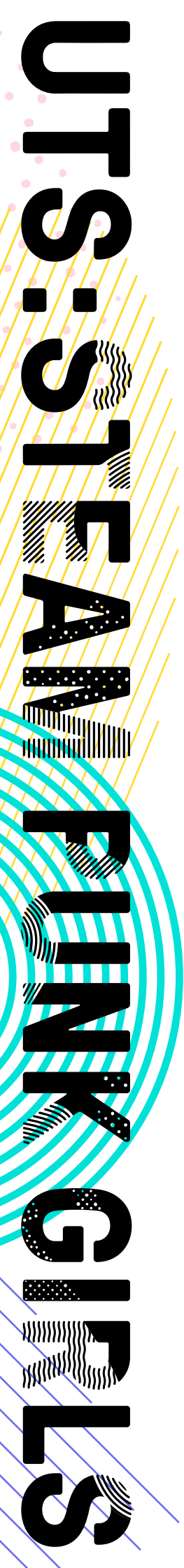


FULL STEAM AHEAD:

Transversal Skills for a 21st Century Workforce

A growing body of evidence has highlighted the importance of ‘futureproofing’ the Australian workforce amidst evolving economic, social, technological and environmental changes. As new and transitioning industries emerge, commensurate skills and technologies are required to meet needs and demands.

Maintaining a skilled, agile and flexible workforce is a current education policy focus, with recent recommendations regarding how the government, educational institutions, educators, industry, employers and the broader community can play a role in preparing graduates for the future ^{1,2,3}



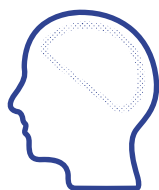
In 2016, UNESCO published an assessment of transversal competencies or skills that graduates should possess, also referred to as '21st century skills'. They encompass the following domains: ⁴



Critical and Innovative thinking - creativity, entrepreneurship, reflective and critical thinking



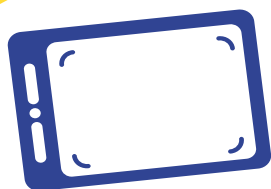
Interpersonal skills - communication, organisation, teamwork, collaboration, empathy



Intrapersonal skills - independence, flexibility, adaptability, motivation, self-discipline



Global citizenship - awareness, responsibility, integrity, ethical behaviour, sense of community, respect for the environment and diversity



Media and information literary - utilisation of ICT to access and evaluate information



Other - Maintaining well-being, respect for religious values



We Need More STEAMPunks.

STEAM stands for Science, Technology, Engineering, Arts and Mathematics.

It extends the concept of STEM to recognise and incorporate the values and concepts from the arts, humanities and social sciences that improve our capacity to solve contemporary problems. In 2016, UTS began to prototype the concept of an educational program designed for young women, by young women to explore STEAM education.

In 2017 we launched UTS STEAMPunk Girls, a unique educational program working at the intersection of high schools, industry and the university. The program aims to empower young women (aged 12-16) to contribute to conversations around innovation, education, and Australia's economic priorities through entrepreneurial education and exposure to STEAM techniques and role models.

The program emphasises addressing real-world problems using a project-based approach. Aligned with the STEAM philosophy of inter-disciplinarity and industry collaboration, the program's internal partners include the Institute for Sustainable Futures, the Faculty of Design, Architecture and Building, the Faculty of Science, the Faculty of Engineering and IT, the Faculty of Arts and Social Sciences, the Women in Engineering and IT Program, and the Centre for Indigenous Health and Technology.

Since the conception of the program, STEAMPunk Girls has set out to explore how social, political, technological and economic shifts will impact the future work landscape. Through our research and co-design workshops we have identified the following key trends that will impact the future of work, industry and emerging practice.

DECLINE IN STEM ENGAGEMENT INNOVATION & ENTREPRENEURIAL SKILLS

Research indicates that STEM skills are a major contributing factor in the success of leading organisations across different sectors.⁵

70% of Australian employers identify STEM-skilled workers as the most innovative.

Despite this, participation and performance in STEM subjects at Australian schools is declining.^{1,6}

Australia currently reports a lower percentage of graduates in Science and Engineering fields in comparison to the global percentage, and to US, Canada, the European Union, Singapore, China and Japan, respectively.⁷



Engineering and the Arts – Tega Brain

Tega Brain is an Australian environmental engineer, artist and academic whose work in ‘eccentric engineering’ intersects art, ecology and engineering. She has presented at the Victoria and Albert Museum, London, Haus der Kulturen der Welt, Berlin, the Science Gallery Dublin and Eyebeam in New York City.

<http://tegabrain.com/>

More countries are integrating transversal competencies into their education systems, as awareness grows of the need to enable innovation and entrepreneurial skills in graduates.^{4,8}

Over the past 50 years, more than half of Australia’s economic growth per capita has been the result of capital, labour and technological innovation, and yet only 50% of Australian companies perceive themselves as innovators.³



Democratised Space Travel

Cuberider is a unique educational program designed to give high school students the chance to launch payloads into space. Launched by young space innovators Solange Cunin and Sebastian Chaoui in 2015, Cuberider is the first Australian organisation to win government approval to fly a mission to space that has been approved by NASA.

<https://www.cuberider.com>

ROLE OF THE ARTS, HUMANITIES AND SOCIAL SCIENCES IN THE TRANSVERSAL SKILL SET

Transversal skills are not just about STEM, but also the integration of the Arts, Humanities and the Social Sciences, in order to understand the social and human contexts of the problems that we are attempting to solve. Innovation requires a variety of skills including business, creativity and entrepreneurial skills, within which Arts, Humanities and the Social Sciences play an instrumental role.¹⁻⁵



Natalie Jeremijenko

Natalie Jeremijenko is an artist and engineer developing Mutualistic Systems and Natural Systems Design. She is the founder of The Environmental Health Clinic (xCLINIC), a health clinic that develops and prescribes systems that improve local human and environmental health.

<http://environmentalhealthclinic.net/>

TOOLKIT

What Role Does Industry Play in this Changing Landscape?

We see that Industry will play an integral role in helping to shape the future workforce. Here are three ways industry can contribute to creating a healthy skills ecosystem.

1

Identify transversal skills valued by the organisation and enable those skills to be reflected in recruitment, training, professional development, reward and promotion policies.

2

Diversify talent pools to promote a more healthy 'skills ecosystem' within their organisations.

3

Create and capitalise on more opportunities for collaboration across sectors (e.g. with researchers and educational institutions and programs) and across organisational divisions.

"We seem to forget that innovation doesn't just come from equations or new kinds of chemicals, it comes from a human place. Innovation in the sciences is always linked in some way, either directly or indirectly, to a human experience. And human experiences happen through engaging with the arts – listening to music, say, or seeing a piece of art."

--John Maeda ⁹

BECOME A STEAMPUNK

The program is currently being piloted by 64 participants at 4 inner-city and low socio-economic schools in Sydney. In the next stage of program development we are looking to co-design the next iteration in collaboration with industry partners who are passionate about empowering the future generation of young female leaders.

If you would like to know more, contact us at steampunkgirls@uts.edu.au

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