

TRANSCRIPT

LEGISLATIVE ASSEMBLY ECONOMY AND INFRASTRUCTURE COMMITTEE

Inquiry into Victorian universities' investment in skills

Melbourne—Thursday, 16 June 2022

MEMBERS

Mr John Eren—Chair

Mr Gary Blackwood—Deputy Chair

Ms Juliana Addison

Ms Christine Couzens

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Mr Nick Wakeling

WITNESSES (*via videoconference*)

Ms Jane MacMaster, Chief Engineer, and

Ms Alesha Printz, General Manager, Victoria, Engineers Australia.

The CHAIR: Welcome to the public hearings for the Legislative Assembly Economy and Infrastructure Committee's Inquiry into Victorian universities' investment in skills. All mobile telephones should now be turned to silent.

All evidence taken by this Committee is protected by parliamentary privilege. Therefore you are protected against any action for what you say here today, but if you repeat the same things outside this hearing, including on social media, those comments may not be protected by this privilege.

All evidence given today is being recorded by Hansard. You will be provided with a proof version of the transcript for you to check. Verified transcripts, PowerPoint presentations and handouts will be placed on the Committee's website as soon as possible. Could I please remind members and witnesses to mute their microphones when not speaking to minimise interference.

I invite you to make a brief opening statement. We will then follow with some questions to you. Thank you very much for being with us this afternoon.

Ms MacMASTER: Good afternoon. Thank you, Chair, and hello, other members of the Committee. My name is Jane MacMaster. I am Chief Engineer of Engineers Australia. I am joined today by Alesha Printz, General Manager of our Victorian division. I do have a 5-minute opening statement; I will speak quickly to ensure I get it all in.

The Institution of Engineers Australia, or Engineers Australia for short, is a professional association with over 110,000 individual members, spanning all engineering disciplines, sectors and areas of practice. We are constituted by royal charter to advance the science and practice of engineering for the benefit of the community. We are Australia's signatory to the International Engineering Alliance and as such are the jurisdictional authority and custodian for the national professional engineering standards, which are aligned with international standards. We accredit university programs in engineering, we are a skills assessor for the skilled migration program on behalf of the Australian Government and we credential engineers for independent practice both through our chartered engineering credential and as an assessing entity for statutory registration schemes. The Engineers Australia professional standards framework, comprising our code of ethics, competency standards, assessment schemes, continuing professional development, complaints process and other resources, supports engineers in Australia to be ethical, competent and high performing.

We appreciate the opportunity to speak to you today and answer your questions on skills, as the skills shortage is the most pressing issue facing our profession, sharing top spot with climate change, and of course the two are interrelated because we cannot act with the pace and scale required to get to net zero emissions and a circular economy in the timescales required without sufficient engineers. Of course there are other national, state and local priorities as well: the burgeoning infrastructure pipeline, defence capability and modern manufacturing and sovereign supply chains, to name a few. The National Skills Commission predicts STEM occupations will experience considerable growth in the foreseeable future. In the infrastructure sector alone Australia will need 40,000 more engineers within the next few years. Of course engineering is not the only profession screaming out for more people; we are competing with just about every other profession and vocation. States are competing with each other for people, and on the international stage Australia is competing with other countries for skills.

Engineers Australia commissioned our project on skills supply and demand in mid-2021 to focus on this issue. We have done a significant amount of work to understand the inflows and outflows for our profession and the motivators and barriers to joining and staying in the profession. The problem of course is complex and multifaceted, but we can think of how to boost the supply of engineers in the short, medium and long term in terms of four important groupings. The first is supporting our skilled migrant engineers. Fifty-eight per cent of our engineering workforce were born overseas, but there are many skilled migrant engineers in the country who are not employed as engineers. Our 2021 research revealed seven main barriers to skilled migrant engineer workforce participation. We need to address all seven. The second grouping is that we cannot rely on skilled migrants alone, so we absolutely need to encourage more young Australians to choose to study engineering. Our recent women in engineering research, which will be released publicly early next month, shows that 90 per cent of women who did not choose to study engineering did not even consider it, and the main reason is the lack of awareness of what our profession is and does. That is our prime focus for the next few years: boosting awareness of what engineering is and the breadth of exciting, rewarding and important career opportunities the

profession offers and how we are different to science to encourage more young Australians of all gender identities to choose to study engineering.

The third grouping is retention in the engineering workforce. Only 60 per cent of qualified engineers work in an engineering occupation, so we need to do a better job of keeping them. As a general rule we underpay engineers and Australian society does not hold engineers in the same high regard as they are held elsewhere, such as in Canada and Germany.

The final area we need to focus on and the reason we are here today is higher education. Our research and analysis reveals many findings, but our top recommendations for universities, in partnership with government, Engineers Australia and others, include: (1) improved support for engineering students through tutors, role models and mentors. Our women in engineering research shows that not feeling a sense of belonging is an important factor in many engineering students changing degrees. The second one is improved work-integrated learning and more internships, not just in final year but from first year onwards, and this should help not only to provide much-needed practical learning to develop workplace skills and the opportunity to apply theoretical engineering knowledge in a practical context but also develop links to the engineering industry that might encourage them to join the engineering workforce rather than accept a position with a consultancy, company or bank, where many of our top engineering graduates go. EA launched our internship hub a couple of months ago to help link internship opportunities in industry with engineering students. It would be helpful if government could also lead in this space by offering internship and graduate programs for engineering, where that is appropriate.

The third recommendation is innovative pathways to engineering, such as incentivising science graduates to become engineers with a two-year conversion masters. Perhaps the Victorian Government can support these places in high-demand areas and universities can strengthen awareness and availability of these programs. These programs can produce engineers, many of whom already have valuable work experience, in just two years.

The fourth recommendation is to work with industry, government and Engineers Australia to understand demand in terms of numbers, in terms of disciplines and in terms of the skills required but also in terms of the three occupational categories. There are three occupational categories within the engineering profession: the professional engineer, the engineering technologist and the engineering associate. In Australia we train, in order of magnitude, more professional engineers, and that requires a four-year degree. But the other two occupations require a two- or three-year degree. It is highly likely that more associates and technologists will help address the skills problem, but we need to understand demand in more granularity first.

The final recommendation is around microcredentials. The need for upskilling and reskilling is already high and it is only likely to increase. We cannot move fast enough in this space to meet demand. Universities play an important role in providing high-quality, comparatively short courses with an assessment component to keep our workforce skills relevant and current. At EA we are in the pilot phase of our short course endorsement framework, which is a system to help engineers find relevant and high-quality microcredentials and other short courses.

There is much to talk about, but I will leave my opening remarks there, and I look forward to your questions.

The CHAIR: Thank you, Jane. I might throw to Juliana first. Juliana, do you have a question?

Ms ADDISON: Terrific, Jane. Thank you so much for that presentation. It was really, really interesting. What I am really interested in is universities being able to attract diversity in the engineering profession. I was just wondering if you could provide the Committee with some suggestions about what measures universities could implement to attract and retain students from diverse backgrounds, including females, to study engineering. You mentioned earlier, which I think is a great idea, the internships and the graduate programs as well as that masters program. I think that is a really, really interesting way of moving forward. Is there anything else our government could be doing to really try and tackle this issue?

Ms MacMASTER: Look, I think there is, absolutely. Our women in engineering research that I mentioned has been very insightful in this regard. One of the things we are very conscious we need to do and we can do in partnership with universities is really a better job at raising the awareness of what engineering careers look like. Young people in particular are very incentivised to contribute positively to the world, to solve problems, to

improve and make the world a better place. That is what engineering is about. It is about solving problems and making the world a better place. So tapping into especially women for engineering careers, I think this is a really important lever that we can pull, so to speak, really raising the awareness of the breadth of opportunities, that it really is an outcomes-focused career where you can really contribute positively. So that is certainly an area that we will be focusing on. I know a number of universities are also focusing on diversity in other aspects, lower socio-economic, for example, cultural, for example. We are all very familiar now with the benefits of diversity more broadly. I think the findings for women in engineering apply equally to other genders and through other lenses of diversity, so it really is about selling and raising awareness of what the engineering profession is, and if we can incentivise people to choose to study engineering, I think that will be a useful addition as well.

Ms ADDISON: Well, can I just say, having you as the Chief Engineer at Engineering Australia is a fantastic role model, so thank you for that.

Ms MacMASTER: Pleasure. Thank you.

The CHAIR: Chris, did you have a question?

Ms COUZENS: Yes. Thanks, Chair. Thank you for that contribution. I really appreciate your time today, and we do have a number of women who are engineers in Geelong who I meet with fairly regularly and who tell me the importance of that, so thank you for reinforcing that. Your submission calls for the Victorian Government to play a leadership role by providing internships in government departments and funded projects. What would be the key elements of work-integrated learning programs for engineering students in government departments and funded projects?

Ms MacMASTER: I will throw to Alesha Printz in a moment about the Victorian context, but I am happy to speak in a general context. Work-integrated learning provides such a valuable opportunity for engineering students to apply what they have learned in theory and concept in the real world. So there is that component, but importantly the other component is making a very strong link between engineering students and an engineering career. So I think those sorts of opportunities need to be very well planned so that it is a positive experience for those engineers and they are being provided with the opportunity to learn and grow and be inspired by the profession, because we lose too many engineers to non-engineering occupations. In ordinary circumstances we do not mind that, because we like the engineering brains, as we call them, out there in the broader economy, but in the context of a skills shortage it is really important that those work-integrated programs provide a really positive, inclusive, supportive and inspirational experience for those students so that we encourage them to stay in the engineering profession. Alesha, do you want to add to anything there?

Ms PRINTZ: I think that is a really good summary, Jane. It definitely is about providing that context for the graduates to appreciate the impact that they can have on society through the connection with the roles, and the other thing that it does is it increases the employability of these engineers. An engineer does not complete their engineering degree necessarily ready to hit the ground running. When they do enter the workforce they do require on-the-ground training. It does take around five years to become a competent engineer. We often get feedback from industry that engineers need more workplace experience and they need to hit the ground running more. If we can provide them these opportunities for placements during their course, it does put them into a much better place to really make a really valuable contribution when they do start. So I think it cannot be underestimated in terms of the value that that adds to industry, so it is really important that industry and the government invest in these placements so that the graduates really are ready to make a really valuable contribution when they first start their graduate placements.

Ms COUZENS: Great. Thank you.

The CHAIR: Thank you. Gary, did you have a question?

Mr BLACKWOOD: Yes. Thanks, John. And thanks, Jane, for your very impressive opening remarks and presentation, but I will bring you back to microcredentials. You are currently piloting the Program Endorsement Framework for the recognition of microcredentials. How does the Program Endorsement Framework work?

Ms MacMASTER: How does it work? Internally to Engineers Australia we call it our accreditation lite system. I mentioned briefly in my opening remarks that Engineers Australia is the accrediting body for engineering qualifications in Australia. We obviously have a very rigorous system for endorsing those engineering qualifications, which is reviewed by the International Engineering Alliance periodically—every six years. We have adapted that very rigorous and internationally reviewed and benchmarked system to make it more appropriate for microcredentials so that we are a bit more agile and nimble. We have a set of quality criteria that maps to our accreditation criteria, which cover a number of both content and pedagogical criteria but also organisational capacity and delivery criteria. Really the intent is to help our members navigate the big wide world of microcredentials to help them find the short courses in microcredentials that are relevant to them but which have also been vetted for quality by Engineers Australia. It is really just to help expedite that process of finding really targeted upskilling and reskilling opportunities for them, and we are happy to send through some additional information on what the quality criteria are if you would like that level of detail.

Mr BLACKWOOD: Yes, that would be good. In terms of assessment, which you probably touched on a bit then anyway, how do you assess the program and the learning outcomes of the micro-credential courses?

Ms MacMASTER: We have a very rigorous and consistent process that we use with the quality criteria that are assessed. We have an evaluation team who bring on board the subject matter experts as required, because, as you would know, engineering is a very broad profession, so the evaluators cannot be across all the detailed subject matter content for every area of engineering. We bring in the subject matter experts as appropriate as well as the engineering education arm of our organisation where that is relevant and appropriate to assist with the educational and pedagogical evaluation as well. Is that sufficient information?

Mr BLACKWOOD: That is great. Just one more little one: how does the Program Endorsement Framework align with the National Microcredentials Framework?

Ms MacMASTER: We are very aware of the National Microcredentials Framework, and that is definitely incorporated into our thinking. We are aware of the marketplace. Our understanding is that that is not fully developed yet, but as that evolves we will be evolving our thinking with it as well. As yet no decision has been made as to the extent to which all programs will be available on the marketplace, but we will certainly be considering that as we move along. Certainly the high-level criteria in that framework are consistent with our microcredentials framework.

Mr BLACKWOOD: Fantastic. Thanks, Jane.

The CHAIR: Thank you. I might ask a question in relation to retaining engineers. I think you mentioned before that there are roughly about 40,000 engineers that are needed going forward to accommodate all of the infrastructure spending that is going on nationally. In this state I think we have got one of the highest rates of infrastructure spend, which is over \$120 billion, and I would imagine that there would be engineers lining up to do the courses because there are so much job opportunity. I am just wondering in terms of being worried about retention, and also I am seeking your views on engineering skills gaps and shortages in rural and regional areas and how universities and the Victorian Government could collaborate to improve the supply of engineers in those areas, rural and regional.

Ms MacMASTER: So retention is a very important point. I think we need to do a better job there. I do not think we do a great job at linking the demand signal back through to universities and, importantly, high school students. There are a couple reasons for that. Firstly, we do not have a good demand signal; the quantitative data on demand is terrible. Sector by sector we—and when I say ‘we’, I mean the collective ‘we’: industry, government and professional associations—are getting better. I know the power sector is doing something. Infrastructure Australia is great. So sector by sector we are getting a better handle of what demand looks like, and that needs to be across the three occupational categories for engineering. But the second step we cannot lose sight of is linking the demand signal back to universities and to high schools so that they understand where the current and future demand is. I think that is one very important point.

Your point about regional cannot be underestimated. I keep coming back to we can have these high-level conversations, and we should of course, but what really makes a difference are the initiatives and programs on the ground. I draw your attention to the EPIC. This comes out of Victoria, and I mention this a lot when I am speaking to people. The EPIC major roads program in Victoria seeks to link refugee and skilled migrant

engineering students who are undertaking study alongside apprenticeships and internships. It is such a wonderful program because it is making a difference on the ground, and I cannot help but wonder if programs like that can be adapted for the regions. I do not think we can underestimate how important it is to design, develop and then implement programs on the ground, and we have got some good success stories to borrow from.

Ms PRINZ: If I could also elaborate a little—

The CHAIR: Sure, Alesha.

Ms PRINZ: There are programs that run in regional areas. Engineers without Borders in particular runs a ‘regioneering’ program, and there is some anecdotal evidence that regional engineers are more likely to stay in regional areas. So it is really important that in the attraction piece we are getting out into regional areas and focusing also on attracting regional engineers. It is harder to get out there when the majority of engineers are based in the city. It is easier to get to city schools and promote within those city high schools, but really how do we get out into those regional areas also and how do we make sure that we are getting in there early enough, before kids choose their subjects? By the time they are in year 11 or 12 it is often too late. If they are not studying specialist maths and the required sciences, they do not have the prerequisites to go on to an engineering degree. So how do we get in early high school? How do we get into primary schools? It is never too early to start this piece about attracting students in. And how do we also educate parents, teachers and careers advisers on the opportunities so that they can also help to amplify that message?

The CHAIR: That is great. I like that terminology, ‘regioneering’. That is very clever. Can I thank you both for being a part of this process. We value the contribution that you have made not only in your submissions but verbally as well here today, so thank you very much.

Ms MacMASTER: Thank you.

Witnesses withdrew.