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Undertaking Professional Development as an Online Student: The Student Engineering Conference Experience

Zachery Quince
Centre for Teaching and Learning, Southern Cross University
Corresponding Author Email: Zach.quince@scu.edu.au

CONTEXT
The Engineers Australia Stage 1 competencies are quite specific in the attributes that a professional engineer must obtain during their studies. Professional skill development, networking and authentic experience have always been a challenge for students of online learning. For online students, the experience typically defaults to watching a screen in real time or after the fact. This leads to disengagement and a lack of skill development.

GOAL
The purpose of this work was to develop an interactive, engaging and real-world event where students from across Australia would come together for the student engineering conference. This approach is not new for regional universities but with a severely deteriorating engagement with online learners, new pedagogical directions and some enrolled students able to take this professional development online, it was time that the structure, activities, outcomes and even methods of engagement were overhauled.

APPROACH
To promote real-world experiences and reinvigorate professional development, a new approach to professional practice for regional students was trialled in 2024, a combined cohort of third, fourth and master's engineering students. To evaluate the conference, a narrative exploration of the conference organisation was used, with students' responses to polls throughout the conference. A hybrid engineering conference was developed to allow students to present their proposed research for the following year, present their final thesis and undertake much-needed professional development events. The conference had three themes, which were sustainable practice, digital literacy and research directives. Like any conference, there were talks, workshops and activities that students could choose from depending on their diverse future directions and previous experiences. Microsoft Teams was utilised as the platform to run the conference, which brought the conference into the age of digital literacy.

ACTUAL OUTCOMES
The newly constructed hybrid student engineering conference was a great success, as rated by students and the perspectives of the educators. From educators to students and industry, all were able to take something away and continue the capacity building of professional engineering skills. The use of Teams was also a great success, with over 95% of the 350 students stating that it was a good inclusion and that it should be used more in online teaching.

CONCLUSIONS
This case study demonstrates the power of authentic practice in engineering education as well as the continued requirement of upskilling education, pedagogy and directives. It provides a scaffolded framework of the theoretical underpinning of how the conference was designed and a critical educator's perspective, driven by narrative exploration methods.

KEYWORDS
Conference, Online learning, Hybrid learning, Authentic practice, MS Teams

Introduction

Professional and personal development is a key part of all higher education programs. For engineering students, it forms a central part of their learning, with directives from Engineers Australia (EA), the Australian Council of Engineering Deans (ACED), and broader societal drivers. Drivers such as sustainability, rapid technological change, and growing calls for more authentic, skill-building experiences are changing the competencies required of a graduate engineer (Lee et al., 2022). Professional skills like communication, critical thinking, teamwork, and social responsibility are now more important than ever to develop across the degree (Quince et al., 2023; Passow, 2012). While these are captured in frameworks such as the EA Stage 1 Competency Standards, derived from the Washington Accord, students, educators, and industry can interpret these framework deficiencies, leading to different understandings about what specific skills are needed, or how they should be demonstrated (Quince et al., 2024a). Regional universities have responded to these challenges in various ways, with residential schools emerging as one of the most effective approaches.

Residential schools are a method of providing online students with practical, lab-based skills as part of their studies. Most residential schools are in person and are the only time when all students studying online come to classes together. Traditionally, residential schools are used to deliver hands-on learning in labs or fieldwork settings. However, residentials also offer unique opportunities for building professional skills, both as a direct set of goals or part of technical proficiency development. When used intentionally, they can include activities such as peer collaboration, live feedback, reflective practice, and structured professional tasks which mirror workplace expectations and allow students to practice key competencies in an applied setting (Beagon et al., 2018). For many students, especially those studying online, residential settings are one of the main learning environments that build relationships with peers and staff. These social and academic connections are not just supportive, but they are central to learning. Embedding these activities and skill development into short, intensive residentials helps ensure all students have access to meaningful professional development opportunities. By positioning professional skills development as a core part of residential programs, regional universities can play a vital role in producing work-ready graduates. These models not only support students in meeting graduate requirements but also in building the confidence and practical skills needed to succeed in their careers. This suite of learning activities is not just seen within higher education practice but is a key part of lifelong learning through engagement in conferences.

Conferences are widely recognised in professional and academic spaces as catalysts for development. In the context of engineering education, their purpose extends beyond the simple exchange of ideas as they create space for life-long learning. By contextualising a conference for students, it aids in stepping into the role of professional engineers. Attending, presenting, and engaging in structured interactions all support the development of key graduate capabilities, particularly in the areas of communication, collaboration, and lifelong learning. These experiences contribute to both skill development and professional identity formation (Kist, 2014). Informal elements like networking or workshop engagement further support the growth of professional competencies, offering students the chance to observe and participate in discipline-specific conversations and development. These settings encourage behaviours aligned with industry expectations, such as initiative, respectful communication, and reflective thinking (Chadha & Heng, 2024). In this way, conferences serve not only as learning opportunities but also as real-world simulations of professional engineering practice. This is particularly relevant when viewed through the lens of regional and online education, where access to industry environments may be limited (Long, 2020).

By combining residential schools, conference design and contextualising it to professional skill development, this study documents the design and activities of a hybrid student conference that aims to improve professional skill acquisition among third and fourth-year engineering students.

Conference Design

To support professional skill development in a hybrid engineering education context, the student conference was designed around a dual-stream structure, tailored to the specific developmental needs of third and fourth-year cohorts. The central theme, *"Engineering in the 21st Century: Research, Sustainability, and Technology"*, provided a cohesive focus for both cohorts while allowing for differentiated tasks, outcomes, and modes of participation. The hybrid model allowed third-year students to attend either online or in person, while fourth-year students were required to attend on campus. This design decision reflects the differing pedagogical priorities for each cohort based on the learning outcomes. There were four specific courses, and by association learning outcomes that were considered within the design. For the third-year students, their conference design was centred around research development, preliminary assessment of designs and professional learning from peers. The fourth-year conference was designed to fill any gaps in professional development that were self-identified before graduation. Whilst the two streams of the conference were designed to ensure that all elements of learning were supported, students had several sessions where they were able to self-select into their chosen session.

To emulate a real-world environment, the format was designed to mirror professional conference structures**,** using scheduled oral presentations, formal Q&A sessions, and structured feedback processes. Each student presented in a stream aligned to their cohort, while also being encouraged to attend sessions across both levels. This promoted inter-year learning and allowed participants to “choose their own adventure,” selecting presentations that matched their interests or professional development goals. This choice-based format supports student agency and engagement, which are key elements of authentic learning (Renaud-Assemat et al., 2023).

Third-year students presented a 10-minute talk focused on their literature review and proposed methodology for their upcoming final-year project. Their conference participation was designed to meet the following learning outcomes:

1. Reflect on professional skills and identify areas for development ahead of the final year.
2. Plan, prepare, and deliver a verbal presentation in English to a professional standard, using appropriate presentation aids.
3. Show initiative in communication with supervisors, technical staff, and peers.
4. Explain the purpose of a professional conference and evaluate peer presentations constructively.
5. Select and justify professional development activities, including those undertaken during the residential school, and reflect on their relevance to future practice.

Peer engagement was integrated through structured feedback forms and scheduled reflection artifacts. These experiences were intended to help students build presentation confidence, practice professional communication, and understand the expectations of final-year research and assessment. Fourth-year students delivered a 15-minute technical presentation followed by a live question-and-answer session. These sessions reflected the culmination of their capstone project work and were designed to meet a more advanced set of learning outcomes:

1. Prepare a written extended abstract to a professional standard.
2. Deliver a technical presentation on their own academic work using clear, engaging visual aids.
3. Defend and debate the technical content of their project in a professional forum.
4. Critically evaluate peer work and provide constructive feedback.
5. Reflect on the strengths and limitations of their academic preparation.
6. Articulate the need for continued professional formation post-graduation.

These sessions supported higher-order skills like critique, synthesis, and professional dialogue. Final-year students were also positioned as role models for younger students, fostering a culture of peer leadership and professional maturity. The hybrid structure was purposefully developed to address access and equity issues common in regional education. By allowing third-year students to participate remotely, the design ensured that students living in rural or remote locations could still engage meaningfully with peers and academic staff. This added an extra layer of complex scheduling and documentation to ensure that students engaging online could still demonstrate their learning. At the same time, requiring in-person attendance for fourth-year students ensured the

development of essential face-to-face professional communication and collaboration skills. This blended approach is consistent with best practices for hybrid learning and aligns with accreditation requirements for in-person engagement in engineering education. The model is also scalable, which was a key undertaking in the design. It can accommodate growth in student numbers and be replicated across different disciplines or year levels. Use of accessible technologies, such as Microsoft (MS) Teams, supported smooth delivery, while the structure offered authenticity.

Implementation

The 2024 Student Engineering Conference ran across five days and was scaffolded around four key activities: student presentations, professional and personal development (PPD) sessions, capability-building, and a formal showcase night. The conference was supported by a team of academics and professional staff and reinforced by an integrated digital infrastructure that enabled both in-person and remote participation through MS Teams. Due to technical limitations, Zoom was utilised for all hybrid sessions. Whilst full MS Teams integration was planned, the systems could not support five concurrent sessions. Shown below in Table 1 is the conference schedule.

Table 1: Conference schedule for the 2024 student engineering conference.

Monday						
Time	Stream 1				Stream 2	
8:15:9:00	Registration					
9:00-10:00	Conference Welcome					
10:00-12:00	Presentation Session 1 – Third year				Circular Economy and Sustainable Practice in Engineering	
	Civil	Mechanical	Electrical	Ag/Env		
12:00-12:30	Break					
12:30-2:30	Presentation Session 2 - Third year				Research Directions	
	Civil	Mechanical	Electrical	Ag/Env		
2:30-2:45	Break					
2:45-4:15	Presentation Session 3 - Third year				Belonging - Unpacking Diversity and Inclusion	
	Civil	Mechanical	Electrical	Ag/Env		
Tuesday						
9:00-10:30	Presentation Session 4 - Third year				Engineering Club Activity	
	Civil	Mechanical	Civil 2	Civil 3		
10:30-11:00	Break					
11:00-12:30	Presentation Session 5 - Third year				How to Interview, New Methods, Pit Falls and Resumes	
	Civil		Multi-disciplinary			
12:30-3:00	Project Meetings with Students					
3:00-6:00	4pm - 6pm Showcase Briefing - Selected Students Only				Break	
6:00-8:30	Student Showcase					
Wednesday						
9:00-10:45	Presentation Session 1 – Fourth year					
	Civil 1	Civil 2	Electrical	Mechanical 1	Mechanical 2	
10:45-11:00	Break					
11:00-1:00	Presentation Session 2 – Fourth year					
	Civil 1	Civil 2	Electrical	Mechanical 1	Mechanical 2	
1:00-2:45	Break					
2:15-4:30	Presentation Session 3 – Fourth year					
	Civil 1	Civil 2	Electrical	Mechanical 1	Mechanical 2	
Thursday						
9:00-10:00	Engineering your future - Moving up within EA					
10:00-11:15	Exit Interviews (fourth-year students must attend)			Stop Drop and Roll - Unpacking Empathy		
11:15-11:30	Break					
11:30-12:30	Using GenAI to Code			Ethical responsibilities, Code of Conduct, Professional Complaints Procedure		
12:30-1:30	Student networking function					
1:30-2:00	Break					

2:00-4:00	Industry Panel	
Friday		
9:00-10:00	Solving a world problem Part 1	
10:00-11:00	Generative Artificial Intelligence vs Engineering Ethics	How to succeed in industry - Skills, attitude and fortitude
11:00-11:30	Break	
11:30-12:30	Solving a world problem Part 2	
12:30-2:00	Conference close, conference photo and networking BBQ	

Student presentations

Student presentations formed part of the central assessment and learning activity of the conference. Third-year students presented ten-minute summaries of their literature reviews and proposed research directions across five sessions held on Monday and Tuesday. These presentations served as a preparatory step toward their final-year projects, with a focus on clarity of communication, planning, and critical engagement with technical literature. Third-year students were then required to provide peer feedback to other third-year students, as well as a forward-thinking reflection for three of the fourth-year student presentations.

Fourth-year students delivered fifteen-minute presentations on Wednesday, reporting the outcomes of their completed capstone projects. These sessions emphasised advanced communication skills, critical analysis, and professional confidence. Noting that there was no parallel session during their presentations, as this was their final presentation for their degree, and as such, deserved an audience.

Academic staff were present during all presentations, which were structured like a typical conference, with a chair responsible for welcoming presenters and managing the timing of activities. Each presentation was assessed by two academics, the chair and a secondary marker with expertise in the relevant field. This was why presentations were grouped, for the most part, by discipline. While it was originally intended that students would not be limited to their own discipline, any alternative arrangement proved logistically unfeasible. To ensure a cross-disciplinary perspective, students were required to attend at least one presentation session outside their own discipline.

Professional and Personal Development (PPD)

PPD activities were embedded across the conference program and were a formal requirement for all students, regardless of year level. These sessions were designed to promote broader understanding of the engineering profession and develop key competencies. By designing them to be interactive, they can be repeated in future years with a different conference theme and still be relevant for students who have undertaken this offering. Key elements: project meetings, EA upskilling session, networking function, industry panel and solving a world problem. These sessions were a requirement of the program and were intentionally designed to allow for the development of life-long learning, student and staff networking and applying real-world solutions to wicked problems (Lee et al., 2021).

Engineering Your Future – Moving Up Within EA

This session provided a comprehensive guide to career advancement through professional engineering accreditation. Topics included Engineers Australia's registration pathways, competency standards, and long-term career development strategies. The session encouraged students to think proactively about their professional trajectories and introduced the frameworks used to assess and support engineering practice throughout a career.

Student Networking Function

This dynamic session provided a platform for third and fourth year engineering students to connect in a relaxed, yet structured networking environment. Designed to encourage collaboration across year levels and disciplines, the event uses a speed networking format to facilitate quick, meaningful interactions through guided prompts. The session supported community building within

the engineering cohort and promoted the development of professional communication and interpersonal skills.

Industry Panel
An open Q&A forum where engineering professionals from diverse sectors shared personal experiences and insights into the realities of industry life. The panel discussed career pathways, adapting to workplace expectations, and emerging trends in engineering practice. This session provided students with practical advice, mentorship, and the opportunity to connect theoretical knowledge with industry realities.

Solving a World Problem (Parts 1 & 2)
These two integrative sessions challenge students to apply their knowledge and skills to address a complex, global engineering issue. Participants worked collaboratively to develop a feasible, interdisciplinary solution, considering ethical, social, and environmental considerations to a problem without a solution. The sessions aimed to synthesise the conference's key themes, Research, Sustainability, and Technology, into actionable problem-solving experiences.

Capability Building and "Choose Your Own Adventure" Sessions

To allow for a more authentic experience, there were sessions that ran in parallel with one another and with the presentations. This gave a feeling of a conference as it was a "choose your own adventure" structure, which allowed students to tailor their experience based on individual interests and development goals. These sessions were aligned with the three conference themes of technology, sustainability and research. The technology theme was focused on two sessions around using GenAI in practice. The research sessions were more tailored towards exposure rather than advanced research methods or topics. Sustainability is focused on two aspects. The first was in the traditional sense, with a two-hour interactive session on the circular economy. The second was sustainable engineering, unpacking human emotions such as empathy, ethics and career development.

Circular Economy and Sustainable Practice in Engineering
This session explored the intersection of engineering practice and sustainability through the lens of the circular economy. Participants were introduced to real-world case studies demonstrating how engineering solutions can be designed with resource efficiency, lifecycle thinking, and environmental impact. Discussions spanned across civil, mechanical, electrical, agricultural & environmental disciplines, encouraging students to consider how sustainable innovation can be embedded into traditional engineering workflows.

Research Directions
In this session, the university's research landscape was brought to the forefront, highlighting key facilities, infrastructure, and ongoing projects across multiple engineering disciplines. It offered students a closer look at how academic research contributes to solving real-world problems, while also demonstrating opportunities for student involvement, collaborative experimentation, and multidisciplinary partnerships.

Belonging – Unpacking Diversity and Inclusion
Using interactive, hands-on activities, this session delved into the concepts of diversity, equity, and inclusion within engineering teams and educational environments. Participants explored the impact of cultural, gender, and experiential diversity on innovation and team performance.

Engineering Club Activity
Designed as an interactive team-building exercise, this workshop aimed to strengthen the social and professional bonds among engineering students through the Engineering Club's initiatives. Students were encouraged to participate actively and consider how such initiatives enhance their academic experience.

How to Interview: New Methods, Pitfalls, and Resumes
A targeted masterclass dedicated to improving students' employability and career readiness. It covered modern interviewing techniques, including behavioural and technical interviews, as well as

strategies to overcome common challenges. Additionally, the session provided actionable tips on writing effective resumes tailored to engineering roles. The goal is to prepare students with the tools and confidence needed to enter competitive job markets.

Stop, Drop, and Roll – Unpacking Empathy
This session explores empathy as an essential quality for modern engineers. Participants reflected on how empathetic listening and understanding of stakeholder perspectives enhance ethical decision-making, user-centred design, and collaborative work. By reframing empathy as a technical competency, the session seeks to revalue its role in professional engineering conduct.

Using GenAI to Code
This interactive session introduces generative artificial intelligence (GenAI) as a transformative tool in engineering development. Students were guided through practical demonstrations that show how GenAI can assist in writing, debugging, and optimising code. The session also considers the implications of AI-assisted development for creativity, productivity, and the future of engineering education and practice.

Ethical Responsibilities, Code of Conduct, and Professional Complaints
Focusing on professional ethics, this session outlined the core principles and behavioural expectations defined by the engineering profession. It introduces students to formal codes of conduct, procedures for addressing misconduct, and the broader ethical challenges engineers may face. Emphasis is placed on integrity, accountability, and the social responsibilities inherent in engineering roles.

Generative Artificial Intelligence vs Engineering Ethics
An exploratory session that examines the ethical implications of using GenAI in engineering practice based on the work detailed by (Nikolic et al., 2025; Quince & Nikolic, 2025; Quince et al., 2024a; Quince et al., 2024b). Through interactive discussion, students assess the alignment of AI applications with professional codes of ethics and consider how engineers can use such tools responsibly. The session encouraged critical thinking about the balance between innovation and accountability in the age of GenAI.

How to Succeed in Industry – Skills, Attitude, and Fortitude
This career-focused masterclass aims to equip students with the essential attributes needed to thrive in the engineering industry. Emphasising the importance of professional attitude, resilience, and a growth mindset, the session delves into what employers look for beyond technical expertise. Topics include navigating early career challenges, building a personal brand, and continuously developing professional skills.

Students were expected to attend a minimum number of the capability-building sessions and submit written reflections on how these experiences contributed to their professional growth. This model supported learner autonomy and helped students build a portfolio of capabilities in areas such as teamwork, innovation, and leadership, competencies that are difficult to develop in traditional classroom settings but critical for future practice.

Showcase

The Tuesday evening poster presentation showcase represented a highlight of the conference, offering fourth-year students a semi-formal platform to visually communicate their capstone project outcomes and engage in professional dialogue with peers, academic staff, and industry guests. Each student prepared a poster summarising their research and was available throughout the evening to discuss their work in a conversational setting. This event complemented the formal oral presentations by fostering a more relaxed but still purposeful form of communication, mirroring real-world industry forums and exhibitions. In addition to its role as an academic showcase, the evening also served as a celebration of student achievement across the year. The atmosphere encouraged connection and reflection, allowing students to share their work not only with assessors but with the broader university community. Importantly, the event remained accessible to remote attendees through a live-streamed broadcast via Zoom.

Given the limited resources typical in the current higher education climate (Kassem & Mitsakis, 2025), the event was delivered without an external events team. Instead, the broadcast was designed and delivered by the author. The setup incorporated three distinct live video perspectives: a fixed stage camera for opening remarks and award presentations, a seated interview area where students gave informal summaries of their work, and a mobile “roving” camera (created using a mobile phone mounted to a shoulder rig) which provided an immersive, real-time view of the event floor. This creative, low-cost setup helped ensure that remote participants could meaningfully experience the atmosphere and flow of the evening, enhancing the inclusivity and professional quality of the showcase.

Technology and Facilitation

Microsoft Teams served as the central organisational hub, facilitating communication and coordination throughout the event. Each student cohort was enrolled in a dedicated Teams site titled StudyDesk 2024 SoENG Student Conference, which contained all essential information and links. With students enrolled in various courses, effective communication was crucial for the success of the week-long residential school. Within the MS Teams environment, several clearly labelled channels guided participation: *Start Here*: Provided onboarding information and instructions for getting set up, including key communications and links to coursework. *All Things Conference Schedules*: Housed the complete conference schedule, attendance expectations, and access to peer feedback forms. *Talk to a Member of the Conference Team*: Acted as a help desk channel, enabling students to directly communicate with conference organisers for support. *Request a Change in Presentation Title*: Allowed students to manage presentation metadata in case of last-minute edits, also serving as final thesis titles if changes were not communicated. *Let the Team Know You Missed Your Presentation*: Offered a formal communication channel for reporting absences and outlining steps to catch up. *Talk with Your Peers*: Functioned as a general discussion space, promoting informal peer-to-peer engagement and professional socialisation.

Zoom was used for all live session streaming. Each physical presentation room was connected to a unique Zoom link, posted within the relevant Teams channels, allowing online students to participate in real-time. This integration of Teams for planning and community, with Zoom for synchronous delivery, enabled a professional and accessible hybrid experience. The digital infrastructure facilitated easy navigation between sessions, real-time updates, and centralised access to resources such as schedules, presentation links, and feedback forms. This design proved particularly effective for students in remote or regional areas, supporting inclusivity, accessibility, and scalability.

Lessons Learned and Recommendations

The most valuable takeaway from the conference was the strength of the dual-stream structure and the flexibility it afforded students. Allowing students to engage across streams and choose sessions based on their interests fostered autonomy, created peer-learning opportunities, and reflected real-world professional environments. Moving forward, expanding to three parallel streams and better pacing could further enhance this model.

Hybrid delivery remains a work in progress. While Teams functioned reliably and supported coordination well, Zoom introduced more friction than expected. The lack of engagement from some staff with online participants also limited the effectiveness of the hybrid model. With more time and resources, both the technical setup and staff training could be improved to ensure equitable experiences for remote and in-person students.

Despite these challenges, the conference format itself proved highly effective. The simulation of a professional conference, complete with keynote speakers, parallel sessions, poster presentations, and structured networking, was well received by students and created a strong sense of occasion for graduating students. Students took the format seriously and appeared to recognise its value in preparing for professional practice. The poster showcase, while limited in scale, emerged as a major highlight. Future iterations could expand this to include all students, stream the event to

industry partners, and include moderated panels to facilitate broader discussion. The success of the conference was due not to external funding but to thoughtful planning, practical technology, and student willingness to engage. Other institutions could replicate this model by focusing on these core elements and adapting it to their own capacity and context.

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