EDUCATION FOR AN AI WORLD

*Future Frontiers: Education for an AI World* was launched during the symposium by Leslie Loble, Deputy Secretary of the NSW Department of Education and Louise Adler, CEO, Melbourne University Press.

*Future Frontiers* is a compilation of essays canvassing different perspectives from thought leaders, technology experts and futurists from Australia and around the world about education for an AI world. The essays explore how technology might affect our lives, our work and our classrooms in the near future, and the types of skills and knowledge that young people might need to successfully navigate the landscape of their future world.