Criterion 4 **Innovation & leadership that has influenced & enhanced learning, teaching & student experience.** *For leading innovative curriculum design & implementing authentic assessments to enhance students' feedback literacy & professional identity development.*

Overview: I joined UTS in 2018 as a tutor whilst doing my PhD, then taught a wide range of mechanical engineering subjects, focusing on flipped learning to enhance student engagement and real-world application. Upon submitting my PhD thesis, in June 2021, I was recruited to a leading role in curriculum development at School of Mechanical and Mechatronics Engineering (MME). I was involved in influencing and collaborating with academics to redesign and introduce innovations in their subjects. This includes designing resources, upskilling subject coordinators, leading workshops, and contributing to the design and delivery of 8 new subjects. In late 2022 I was offered a lecturer role, I've since been subject coordinator and further refined assessments and innovations in one of the new subjects, 41059 Mechanical Design Fundamentals Studio 1 (MDFS1). I also supervise both master's and undergraduate capstone students, applying the same innovative approach as in MDFS1; focusing on continuous documentation and reflection. My work and impact extend beyond UTS, with national and international educational collaborations, resource development, and presentations at professional forums. These efforts aimed at shaping a forward-thinking, globally relevant educational experience for future engineers.

Shown creativity & innovation: I continuously enhance my teaching practice through reflection, collaboration, & external feedback from both industry and academia. I use flipped learning & feedback for growth to create an engaging & student-centered educational experience [1,2]. These strategies have enabled me to support students' active learning & continuous development. My trajectory of creativity & innovations in engineering education reflects a continuous evolution of teaching practices prior to 2021. During COVID-19, I managed to implement an online metrology simulation to replace the physical lab for Manufacturing engineering & develop interactive PowerPoints for guided learning for students to understand complex concepts in Mechanical Design 2 – a resource appreciated by students & later adopted by new tutors. "*Anna was very helpful & the powerpoints were an easy way to cover the material*" – SFS 2020.

I collaborated with faculty on curriculum development projects, creating a standardised Canvas landing page & module template to enhance the student experience. These templates, along with resources, video instructions, assessment options & interactive H5P examples—designed based on scholarly literature, student feedback, & industry experience—are available on my personal Canvas site for academic use. The template was adopted by 8 subjects I directly worked on, & at least 3 additional subjects within the school. My site has been accessed by academics & faculty members collectively spending over 300 hours. "*Anna played a key role in structuring the approach for Dynamics Systems A & B, a project we began in 2022. Her custom-designed templates & active learning strategies, including H5P, were integral. We strived for best practices, ensuring a consistent approach across multiple subjects within the discipline. Recently, we submitted our work to AAEE 2024 in a paper titled 'Reflections on Mastery Exams, Viva-Voces, & Projects for Assessment Authenticity in Engineering Higher Education.'*" – Associate Professor Ben Halkon, UTS.

In December 2022, I introduced ChatGPT to the Faculty of Engineering & Information Technology (FEIT) at UTS, developing resources for assessment design & content delivery. "*Anna brought ChatGPT to the lips of academics before it 'became the hot topic on everyone's lips'. She is collaborating world-wide on this topic & is integrating ChatGPT into her assessment tasks & providing guidance on how to make the most of it for educators & students.*" - Beata Francis, Academic & Curriculum Development Coordinator at UTS, 2023. Driven by a commitment to advancing both academic & student professional capabilities, I was an early adopter of integrating GenAI into my course. I allow students to freely use GenAI in their design process, encouraging them

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[1]Bergmann, J., & Sams, A. 2012. Flip your Classroom: Reach every student in every class every day. Washington DC: International Society for Technology in Education.

[2] Hattie, J., & Timperley, H. (2007). The Power of Feedback. Review of Educational Research, 77(1), 81-112. https://doi.org/10.3102/003465430298487
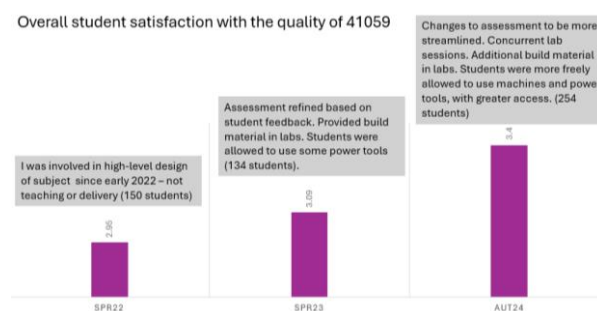
to validate their findings & reflect on their engagemen. I shared a video guiding academics how to designing assessments through an LX blog post. My early observation of students' critical engagement with GenAI was cited in a TEQSA webinar & in an AARE blog. My work has also been widely disseminated via LX Blog posts, impacting over 3,000 academic staff at UTS & beyond. In January 2024, I led a workshop on Feedback Literacy & GenAI in higher education at the Swedish University of Agricultural Sciences. I am also involved in the AAIEEC project cluster that is developing & investigating a framework for integrating GenAI into project-based learning.

Designing Formative Sprints for feedback Literacy & Professional Capabilities: In coordinating MDFS1, I've introduced innovative pedagogy to foster dialogic feedback[3] & build students' feedback literacy[4] through formative sprints. Feedback literacy, as defined by Carless & Boud (2018), is "the understanding, capacity, & dispositions needed to make sense of feedback & use it to enhance one's work & learning." This first studio experience for mechanical & mechatronic engineering students involves designing a robot for the Warman Challenge. The 12-week semester is divided into 3-week sprints, modeled after agile framework. Each sprint ends with a design review where teams present their progress & discuss how feedback guided their decisions. The first three reviews are formative, & the final review is graded, requiring integration of all prior feedback.

Students individually submit an Engineering Design Portfolio showcasing four artefacts documenting their design & decision-making processes. Throughout the semester, guidance & feedback is provided to create these artefacts through scaffolded design exercises. This portfolio serves both as a tool for assessing their skills & as a resource when seeking internships opportunities. Students also document their learning in an Engineering Design Journal (EDJ). This notes their progress, learning, & reflection on their studio experiences to help develop their critical thinking skills & prepare them for future engineering challenges as reflective practitioners.

The formative sprints prioritise learning & feedback over grades, supporting Sadler's (2010) concept of assessment fidelity, which stresses accurately reflecting a student's achievement in their final grade[5]. By focusing on feedback, the sprints ensure grades reflect students' demonstrated understanding at the end of the subject rather than accumulation of marks. Additionally, the sprints, scaffolded EDJ, & tutor engagement are designed to foster reflection-in-action during activities & reflection-on-action afterward, encouraging continuous learning & improvement[6]. My paper on *Formative Sprints to enhance feedback, learning, & fidelity in practice-based activities*, received the Highly Commended Best Practice Paper award at the 2023 AAEE Conference[7]. I apply these findings to teach students about feedback literacy & the importance of actively engaging with feedback.

Positively impacted on student learning, student engagement & overall student experience: The use of industry-related context & practices is embedded in MDFS1, preparing students for their first career opportunities. The 2024 SFS highlights the effectiveness of the student-led approach in fostering autonomy & ownership in learning. *"I also appreciated that the learning & work were student–led, allowing me to explore & develop my skills independently. This approach fostered a sense of ownership & responsibility, enhancing my overall learning experience. Additionally, the project tested my capability to build a robot within a short timeframe. It challenged me to manage a team of people I had not worked with before, which helped me develop valuable leadership & teamwork skills."* This aligns with the goal of

Overall student satisfaction with the quality of 41059

I was involved in high-level design of subject since early 2022 – not teaching or delivery (150 students)

Assessment refined based on student feedback. Provided build material in labs. Students were allowed to use some power tools (134 students).

Changes to assessment to be more streamlined. Concurrent lab sessions. Additional build material in labs. Students were more freely allowed to use machines and power tools, with greater access. (254 students)

SPR22   SPR23   AUT24

[3] Carless, D. (2012). Trust and its role in facilitating dialogic feedback. In D. Boud & E. Molloy (Eds.), *Feedback in higher and professional education: Understanding it and doing it well* (pp. 90-103). Routledge.

[4] Carless, D., & Boud, D. (2018). The development of student feedback literacy: Enabling uptake of feedback. *Assessment & Evaluation in Higher Education, 43*(8), 1315-1325. https://doi.org/10.1080/02602938.2018.1463354
[5] Sadler, D. R. (2010). Beyond feedback: developing student capability in complex appraisal. *Assessment & Evaluation in Higher Education*, *35*(5), 535–550. https://doi.org/10.1080/02602930903541015

[6] Schön, D. (1983). The Reflective Practitioner: How Professionals Think in Action. London: Temple Smith.
[7] Lidfors Lindqvist, A., Willey, K., & Lidfors, L., & Francis, B. (2023). *Formative sprints to improve feedback, learning, and fidelity in practice-based activities*. In Proceedings of the 2023 Australasian Association for Engineering Education Conference (AAEE 2023). Gold Coast.

preparing students for real-world challenges, where independent problem-solving & collaboration are key. Student satisfaction is often lower in PBL, especially in multi-disciplinary units & classes with more than 120 students[8]. Hence, each semester I close the feedback loop by embedding improvements based on students' feedback. *"The staff are very friendly, smart & eager to help the students. I have learned so much about [MME] systems in this subject through experience. I appreciate how the subject has been made significantly more accessible with each semester (decreasing importance of robot performance on grade, increasing availability of materials, etc.), as well as the actions staff have taken within this semester. Overall a very valuable experience for [MME] students."*-SFS AUT24

Some students find unmarked deliverables pointless, whilst others recognise their value in their learning process. *"I like how the work was split between the sprints, which made this very large task much more manageable & approachable, as well as the constant feedback to help us improve the overall project. It was also a great opportunity to learn new skills & work on an industry–like project."* –SFS, AUT24. Students appreciate PBL more in hindsight[8], which resonates with students in later studios: *"I found MDFS1 challenging due to its unique approach, but the skills I gained helped me engage effectively with feedback in the Embedded Mechatronics Studio & I got a Distinction"*.

Leading Studio Design & Transferable Pedagogy: I've been recognised by colleagues, & my initiatives have established a consistent approach to studio learning. Recently I contributed to two later studio subjects, Embedded Mechatronics Studio (EMS) & Mechanical Systems Design Studio 1 (MSDS1). *"Anna's innovative studio framework that she developed for MDFS1 significantly streamlined the design of the Embedded Mechatronics Studio by providing a strong foundation that focuses on enhancing the student experience, solidifying the students' learning outcomes, & incorporating feedback in the learning process."* – Senior Lecturer Michael Ruppert, UTS

I've also collaborated on an international level: *"I have had the pleasure of collaborating with Anna on the development & improvement of two project-based courses, & I can confidently say that she is an exceptional educator & innovator. Her expertise in course design, particularly with her agile approach in 41059, served as a significant inspiration for my own master's course, 1TS334 Industrial Project with Extended Reality, at Uppsala University… Anna's insights & feedback have led to significant improvements in my course, which have been well-received by students. Her willingness to share her knowledge & her supportive nature make her a valuable colleague & partner in education."* – Assistant Professor Kaveh, Uppsala University, Sweden My work has been published in blogs & I've been invited to speak at events such as LX labs & School of Civil Engineering. *"Anna was invited as an expert in studio learning & feedback literacy to inspire academics at the School of Civil Engineering. Her innovative approach, using feedback-driven sprints, has transformed student learning, setting a new standard for continuous improvement & success in engineering education."*-Professor Behzad Fatahi, Deputy Head of School T&L

In Autumn 2024, four of my capstone students were selected from over 1000 peers to present their projects at the FEIT showcase. One student won the UTS Rapido Innovator Award, another was runner-up & the 3rd won the UTS Alen Chappel Award. These awards are a testament to the effectiveness of the teaching strategies implemented in MDFS1. *"The steps taken in MDFS1 are the steps I am presently now taking within my work to achieve a project…I have adopted the methodology from MDFS1 & applied that to my Capstone project thinking… to get continual feedback. Having the background in MDFS1 makes tackling projects appear more achievable..."* – Capstone Student. *"Anna's emphasis on reflection throughout MDFS1 allowed me to gain deeper personal insights & actively reflect & improve throughout the project, rather than waiting until the end—a practice I've successfully continued in my capstone & other projects."* – Capstone Student

[8] Miao, G., Ranaraja, I., Grundy, S., Brown, N., Belkina, M., & Goldfinch, T. (2024). *Project-based learning in Australian & New Zealand universities: current practice and challenges. Australasian Journal of Engineering Education, 1–13.* https://doi.org/10.1080/22054952.2024.2358576