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### TRANSCRIPT

#### E&OE TRANSCRIPT

Address at the Conference of the Australian Science Teachers Association (CONASTA)

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**Simon Birmingham:** Thanks so much, Geoff [Quinton], for that welcome and I acknowledge you as the President of ASTA. Professor Trevor Hambley, Dean of Science at the University of Sydney. ASTA CEO, Vic Dobos. Margaret Shepherd, President of the New South Wales branch. Ladies and gentlemen, delegates and friends, it's wonderful to be here with you all today. Can I commence by acknowledging the traditional custodians of this land – the Gadigal peoples of the Eora Nation. And as Australia's Education Minister, acknowledge that we continue to learn so much more of Indigenous culture and knowledge, from Indigenous culture and knowledge, and together as a nation build upon that culture and knowledge.

The Australian Science Teachers' Association began nearly 70 years ago, and today your work is more important than ever. We need our children to be equipped with the skills that will drive Australia's economy into the future and make the most of their individual potential. And this requires STEM skills – science, technology, engineering and maths. Humanity has been aware of this fundamental premise at least since the 18<sup>th</sup> century and the proliferation of intellectual and philosophical ideas we now call the Enlightened or the Age of Reason. Scientific knowledge and reasoning back in those days were recognised as fundamental and transformative. Sir Francis Bacon, a key leader in the court of King James I, championed scientific method as a means of understanding the world, as well as advancing medical, legal and economic reforms. As he said, 'knowledge itself is power'.

From that day to this, the central importance of STEM remains the same – a building block of learning, driving innovation and creating new opportunities across all aspects of our society and economy. STEM is a powerful economic driver. PricewaterhouseCoopers has estimated a change in just 1 per cent of Australia's workforce into STEM-related roles could add some \$57 billion to our GDP over a 20-year period. Back in 1970, in his celebrated book *Future Shock*, futurologist Alvin Toffler predicted that the convergence of science, capital and communications would create an entirely new kind of society. The knowledge and skills of the STEM disciplines have truly transformed each and every aspect of our lives since that time. We need think no further than of the remarkable rescue of those four children in the Thai football team to appreciate the feats of science, technology and engineering that made such a rescue possible.

From the highchair, all the way through to higher education, and into our world-class research institutions such as the University of Sydney, our government aspires to see each student engaged in science, interested, curious and excited by science. Encouraged to choose STEM subjects as the basis of rewarding work and as the basis of an inquiring and creative mind. It is crucial for Australia's progress and future prosperity, yet our performance in international STEM assessment has, in some measures, been stagnating or in decline. While students appear to be looking elsewhere for their subject selections.

Our chief scientist has highlighted that maths – which he describes as the language of science – has seen Year 12 enrolment rates in intermediate or advanced maths decline from 54 per cent in 1992 to 36 per cent in 2012. Science disciplines themselves have also seen a decline, notwithstanding a broader range of subjects being made available.

Out-of-field teaching clearly stands as a likely issue in both student performance and subject selection. In 2013, it was estimated that around 20 per cent of general science teachers taking Year 7 to 10 classes had not completed at least one year of tertiary study in that area. Meanwhile, we see countries as diverse as

Sweden, Japan, Korea, Russia, Finland, Taiwan and Estonia, requiring maths, for example, to be studied until the end of high school. And we know that students from each of these countries did better than Australian children in PISA assessments in 2016.

Incentives to stick at maths and science have diminished as universities have dropped or withdrawn prerequisites, though recently I was very pleased, very pleased with the announcement by the Australian National University that it is making maths and English prerequisites for future admissions. And I also welcome the University of Sydney's planned requirement for students across a number of STEM courses to have passed at least intermediate level maths at a minimum from 2019. These steps are in keeping with advice from experts, like our chief scientist Dr Alan Finkel, and I believe they will only serve to boost the status of the ANU and the University of Sydney as world-leading universities. All Australian universities should reintroduce clear prerequisites as part of their admissions processes, particularly requiring maths or science subjects, as well as English.

The recent report from David Gonski and a panel of education and policy experts *Through Growth to Achievement* has given us a roadmap for achieving excellence across our schools so every student can have the opportunities they need to succeed, supported by the needs-based funding recommended in David Gonski's first major education report. But decisive and specific action is required in the area of STEM, which is why we're moving to also implement not just the latest Gonski report, but also the advice that Dr Finkel from his STEM Partnerships Forum, to ensure that Australian students leave school with the STEM skills to thrive in this globalised world, evermore technologically interdependent as it is. The STEM Partnerships Forum focused on how to build a better approach to school industry partnerships that will more actively engage students with STEM subjects.

A range of recommendations for industry, education and government included how the three sectors can cooperate to support teachers and build interest in STEM careers, and it's wonderful to see in a conference such as this, not just such a gathering of teachers and educational leaders, but also those in trade who are working to engage and provide those links to industry, to resources that can best support your teaching practice. One key element though is that we have to increase the supply of skilled STEM teachers in schools throughout Australia. We need more people like you, science teachers devoted to the cause, passionate and interested and committed to this vital area of learning. Able to bring your wealth and experience, your knowledge and your insights to bear on the challenges before us. There just aren't enough STEM-trained teachers in our classrooms. That doesn't mean that teachers running STEM courses aren't doing a fantastic job, but it stands to reason that Australia can do better, better by our students, by ensuring they're taught by people with experience, expertise and enthusiasm of all the subjects they're teaching.

It's unacceptable that secondary school students are taught science or maths subjects by people without specialist skills in science or maths. Better workforce planning and smarter use of technology should enable us to ensure that every high school has access to specialist teachers to teach specialist science and maths subjects. We should strive to achieve this within the next five to ten years. Based on better workforce data, the states and territories should be willing to make clear to universities where their employment priorities lie and create direct incentives for more people to consider specialising in physics, chemistry, biology, technology or maths. If need be, federal funding powers over university places could be used to help the states to influence teachers we need for the future. Although I'm confident that just as the states and territories recognise this challenge and will want to work to solve it, so too will our universities.

Equally, primary school students deserve more specialists to inspire their early interest and knowledge in the sciences. Our recent teacher training reforms already now mandate universities to require a subject specialisation as part of a primary school initial teacher education degree. We expect this to deliver more primary school teachers in the future, with maths and science expertise and specialisations, as well as more with English, music or foreign language specialisations, for example. Again, with better workforce data and workforce planning, we should aspire for every primary school with more than two or three teachers to have subject specialists in the sciences, who can mentor other teachers, lead content development and inspire new generations of students towards a passion for science.

Developing the workforce strategy as recommended by both Finkel and Gonski is a key part of our national reform agreement with the states and territories that we're seeking to resolve by year's end. So that the future generation of students get access to the STEM teachers to equip them for the modern world. Mathematicians teaching maths, physicists teaching physics, chemists teaching chemistry, IT specialists teaching about technology, Australia's students deserve specialist know-how. Now, I wish I could wave a magic wand to simply achieve this, but as you would all know, our government at a federal level doesn't run any schools or employ any teachers. So I will work closely with my state and territory colleagues and the leaders in the non-government sector to reach agreements that ensure every one of our schools have access to the qualified STEM teachers they deserve.

Equally, Australia's growing group of certified highly accomplished and lead teachers are also well-placed to assist other teachers towards continuous improvement in all the areas of their learning, something that you are demonstrating through your attendance at this very conference. School systems and individual schools should look at how best to use the expertise of highly accomplished and lead teachers, including those teaching STEM subjects to improve teaching beyond their own classrooms. I encourage those jurisdictions not yet participating in the whole certification process to get on board as a means to truly recognise that professionalism and skills within our teaching ranks, while also increasing the level of qualification and expertise their teachers bring not only to their classrooms, but to their staffrooms every day.

We're also looking at ways in which we can support more high performing individuals who have outstanding skills in fields such as science, technology or coding into our classrooms. As part of the 2018-19 Budget, our Government has announced that we'll be supporting alternative pathways into teaching through the High Achieving Teachers Program. Providers who'll be selected through a tender process, will be funded to select, develop and place around 200 participants who have the potential to become high quality teachers in Australian secondary schools experiencing- schools who may be experience teach workforce challenges, such as a shortage of STEM teachers.

We've also committed \$64 million to fund a series of early learning and school STEM initiatives, directly supporting STEM teaching in the classroom. Our innovative Early Learning STEM Australia pilot being rolled out in preschools across Australia, I hope, will see the same level of success as a similar program has for learning languages in those early years. By building a foundation interest in STEM at those first years of educational experience, we hope and expect more students to be curious about STEM subjects, to enhance that natural curiosity that of course students so often start their schooling with and to honour that throughout their schooling and into the workforce.

Building these capabilities in the early years, alongside massive investment in research, is a key part of our \$1.1 billion National Innovation and Science Agenda, which has most recently been complemented in this year's Budget by a \$1.9 billion commitment to reinvigorate Australia's national research infrastructure.

We also want industry to do more to help schools to access work relevant STEM skills, which is why in 2016 the Turnbull Government extended delivery of the Pathways in Technology pilot. P-TECH, as it's known, offers secondary school students an industry supported education pathway to a STEM-related post-school qualification and enables teachers to work more closely with local industry in their local community. Students have an option under this program to continue their study at the tertiary level or to pursue employment in a STEM-related field, including job opportunities often preferentially given with that school's local industry partners.

All of our future economic success begins in the classroom – in each individual child having the support they need to learn and thrive. But of course, as ASTA members you know this. It's the farsightedness of Australia's science teachers back in 1951, and your founder Roy Stanhope, who started this organisation, because they recognised how vital it is to champion and advance the teaching of science. They took action in a time of change. As well as being the first year, the year of CONASTA 1, 1951 was also the year that the CSIRO held its first computer conference and buzzed the world's first digital music to an international audience. A few years later in his 1963 election speech, then Prime Minister Robert Menzies noted the special need for improved science teaching in secondary schools, if we are to keep in step with the march of science.

A few years after that, by 1966, Australia had sixteen universities and 91,000 higher education students. More than fifty years later, our 41 universities and many higher education providers now enrol around 1.3 million students. Our investment in education as a nation and our capability in STEM subjects has produced outstanding results for our country, and for the world. The primary industries that built the foundations of our country spurred us on to world-class research and development, setting a trend for innovation and adaptation that has given our country living standards that are the envy of the world.

Our children must develop the skills and the knowledge they need to maintain these standards and to meet the future head on. As science teachers, you play a major part in that endeavour and I thank you most sincerely for your commitment to the task ahead which is demonstrated most emphatically by the fact that you are here as leaders of your profession, engaging in professional development, getting the skills required to ensure your students across your schools get the best opportunities in the years ahead and we're committed to working hard so there are more of you in the years that come.

Thanks very much.

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