

Elevate Australasia

 AdvanceHE

Equity and inclusion



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From the Editor

We are delighted to share the third set of case studies as part of the Elevate Australasia program in 2025-26. The Elevate program was designed to support institutions around the world with the challenges they face in educational excellence and student support. The Australasia edition ran in the context of evolving student needs and with the challenge of new regulatory requirements specific to the Australasia region.

As part of the program we invited submissions to a digital showcase of case studies, demonstrating good practice initiatives from across Australasian higher education providers that could be adapted into good practice across the region. In the second edition of the showcase, we share five case studies which look at programs and schemes which demonstrate equity and inclusion good practice.

Sunshine Coast's Toby Gifford tackles inclusive digital design through microcredentials; Deakin University contributes four case studies to this theme: gender equality and violence prevention, verifiable AI-assessment design, widening STEM participation and fieldwork-based engineering assessment, together spanning universal design, co-design and authentic, inclusive assessment practice.

We'd like to thank all of the authors who contributed to the publication of these insightful, innovative and impactful case studies.

**Dr Elliott Spaeth, Senior Consultant, Inclusive Education,
Advance HE**



Embedding verifiable attribution in assessment design to support learning assurance in the AI era

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Background

The rapid uptake of GenAI has significantly altered how written assessment operates in higher education. Students can now produce fluent academic writing with references that appear credible, even when the relationship between claims and sources is weak or unverifiable (Orduña-Malea & Cabezas-Clavijo, 2023; Gravel et al., 2023; Mugaanyi et al., 2024). This creates a fundamental challenge for assessment, as references can no longer be assumed to demonstrate meaningful engagement with the literature. This challenge became evident in my teaching across undergraduate and postgraduate units in architecture and construction management at Deakin University. These units require students to construct evidence-based arguments and justify decisions through scholarly sources.

The cohort is highly diverse, with approximately 70% international students, many from non-engineering backgrounds, making explicit scaffolding of academic writing and referencing essential (Emerson et al., 2005). Across these units, around 80% of students experienced difficulty with conventional referencing. Many submissions included incomplete or inaccurate referencing, such as missing or inconsistent in-text citations, errors in reference details, or vague attribution, for example citing “unit materials”.

Others relied on superficial or unverifiable sources, including fabricated references, and lacked a clear connection between claims and evidence. This created uncertainty for markers and highlighted a misalignment between intended learning outcomes and what could be confidently assessed.

The issue therefore reflects a limitation in assessment design rather than simply student behaviour. Traditional referencing supports attribution but does not clearly show how evidence informs specific claims, particularly in AI-supported workflows (Neville, 2012; Friedman, 2024). Detection-based approaches are limited and generally not recommended, as they act after writing, fail to keep pace with evolving AI tools, and offer little insight into how evidence is selected or applied (Lodge et al., 2023). In addition, reliance on detection and surveillance-oriented practices can undermine trust and does not support learning-focused assessment. In response, a new referencing approach was developed to make evidence use visible and directly verifiable, without relying on detection or surveillance. This began as Smart Context Citation (SCC) and later evolved into the ISNAD Research Workspace, with the aim of repositioning referencing as an integral and assessable component of learning.

Approach

The intervention focused on modifying how students demonstrate evidence use within existing assessments rather than introducing a new assessment type. Students were not required to complete different tasks; instead, the emphasis was placed on making the relationship between claims and evidence explicit.

The SCC approach enables students to extract specific evidence from sources, such as key statements or data, and link these directly to in-text citations. These extracts can be taken from online sources or uploaded PDFs. The system embeds this extract within the in-text citation as a hyperlink, allowing both students and markers to directly verify that the source exists and supports the claim. This process does not add additional workload, as selecting and interpreting evidence is already required for the task; instead, it makes this process explicit by allowing students to capture and link the relevant information directly within the system. In practice, referencing shifts from a static list to a transparent and inspectable process embedded within the text. For example, instead of citing a source generally, a student provides a linked extract showing the exact passage supporting a specific sentence. This enables markers to assess evidence immediately and encourages students to engage more actively with reading, selecting, and evaluating sources, as illustrated in Figure 1.

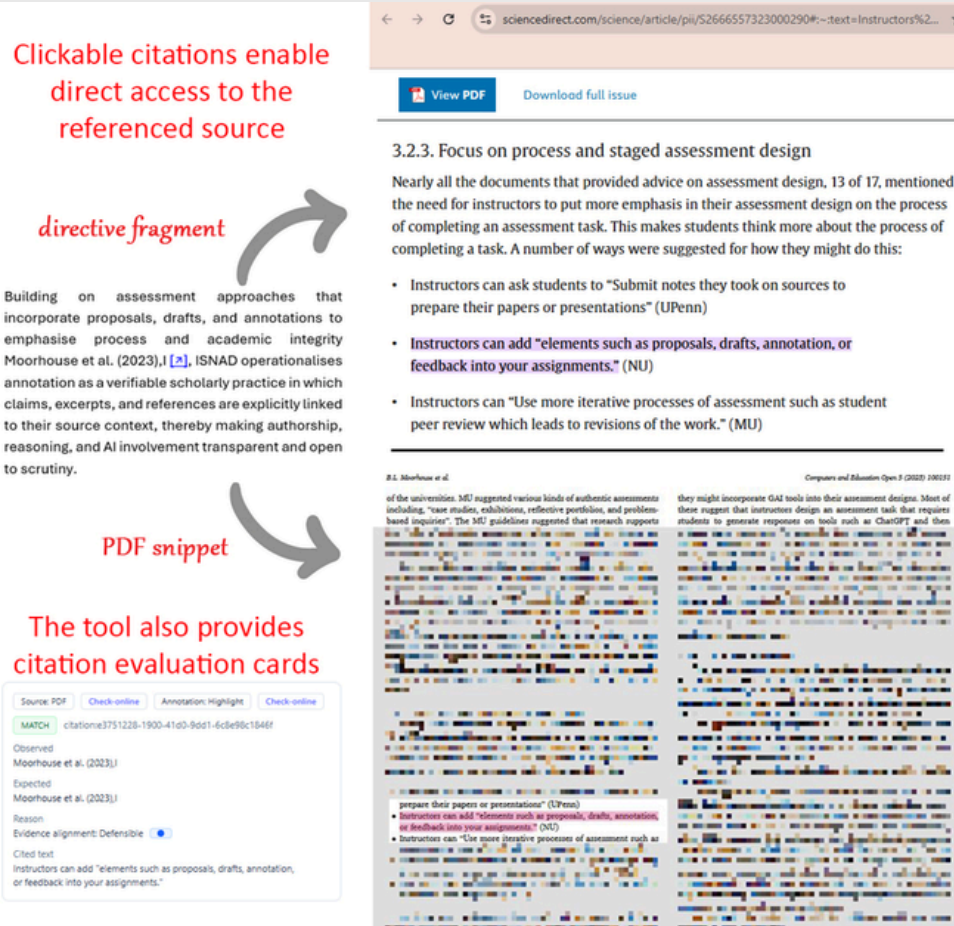


Figure 1. Example of Smart Context Citation (SCC), showing how an in-text citation links to a specific source passage in a PDF or online article, enabling direct navigation to and verification of the referenced evidence. The interface also includes an evaluation panel that supports assessment of citation suitability and alignment between the claim and the source.

The approach was piloted in SRT257 (undergraduate) and SRT757 (postgraduate), involving 324 students in total, as an optional pathway alongside traditional referencing. Students could either continue with conventional referencing or adopt SCC, which supports the use of AI as an assistive tool rather than a content generator, requiring students to read, evaluate, and explicitly link evidence to their claims. Implementation was supported through short instructional resources, including step-by-step demonstrations and examples, guiding students on how to use the system to select, link, and explain evidence. Teaching teams were also briefed to ensure consistency in marking and feedback.

The design aligns with constructive alignment, as evidence use is already embedded in the learning outcomes and is made visible in assessment (Biggs & Tang, 2020). Universal Design for Learning supported accessibility for diverse learners (CAST, 2024), while Cognitive Load Theory guided the reduction of formatting complexity to allow focus on evaluating and applying evidence. Following the pilot, SCC was extended into ISNAD (Integrated System for Networked Attribution and Documentation), which builds on this approach through additional layers, see Figure 2.



Figure 2. ISNAD five-layer framework, illustrating the progression from digital referencing to citation context, authentication, evaluation, and provenance

Outcomes

The primary outcome was a shift in how students understood and used attribution in their writing. Referencing moved from a formatting task to part of constructing an argument. Students who adopted SCC produced more transparent and structured work, with claims directly supported by traceable evidence rather than references being added retrospectively. This made evidence visible within the text and supported more critical engagement from both students and markers.

Adoption data from SRT257 showed that 28% of students used SCC, while 72% continued with traditional referencing. Despite this partial uptake, the impact on academic integrity in referencing was substantial, as summarised in Table 1. The results indicate a clear improvement in the appropriateness and reliability of evidence use, particularly among students who had previously demonstrated academic integrity issues. Students using SCC engaged with a greater number and a more diverse range of sources, indicating deeper engagement with the literature.

Student feedback reflected this shift. Many described the approach as clearer, fairer, and more intuitive, particularly when using AI tools. Rather than focusing on formatting rules, students reported that SCC helped them understand the purpose of referencing as evidence within an argument and enhanced the quality of their reports.



This was especially beneficial for students with limited familiarity with academic conventions, as it provided transparent examples of effective evidence use and reduced pressure by clarifying expectations (Emerson et al., 2005; Kift, 2009).

There were also practical gains for marking. Markers reported reduced marking time and improved consistency in evaluating evidence, as references could be verified quickly through linked source content or via the document key. The visibility of evidence reduced ambiguity and supported more confident judgement, which is particularly important in the context of AI-generated writing. While verifiable citation trails do not eliminate all integrity issues, they provide more inspectable evidence and support more accountable academic practice (Bittle & El-Gayar, 2025).

Academic Integrity Level	SCC (%)	Traditional Referencing (%)
Excellent	63	13
Good	18	36
Requires improvement	19	51

Table 1. Academic integrity in referencing by approach



As with many new initiatives, the work continues to evolve through ongoing piloting and refinement. The development of ISNAD extends SCC through additional layers of evaluation, provenance tracking, and automated comparison between claims and evidence, supported by further research-informed features. These developments strengthen the visibility and verifiability of evidence use within assessment. They also highlight the potential for referencing to function as an integral component of learning rather than a purely formatting task.

For disciplines reliant on evidence-based writing, this offers a practical and transferable approach to strengthening both student learning and confidence in assessment. Further development is ongoing, with the tool available for pilot use and cross-disciplinary exploration at www.isnadresearch.org.

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Development of a microcredential in inclusive digital design

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Background

Inclusive digital design is an area of growing urgency. Regulatory frameworks and ethical expectations around accessible digital practice are strengthening across Australia and internationally, yet formal training opportunities in digital accessibility remain scarce. At the same time, universities are expanding their microcredential offerings, providing short, flexible qualifications that working professionals can complete alongside employment and apply directly in their workplace. This convergence created an opportunity: to develop a high-quality microcredential in inclusive digital design that addressed a genuine skills gap in the workforce.

This case study describes the design and delivery of that microcredential, developed at the University of the Sunshine Coast in collaboration with Australian peak bodies for digital accessibility. The course was designed as an intensive aimed primarily at working professionals seeking skills in accessible and inclusive digital design. The central challenge was to develop a course that not only taught accessibility principles but embodied them in its learning design and delivery — the course itself functioning as a practical demonstration of its content.



Co-design is a key tenet of inclusive design, and “nothing about us without us” is a central maxim of disability studies. This microcredential was co-designed with the Centre for Accessibility Australia, the national peak body for digital accessibility, with input from Deaf Australia, Deafblind Australia, and consultants with lived experience of disability.

The course design was informed by research on authentic assessment (Wiggins, 2014), teacher presence in online learning environments (Lynch & Pappas, 2017), and structured learning design (Smith, 2000). It also drew on principles of Universal Design for Learning, particularly research highlighting the benefits of designing learning materials that support neurodiverse learners (Wood, 2021; Cole et al., 2024).

Approach

The microcredential was developed by a multidisciplinary team comprising four academics, three learning designers and a digital designer. The course convener led the project, coordinating pedagogical development, industry partnerships with national accessibility organisations, and collaboration across the design team.

Given the scale of the content and tight development timeframe, a structured module template was introduced to ensure consistency across modules developed by different academics. Each contributor developed their content within this shared framework. The template embodied several key learning design principles, summarised in Table 1 below.

Module element	Learning design purpose
Opening orientation video (convener)	Establishes teacher presence; frames content and goals
Short explanatory videos (specialist academics)	Multimodal delivery; manageable content units accessible alongside employment
Concise written companion text	Supports diverse learners; reinforces video content
Active learning activity (introduction)	Activates prior knowledge; supports engagement
Active learning activity (summary)	Consolidates understanding; supports retention
Summary video (convener)	Closes the loop; reinforces key takeaways and links to next module

Table 1. Learning design purpose of module elements.

Consistency in structure supported accessibility for neurodiverse learners, for whom predictable learning environments can enhance engagement (Wood, 2021). This approach aligns with Universal Design for Learning principles suggesting that learning environments designed for accessibility benefit all learners (Cole et al., 2024). Inclusivity was therefore embedded not only in the course content but in the learning design itself.

Short video segments and concise text blocks created manageable units of learning that could be completed alongside full-time employment. The microcredential was delivered intensively to a cohort largely composed of working professionals, and authentic, workplace-relevant assessments enabled students to apply accessibility principles directly within their own professional contexts.

Outcomes

The project demonstrated strong educational impact and received positive feedback from multiple stakeholders.

The learning materials received strong endorsement from the university's teaching support unit, which described the course as "a perfect example of how we can work well across boundaries to deliver exceptional learning experiences." Industry collaborators similarly praised the quality and design of the materials, describing them as a "gamechanger in teaching about accessibility." Senior university leadership also recognised the innovation and quality of the work.

Student feedback reinforced these evaluations. A striking pattern was the high proportion of self-identified neurodiverse students in the cohort, many of whom commented specifically on the accessibility and clarity of the learning materials. One student noted that the course structure — combining short videos with concise text segments — made the material significantly easier to engage with compared to traditional lecture recordings and textbook readings. These responses suggest that embedding accessibility principles directly into course design can significantly enhance learner engagement and comprehension across diverse cohorts.

Quantitative outcomes also reflected strong student success. Of the 56 students enrolled, 48 achieved a grade of Distinction or higher despite most studying while working full time. In exit survey feedback, students described the course as "exceptional quality" and emphasised its practical relevance and impact on their understanding of accessibility and disability inclusion.

A deliberate decision was made to extend the reach of this work beyond the enrolled cohort: a portion of the course has been made freely available online as a 'taster' course. This open offering has attracted over 1,000 enrolments, substantially increasing national awareness of digital accessibility and demonstrating the potential of microcredential content to serve a broader public purpose.

A key insight from the project is that inclusive learning design benefits all learners, not only those with identified accessibility needs. Embedding accessibility principles into the core structure of a course can significantly enhance engagement, clarity, and learning outcomes across diverse cohorts. The approaches adopted here — consistent module structures, multimodal content presentation, and strong teacher presence — are transferable to other disciplines and to online or intensive course formats more broadly.

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Contemporary scholarship in sexuality and relationships education

Claire Stonehouse, Deakin University

Background

The Australian government has prioritised gender equality and the reduction of gendered violence through The National Plan to End Violence Against Women and Children 2022-2032 (Commonwealth of Australia 2022). A key recognition within this plan is that respectful relationships and consent education act as a powerful prevention strategy for addressing violence against women and children; as such schools serve as critical sites for this, now mandated, educational approach.

This policy imperative is particularly evident in the state of Victoria, where The Respectful Relationships Education (RRE) program became a core component of the Victorian Curriculum subject Health and Physical Education (Foundation to Year 12) even earlier in 2016 (State Government of Victoria, 2025).

Existing RRE resources were updated in 2024, due to the rapidly changing landscape, and now implemented in government and Catholic schools across the state (State Government of Victoria 2026). All in-service teachers must maintain an awareness of RRE and work within whole of school approaches to implement.



Despite this mandate in schools, RRE remains absent from accreditation requirements for Initial Teacher Education (ITE) programmes. This gap is particularly significant given the rising global tide of authoritarian politics, which includes renewed forms of patriarchal backlash threatening the rights of diverse genders and sexualities, including children's access to comprehensive Sexuality and Relationships Education (SRE). Equipping pre-service teachers with confidence and capability in delivering RRE is therefore critical. When teachers receive quality preparation in ITE, schools require less intensive professional learning post-graduation, reducing dependence on external providers such as NGOs and enabling more sustainable, embedded practice.

Leading scholars in SRE research advocate for arts-based pedagogies as powerful tools for enabling young people and children to connect with one another and co-create ways of being that transcend narrow, prescriptive norms of gender and sexual life (Quinlivan, 2018; Renold & Timperley, 2024). These pedagogies offer young people voice and psychological safety to navigate the complexities and violences embedded within gendered and sexualised social norms.

This case study examines an undergraduate unit explicitly teaching Sexuality and Relationships Education (SRE). The unit serves as a third-year core offering within the Bachelor of Health and Physical Education and as an elective within the Bachelor of Education (Primary) degrees at Deakin University (Victoria). Students who participated were enrolled in one of three seminars, approximately 30 students each, across one Trimester of study (11 weeks).

Approach

This project draws on contemporary scholarship in SRE that engages with feminist new materialism, affect theory and queer theory, particularly guided by the work of E.J. Renold, a leading international scholar in gender, sexualities and relationships education. Renold et al.'s (2024) concept of 'post-qualitative, art-ful praxis' provides a methodological and theoretical resource that challenges conventional approaches to how research unfolds and generates knowledge. This allowed a seamless transition of research into practice. It also modelled inclusive pedagogies that addressed diversity in the classroom and allowed for maximum engagement with the learnings.



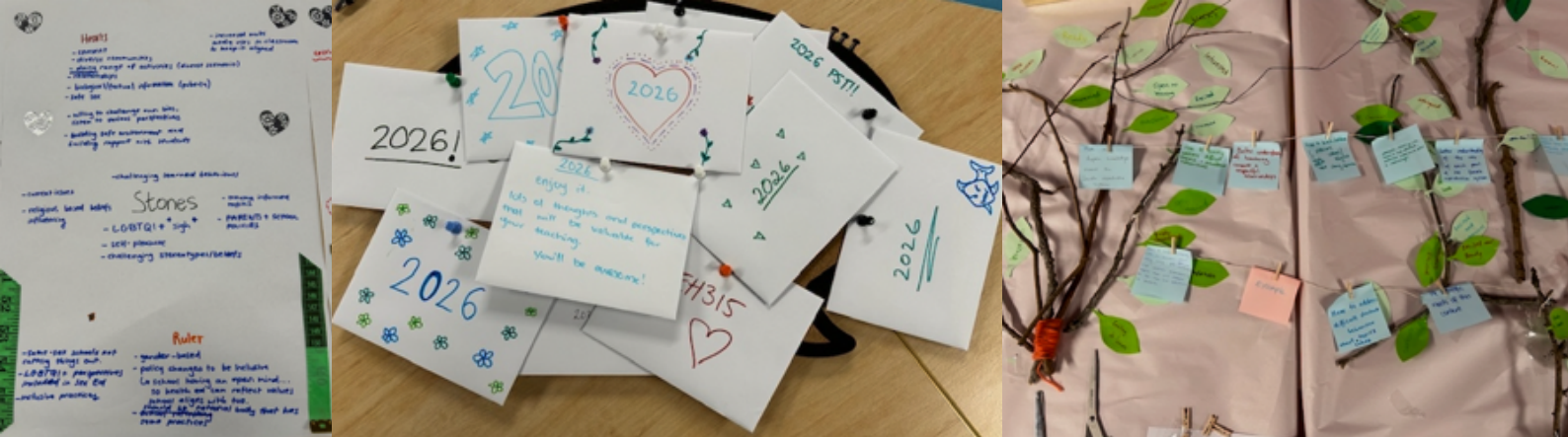


Figure 1. Arts-based pedagogies used in the ITE unit (Deakin University 2026): left - Stones, Hearts and Rulers; middle – letters to the next cohort; and right – trees as metaphors.

These theoretical frameworks enabled me to support continued learning for students and other staff teaching, as well as build my own core knowledge. I supported and guided students through art-based pedagogies from:

1. Renold's work (Renold et al 2024):

- Stones (what is still heavy) Hearts (what I am looking forward to) and Rulers (what rules need to be put in place or changed to ensure SRE is inclusive for all); and
- mapping whole of school approaches.

2. Sexuality Education Matters (2013) (ITE resource):

- building reproductive systems with craft items to understand how to teach inclusively about gender;
- drama role plays about decision making (pause, rewind, action); and
- poetry and song production.

3. Deakin University (2026) EEH315 Teaching Sexuality and Relationships Education:

- drama tram stops (affective empathy, intersectionality and safety in different environments).

4. New learning activities designed:

- making trees as metaphors to ground students' initial understandings of where they learned about SRE (roots), how they are feeling about learning/teaching SRE (leaves), and later in the course what questions they still have about SRE (notes pegged on washing lines that join the trees together); and
- writing letters to the next cohort.

Students also initially co-designed and agreed upon classroom agreements to set up safe spaces via trauma informed practices (Ollis et al 2013). One inclusion was the 'Opt Out rule' where students did not have to participate at any time during the Trimester if they didn't feel like it. Pedagogies were designed to directly model inclusive strategies for pre-service teachers to build relationships with students for engagement. The pedagogies, or their reactions to, were not assessed to enhance participation and engagement.



Outcomes

The feedback from the unit was overwhelmingly positive, both informal comments from students about the advanced levels of engagement they felt and that they observed in others, as well as in their reflection assessment pieces (where they were asked to reflect on their emerging teacher practice based on their learnings in the seminar, and/or comfort and confidence in teaching the topic). One student's reflection response that summed up the cohort:

“Overall, my attitudes have remained rooted in a belief in the importance of SRE. However, my practice related confidence has deepened, and my perception for what high quality, inclusive and relevant education looks like has broadened. I now understand SRE to be ... a contested site for competing political, social, and cultural interests. As such, SRE serves to address a wide range of social, economic, and moral issues (Allen, 2008). This explains why its scope is often limited to risk-avoidant education. However, this narrowness excludes areas that students themselves identify as important; SRE that addresses what young people define as more relevant is far more likely to engage them in its messages (Allen, 2008)”.

Attendance was high in these seminars and students looked forward to participating each week (informal feedback and in reflective journals). Students found the pedagogies were safer and more engaging than others they had experienced. As the Seminar Leader I observed that I didn't need to prompt the students as much as I usually would to continue discussion and get them thinking more deeply.



My weekly reflections enabled me to tailor the pedagogies to each seminar for maximum inclusion and engagement. Overall reflections have led me to include arts-based pedagogies in every unit I teach. The impact of addressing all learners' needs reinforces my professional values and use of a sex and ethics approach (Carmody 2009) I work within every day.

Moving forward, the seminar has also created a community of practice of educators many eager to, and some already enacting RRE in Victorian schools. This is exciting as there is the possibility to generate future research into practice when these pre-service teachers become in-service teachers and may be soon leading RRE in their schools.



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Using virtual reality as an immersive outreach tool in STEM education

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Background

Across Australasia, the transition to renewable energy systems and sustainable industries is driving increased demand for a future-ready STEM workforce. At the same time, many secondary school students demonstrate limited understanding of STEM career pathways, with aspirations shaped by incomplete knowledge of the labour market and available opportunities (OECD, 2020; Kang et al., 2023; DeWitt et al., 2014).

Broader national data further highlight ongoing challenges in STEM participation across the education-to-workforce pipeline (Australian Government Department of Industry, Science and Resources, 2025). Recent national initiatives emphasise broadening students' exposure to STEM careers, particularly among underrepresented groups (CSIRO, 2024; Australian Government Department of Industry, Science and Resources, 2025). Students' career awareness is often limited and misaligned with evolving workforce demands, challenging universities to support informed STEM transitions (World Economic Forum, 2023).

The REACH Outreach VR initiative was developed within Deakin University's Recycling and Clean Energy Commercialisation Hub (REACH), a cross-faculty initiative focused on renewable energy and sustainable technologies. The program addresses a key challenge: how to make complex, research-intensive STEM environments visible, accessible, and meaningful to prospective students, particularly in regional contexts with limited access to laboratories and industry facilities.

Immersive technologies such as virtual reality (VR) offer new opportunities to engage learners by providing experiential, context-rich environments that support exploration and interaction (Radianti et al., 2020; Makransky & Petersen, 2019; Parong & Mayer, 2021).



The VR application was designed for secondary students (Years 9–12) and provides virtual access to difficult-to-access research infrastructure across multiple Deakin campuses, including hydrogen, microgrid, battery, and solar car environments. Through 360° virtual environments and interactive exploration, students encounter real technologies and research contexts.

The development of these modules is informed by Social Cognitive Career Theory (Lent et al., 2000), particularly the role of self-efficacy and outcome expectations in shaping career interests. It also draws on research in situational interest and experiential learning, positioning immersive exposure to support connections between school subjects, university study, and industry roles (Makransky & Petersen, 2021; Makransky et al, 2020).

The REACH VR system is designed not only as a tool for engaging students but has embedded data collection to support associated research. Unlike traditional outreach programs that rely primarily on self-report surveys, the system captures behavioural interaction (eg navigation pathways, time allocation, interaction patterns) within authentic learning contexts. When combined with more traditional validated self-report measures, this supports the analysis of engagement, interest, motivation, and cognitive load (Makransky & Petersen, 2021).

Approach

The REACH VR experience was designed as an immersive outreach tool to support secondary school students' engagement with STEM and awareness of related career pathways. The approach prioritises accessibility, usability, and meaningful engagement.

Rather than presenting careers through static information, learners are situated within authentic laboratory and engineering contexts where they can observe equipment and workflows, interact with key concepts through structured activities, and hear directly from researchers and students.

The application adopts a modular design comprising four thematic areas of sustainable engineering: hydrogen, renewable energy microgrids, battery innovation, and solar car design. This structure supports flexible deployment and enables non-linear exploration, allowing students to engage with content based on their interests.

Each module follows a consistent structure. A short, animated introduction provides narrative context, followed by an immersive 360° entrance scene that establishes a sense of place. Users then enter a central navigation space to explore topic areas through guided interaction and self-directed exploration. “Explore Careers” components link technical content to real-world STEM roles and highlight relevant school subjects, helping students understand potential educational and career pathways.



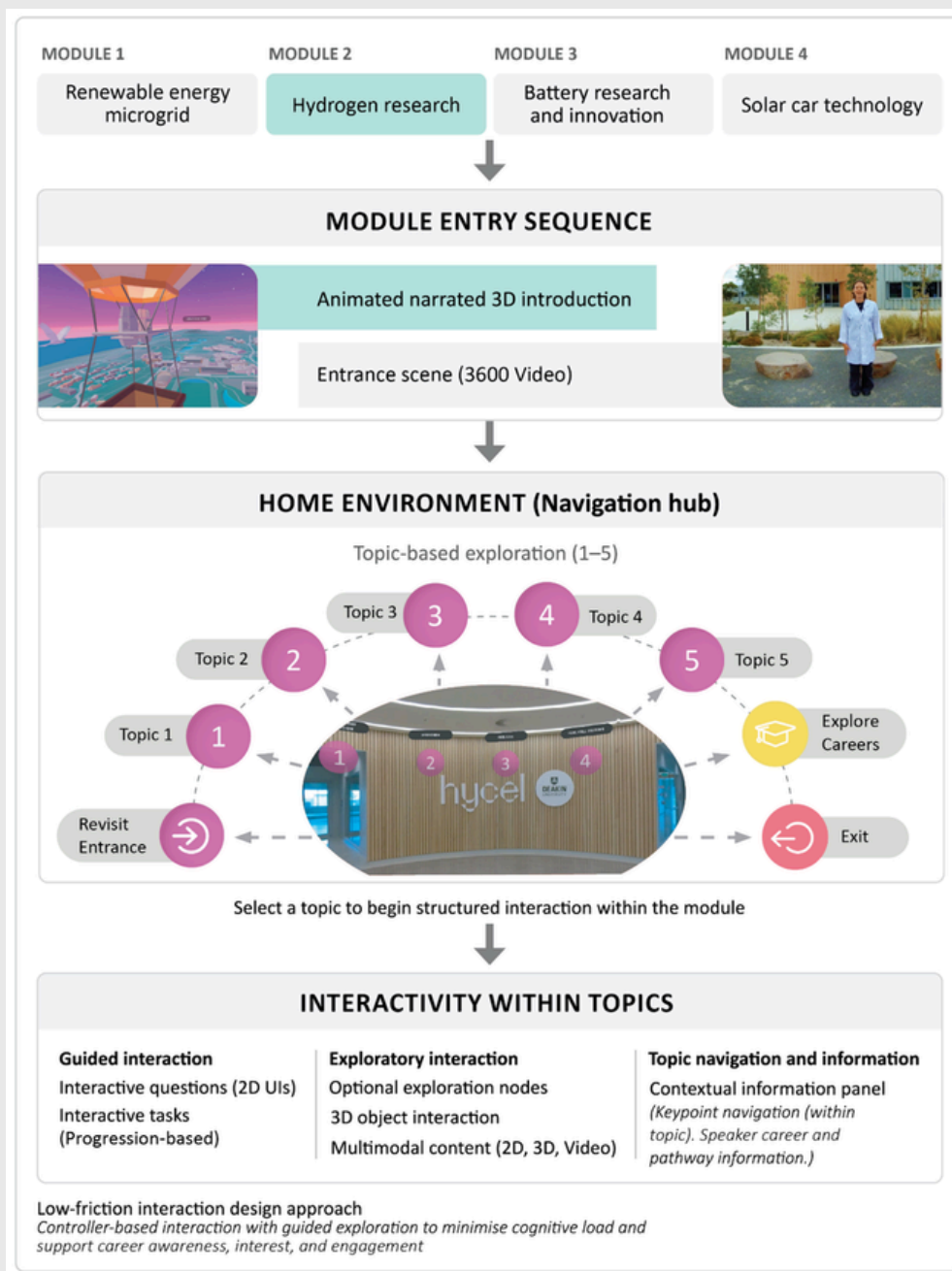


Figure 1. Modular structure of the REACH VR experience and interaction design.

Within each module, users engage with topic areas that combine guided interactions. Guided elements include interactive questions and task-based activities, while exploratory elements include 3D object interaction, optional content nodes, and multimodal materials such as video and spatial visualisations (Figure 1). Each topic also incorporates a contextual information interface that supports navigation and provides supporting explanations, including speaker insights and pathways.

The design combines immersive, world-embedded elements (eg interactive hotspots and 360° environments) with structured interface components (eg information panels and on-screen instructions) to support both engagement and understanding. This hybrid approach supports experiential learning and accessible engagement with content for learners with varying levels of prior knowledge (Kolb, 2014; Makransky & Petersen, 2021).



Interaction is designed to be low-friction, minimising the need for complex controls or prior training. Users engage primarily through intuitive gaze- or controller-based selection, allowing focus on content rather than system operation. This is particularly important in outreach settings with limited time and diverse user experience levels.

Development was collaborative and cross-disciplinary. Academic researchers ensured disciplinary accuracy, technical staff supported laboratory access and representation of workflows, and outreach coordinators advised on alignment with secondary engagement strategies. Iterative pilot sessions with student groups and stakeholders informed ongoing usability refinements, ensuring that the content remained authentic and accessible.

The experience is portable and adaptable across educational settings, including school outreach, on-campus events, and community engagement. Its modular structure and consistent interaction patterns support ease of facilitation and repeat use. This positions the REACH VR experience as an engaging educational tool and platform for ongoing outreach and evaluation.

Outcomes

Development commenced in 2024, with refinement continuing through 2025-2026. The application has been piloted through Deakin outreach activities involving secondary students and tested with academic staff, technical experts, and outreach professionals. These engagements informed iterative refinement of both content and user experience design.

Early observational insights indicate strong engagement and curiosity. Participants frequently reported increased awareness of renewable energy technologies and associated career pathways. The experience supported conversations about study options and career pathways, while making complex research environments more accessible to non-specialist audiences. These observations are consistent with prior research showing that immersive virtual environments can enhance engagement and create more compelling educational experiences (Radianti et al., 2020). A key outcome is the development of a structured, theory-informed evaluation framework to accompany immersive outreach delivery.

The evaluation framework integrates validated pre- and post-engagement measures of STEM interest, perceived pathway clarity, and self-efficacy with system-logged behavioural data, including navigation, time allocation and interaction patterns. This mixed-method approach enables a more robust understanding of how learners engage with immersive environments, including factors related to presence and motivation (Makransky & Petersen, 2021). The framework is designed to support future large-scale evaluation of engagement and pathway development outcomes.

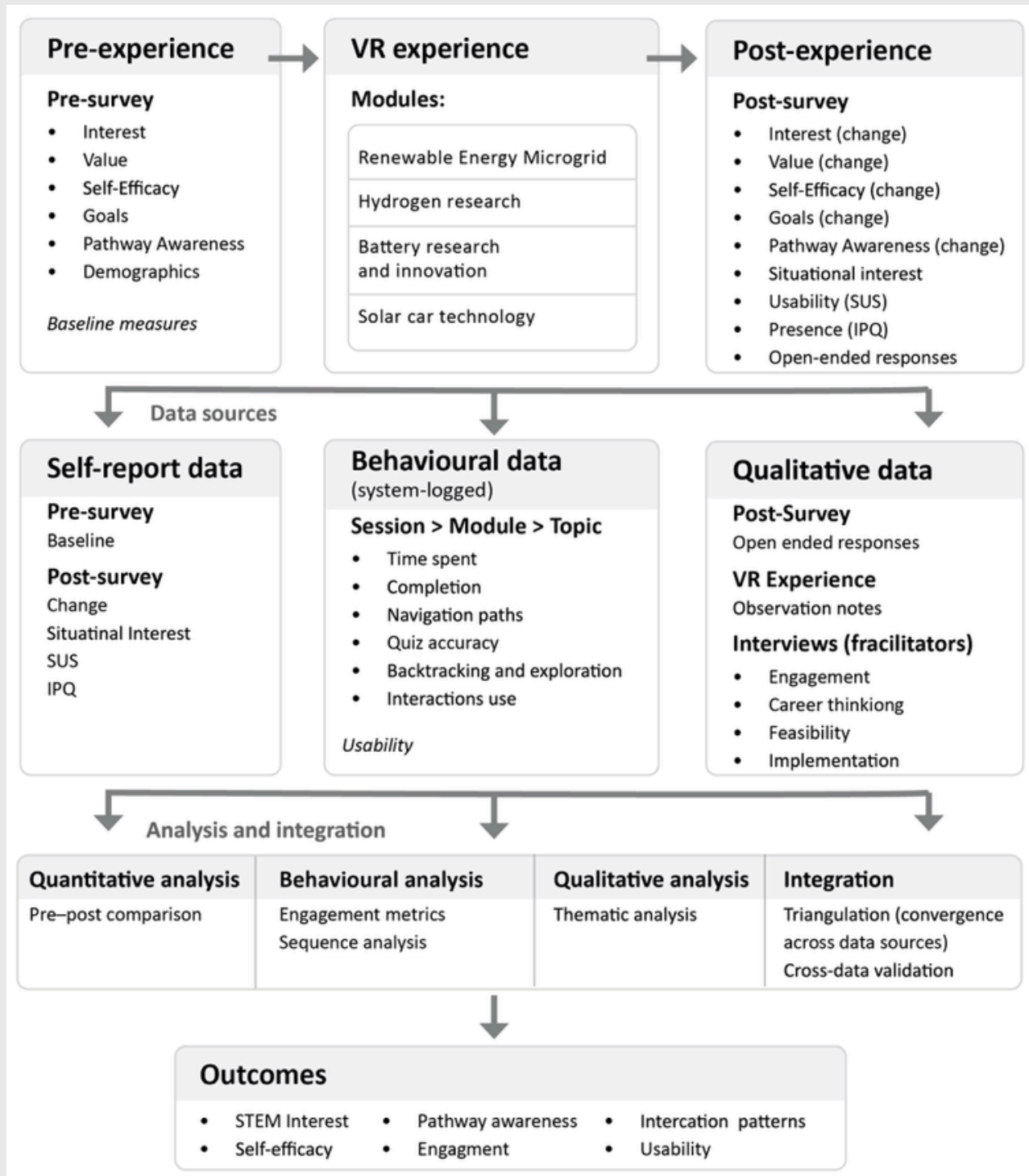


Figure 2. REACH VR evaluation framework: a convergent mixed-methods design.

The evaluation will be implemented at scale across a range of activities, including visiting school groups, excursions, and incursion programs with educational partners. The team are also exploring opportunities for sharing the experiences on public access platforms for wider uptake.

By integrating behavioural and self-reported data, the initiative supports evidence-informed understanding of how immersive experiences influence engagement, STEM interest, and pathway awareness. Findings will inform ongoing refinement of both the application and outreach delivery strategies.

Future development will focus on strengthening deployment protocols, expanding stakeholder collaboration, and refining evaluation methods to support scalable, data-informed STEM engagement across diverse educational contexts. This positions the initiative not only as an immersive outreach tool but also as a platform for advancing evidence-informed approaches to understanding how students engage with and navigate STEM pathways.



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Authentic field-based assessment as early professional induction in a blended engineering curriculum

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Background

Developing authentic practical skills in engineering education remains challenging, particularly in blended and online delivery modes. In civil and environmental engineering, field-based competencies such as soil classification and site observation are foundational to professional practice but are traditionally introduced through laboratory sessions or intensive on-campus activities.

At Deakin University, the second-year unit Field Investigation (SEJ202) is a core unit enrolling both on-campus and online students. Between 2019 and 2025, enrolments averaged 86 students per year, with online participation increasing from 23.7% (2019 – 2021) to 34.7% (2022 – 2025). Historically, practical exposure for online students was delayed until mid-trimester intensive sessions, while on-campus students engaged earlier through scheduled laboratory and fieldwork. This created a disparity in learning progression and limited opportunities for early engagement with professional practice. Student feedback over several years consistently highlighted this imbalance, suggesting that this temporal misalignment also affected perceptions of fairness.

This prompted a fundamental question: is practical learning inherently tied to laboratory infrastructure, or can it be reframed around authentic professional practice?



Three key challenges motivated the redesign:

- Equity across delivery modes: Online students lacked early access to practical learning, resulting in uneven progression.
- Delayed engagement with practice: Students encountered authentic classification tasks only after several weeks, limiting early conceptual integration.
- Limited authenticity in traditional formats: Laboratory-based tasks often simplified conditions and reduced student agency, positioning learners as passive recipients rather than active investigators.

Collectively, these challenges pointed to a deeper issue: practical learning was being treated as location-dependent, rather than grounded in professional practice.

Approach

To address this, a new assessment task called Field Classification was introduced in 2019. The task reframes practical learning as an authentic, student-driven activity grounded in professional standards (AS1726, Geotechnical Site Investigations).

Students are required to:

- collect five soil samples from their local environment
- conduct field classification using visual–manual techniques
- document observations through photographs
- provide structured justification for classification decisions.

A key consideration in the design was the alignment between field and laboratory classification processes. In this unit, laboratory practicals focus on sieve analysis and Atterberg limits, which are used to determine particle size distribution and plasticity characteristics. The Field Classification task exposes students to the same classification logic at an earlier stage, requiring them to make visual and tactile judgements about grading, plasticity and consistency.



The design aligns with established frameworks for authentic assessment, which emphasise alignment between task, context, outputs and criteria with professional practice (Gulikers, Bastiaens & Kirschner, 2004). It also draws on principles of authentic learning (Herrington, 2006; Reeves, Herrington & Oliver, 2002) and experiential learning (Kolb, 1984), where knowledge is constructed through direct engagement with real-world phenomena.

A key design principle was to decouple practical learning from institutional infrastructure while maintaining alignment with disciplinary standards. Rather than attempting to replicate laboratory conditions remotely, the task focuses on the core professional activity of observing, interpreting and classifying soils in situ.



The assessment was structured around four interrelated principles:

Accessibility and inclusion: Students can complete the task in their own environment, removing dependence on campus facilities and enabling equitable participation across delivery modes. This ensures that all students engage with the same authentic task, rather than parallel or compensatory alternatives.

Early engagement and alignment: The task is scheduled early in the trimester, allowing students to engage with practical concepts alongside theoretical content. This redistribution of assessment weight supports constructive alignment between intended learning outcomes, learning activities and assessment (Biggs & Tang, 2011), while enabling earlier development of professional judgement.

Authenticity of practice: Students engage in practices that closely reflect professional workflows, including interpreting heterogeneous soils and applying standard classification procedures. They need to make judgements under uncertainty which reflects ill-structured problem-solving typical of professional contexts (Jonassen, 1997), where solutions require interpretation of incomplete information.

Structured assessment design: A scaffolded template supports reasoning and communication, requiring students to make their thinking explicit. Assessment criteria emphasise process, justification and alignment with standards, consistent with assessment-for-learning principles (Boud & Falchikov, 2007; Gibbs, 2010).

During the 2022 curriculum renewal, I worked with A/Prof Nick Milne (Environmental Engineering) to extend the task to include textural feel analysis, strengthening its interdisciplinary relevance and linking civil and environmental approaches to soil classification.

The task is intentionally developmental. Later in the unit, students perform laboratory-based classification using quantitative test results. Early exposure to field classification enables students to form expectations and interpret laboratory data more meaningfully, strengthening the integration of qualitative and quantitative reasoning.

Outcomes

Across 2022–2025, submission rates for the Field Classification task remained consistently high (97.4%, 96.2%, 90.5%, and 94.3%), with average marks of 66.2%, 73.0%, 74.0% and 67.2%. These outcomes were achieved while online participation increased to 34.7% of enrolments, without requiring differentiated assessment pathways.

The most significant impact has been structural, developmental and pedagogical.

Equitable early engagement: Students across all delivery modes now engage in hands-on professional practice from the beginning of the trimester. This addresses previous disparities and creates a more coherent learning trajectory across cohorts.

Improved integration of learning: Students demonstrate stronger connections between field observations and laboratory results. In particular, they increasingly interpret sieve analysis and Atterberg limits data in relation to prior tactile and visual assessments, indicating improved conceptual understanding of soil behaviour and the ability to anticipate laboratory outcomes.

Development of professional judgement: The task supports key competencies aligned with engineering practice, including observation, classification, interpretation and evidence-based reasoning (Engineers Australia, 2013). Importantly, students engage with real variability and uncertainty rather than controlled laboratory conditions.

Academic integrity: The personalised and context-dependent nature of the task has resulted in extremely low academic misconduct (one case across approximately 600 submissions). Because responses are grounded in individual experience and evidence, superficial or AI-generated work is readily identifiable and typically self-penalising.

Resilience and adaptability: During COVID-19 disruptions, when access to laboratories was restricted, the task continued without modification. This reinforced the value of designing assessment around core professional practices rather than institutional constraints.



This case challenges a common assumption in engineering education that practical learning must occur in laboratories. It demonstrates that authentic tasks can enhance learning, engagement, and resilience to disruption simultaneously.

The Field Classification task reflects multiple dimensions of authentic assessment, including task fidelity, real-world context and criteria grounded in professional standards (Gulikers et al., 2004). This alignment enhances both the validity of assessment and its impact on learning.

A key insight from this work is the importance of temporal design in curriculum. By introducing authentic practice early, students develop confidence and conceptual grounding before engaging in more complex laboratory tasks. This shifts assessment from being a terminal measure of learning to an active driver of it.

This work reinforces the value of designing assessment around authentic professional practice as a means of achieving inclusion, integrity and meaningful learning outcomes simultaneously, rather than treating these as competing priorities.

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