INTELLIGENT TECHNOLOGIES IN EDUCATION

AI Power Up: Prioritising Student Learning

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Abstract

This paper presents a design-based research (DBR) case study examining how a community-of-practice-driven process can operationalise UNESCO's AI Competency Framework for Students (Miao & Shiohira, 2024) through the development of an institution-wide AI literacy resource in a predominantly online learning context. Drawing on socio-cultural learning theory, experiential learning, and critical digital pedagogy, the case study saw the researchers position AI literacy not as a technical skill set but as a socially situated, reflective, and ethically mediated practice. The case under discussion is the collaborative generation of the resource, AI Power Up: Supercharge Your Learning, by the Artificial Intelligence Pedagogy Project (AIPP) at the University of Southern Queensland, which brought together academics, learning designers, librarians, and professional staff to address student confusion and anxiety around AI use in academic contexts. Informed by Universal Design for Learning (UDL) principles and structured across four modules (AI Foundations, AI for Learning, AI for Academic Writing, and AI for Assessment), the resource integrates video, interactive H5P activities, and reflective prompts to develop both AI awareness and AI literacy across disciplines. Early implementation data indicate positive engagement, with 2,596 views by 582 users in the first trimester of deployment. This paper reflects critically on the design process, implementation challenges, and the limitations of early-stage evidence, while identifying transferable principles for institutions seeking to support ethical, inclusive, and pedagogically grounded student engagement with AI in higher education.

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Introduction

The rapid integration of generative artificial intelligence (GenAI) into higher education (HE) has intensified long-standing questions about how students learn, how knowledge is constructed, and how agency is exercised within digitally mediated environments. Since the introduction of user-friendly interfaces such as ChatGPT, HE institutions worldwide have been required to respond quickly to both the perceived opportunities and risks associated with AI-enhanced learning. While AI technologies offer considerable potential to personalise learning, support student engagement, and enhance productivity, they also raise significant concerns related to academic integrity, ethical use, cognitive offloading, and the erosion of critical and creative thinking skills (Bozkurt et al., 2024; Chen et al., 2025; Francis et al., 2025). These tensions underscore the need for pedagogical approaches that move beyond instrumental or deficit framings of AI and instead foreground learning as a reflective, socially situated, and ethically mediated process.

Within HE, GenAI is increasingly positioned as both a support mechanism and a source of disruption. Students are engaging with AI tools for a wide range of academic purposes, including ideation, drafting, summarisation, and research support, often with limited formal guidance (Attewell, 2025; Jisc, 2023). At the same time, educators report uncertainty regarding appropriate pedagogical responses, inconsistent institutional messaging, and a lack of shared understanding about ethical and effective AI use in learning and assessment (Robert et al., 2025; UNESCO, 2025). In this context, students may receive mixed or contradictory signals about whether AI is permissible, beneficial, or risky, contributing to confusion, anxiety, and uneven learning opportunities (Attewell, 2025; Chen et al., 2025; UNESCO, 2025). Rather than viewing AI solely as a threat to academic integrity or a productivity tool, there is growing recognition that students require structured, explicit support to develop informed judgment about when, why, and how AI should be used to support learning (Bozkurt et al., 2024; Chen et al., 2025; Robert et al., 2025).

Within this dichotomy of mixed benefits and challenges, frameworks for AI literacy and competency are emerging. This paper focuses on the UNESCO *AI Competency Framework for Students* (Miao & Shiohira, 2024) and its influence and role in artefact development to support student AI use. It is the first-ever global framework of its kind that aims to articulate a vision of students as conscious, ethical, and creative decision-makers in relation to AI systems. In addition to helping educators integrate AI into their teaching, it aims to equip students with the values, knowledge, and skills necessary to examine and understand AI critically from a holistic perspective, including its ethical, social, and technical dimensions. While such frameworks provide essential policy and aspirational guidance, they do not prescribe how students develop these competencies through lived learning experiences, nor how institutions might operationalise ethical AI literacy within everyday teaching and learning practices.

This paper addresses that gap by focusing on the design and implementation of a student-facing AI literacy resource, *AI Power Up: Supercharge Your Learning*, developed at the University of Southern Queensland (UniSQ), a regional Australian university with a predominantly online student cohort. In online and distributed learning contexts, where students often rely on asynchronous resources and self-directed study, the need for clear, consistent, and pedagogically grounded guidance on AI use is particularly acute. The AI

Power Up resource was developed through a cross-institutional community of practice (CoP) called the Artificial Intelligence Pedagogy Project (AIPP) bringing together academics, learning designers, librarians, and professional staff to respond collaboratively to emerging challenges around student AI use.

Rather than positioning AI as a technical skill set to be mastered or a risk to be mitigated, the development of *AI Power Up* was informed by socio-cultural learning theory, experiential learning, and critical digital pedagogy. From this perspective, AI is understood as a mediating artefact within a broader learning ecosystem, shaping and shaped by social interaction, institutional norms, and ethical considerations. The project was created to reimagine traditional approaches to education, improve student outcomes, and foster innovation in teaching and assessment methods. In 2024, as AI awareness and use escalated, it became obvious to staff connecting in the AIPP that students were confused, and mixed messages were being given about what AI to use and how to use it, especially in terms of critical and ethical use, and particularly for assessment.

This paper presents a design-based research (DBR) case study of the conception, development, and early implementation of the AI Power Up resource, drawing on established DBR methodological frameworks (Design-Based Research Collective, 2003; Anderson & Shattuck, 2012). It contributes to the growing body of scholarship on AI in higher education by demonstrating how AI literacy can be operationalised as a socially situated, practice-based, and ethically informed learning process. The paper first reviews relevant theoretical and empirical literature on learning with AI, before outlining the design-based research methodology underpinning the project. It then describes the resource design and implementation, followed by reflections on its early uptake and implications for supporting student learning with AI in higher education.

Literature review

Theoretical perspectives on learning with AI in higher education

To deepen theoretical engagement, this study draws on three complementary learning traditions: socio-cultural learning theory, experiential learning, and critical digital pedagogy. Together, these perspectives position learning with artificial intelligence not as an individual or purely technical activity, but as a socially situated, practice-based, and ethically mediated process that foregrounds learner agency and institutional responsibility.

From a socio-cultural perspective, learning is understood as occurring through interaction with others and through engagement with mediating artefacts within specific cultural and institutional settings (Vygotsky, 1978; Lave & Wenger, 1991; Wenger, 1998). In this view, AI functions as a cultural tool that mediates thinking, meaning making, and participation rather than acting as a neutral or autonomous tutor. Learning emerges through participation in communities of practice where knowledge, norms, and values are negotiated collectively. This framing aligns with the present study's emphasis on a whole-institutional CoP and the design of AI Power Up as a shared mediating resource that supports consistent, human-centred engagement with AI across disciplines. It is particularly relevant in AI-mediated contexts, where learning is shaped not only by human interaction but by the affordances, constraints, and values embedded within AI systems themselves.

Experiential learning theory further illuminates how students develop AI literacy through cycles of action, reflection, and adaptation (Kolb, 1984; Schön, 1983). As students interact with AI tools, reflect on ethical implications, and apply insights to academic tasks, learning occurs through iterative experimentation rather than passive consumption. This perspective foregrounds reflective judgment, metacognition, and the development of learner agency. These qualities are increasingly essential in AI-mediated educational environments. Within AI Power Up, experiential learning is enacted through scenario-based activities, interactive elements, and reflective prompts that encourage learners to test AI use, evaluate outcomes, and refine their practices.

While competency frameworks provide important guidance for AI integration, critical digital pedagogy (Stommel et al., 2020; Watters, 2021) prompts deeper questions about power, agency, and justice in AI-enhanced learning environments. Drawing on Freire's (1970) notion of education as consciousness-raising rather than mere skill transfer, critical digital pedagogy emphasises students' capacity to question dominant technological narratives, recognise embedded biases, and make informed decisions about when and how AI should be used within and beyond formal assessment contexts. This orientation aligns with UNESCO's framework that provides aspirational direction for this work. Positioning AI competency as encompassing not just technical skills but human-centred mindsets, ethical reasoning, and the capacity to contribute to just and inclusive AI societies (Miao & Shiohira, 2024; UNESCO, 2025).

Taken together, socio-cultural learning theory, experiential learning, and critical digital pedagogy provide a coherent theoretical foundation for examining AI-enhanced learning as a socially situated, practice-based, and ethically charged process. These perspectives inform the design of AI Power Up as a mediating artefact that supports student agency, reflective judgment, and participation within a broader learning ecosystem. Table 1 summarises how these theoretical perspectives directly informed the pedagogical design decisions underpinning AI Power Up.

Table 1. Theoretical perspectives informing the design of AI Power Up

Theoretical perspective	Core learning assumptions	Design implications in AI Power Up
Socio-cultural learning	Learning is socially situated and mediated by cultural tools	AI Power Up as a shared institutional artefact; community-of-practice design; consistent cross-disciplinary messaging
Experiential learning	Learning occurs through cycles of action and reflection	Interactive H5P activities; scenario-based ethics; reflective prompts on AI use
Critical digital pedagogy	Learning involves questioning power, ethics, and agency	Emphasis on human-centred AI; ethical decision-making; rejection of deficit and surveillance narratives

Generative AI in higher education: Opportunities and challenges

The advent of AI, particularly GenAI, has rapidly transformed the educational landscape, presenting both profound opportunities and significant challenges for learning and teaching practices within HE (Chen et

al., 2025; Bozkurt et al., 2024; Georgieva & Stuart, 2025). At its core, AI offers the potential for highly personalised and adaptive learning experiences, tailoring instruction to individual student needs, preferences, and learning paces (Airaj, 2024; Ajani et al., 2024; Francis et al., 2025). AI can enhance educator efficiency by freeing them to focus on more impactful, higher-order pedagogical tasks and student engagement (Ajani et al., 2024; Attewell, 2025; Francis et al., 2025; Cukurova & Miao, 2024). However, this transformative potential is balanced against substantial risks. Major concerns include the erosion of academic integrity, with GenAI facilitating cheating and plagiarism due to its ability to produce sophisticated, human-like content that is difficult to detect (Francis et al., 2025; Liu & Bridgeman, 2025). Over-reliance on AI also threatens the development of critical thinking, problem-solving, and creativity, potentially leading to superficial learning, cognitive offloading, and a reduction in meaningful intellectual growth (Chen et al., 2025; Francis et al., 2025; Robert et al., 2025). These challenges demand that education systems proactively adapt to ensure AI augments human capabilities rather than replacing them (Bozkurt et al., 2024; Robert et al., 2025; Cukurova & Miao, 2024).

AI literacy, readiness, and the student–educator divide

To effectively cope with and integrate AI, both educators and students require support, including a multi-faceted approach centred on AI literacy, clear ethical frameworks, and pedagogical redesign. A definition of AI literacy is the ability to be aware of, and comprehend, AI technology in practical applications; to apply and exploit it for tasks proficiently; and to analyse, select, and critically evaluate AI-provided data and information while fostering personal responsibilities and respecting rights and obligations (Chen et al., 2025).

Educator readiness to use AI with students is currently significantly less advanced than student engagement and is often characterised by a lack of clear institutional policies and sufficient support (Robert et al., 2025; Francis et al., 2025). Educators' responses to GenAI have varied widely, from enthusiastic adoption to outright bans, often leaving individuals to navigate these complex issues without clear guidance (Chen et al., 2025; UNESCO, 2025). While some educators are early adopters, leveraging AI for tasks such as lesson planning, quiz development, and drafting syllabi (Chen et al, 2025; Jisc, 2023), many face substantial complexities in adapting to new digital tools and lack adequate AI literacy themselves (Francis et al., 2025). Challenges include increased workloads, insufficient training and support, and concerns that over-reliance on AI may depersonalise education, devalue human expertise, and lead to superficial learning outcomes (Bozkurt et al., 2024; Robert et al., 2025; UNESCO, 2025).

Student readiness and understanding of AI reflect a complex picture of proactive, self-driven engagement alongside significant needs for formal guidance and structured development. A substantial portion of university students have already engaged with GenAI tools for various academic tasks, including idea generation, writing assistance (proofreading, paragraph generation), information condensing, summarisation, outlining, and research (Abassi et al., 2025; Attewell, 2025; Jisc, 2023). Students often perceive AI as a "24/7 free assistant" that enhances efficiency and creativity (Chen et al., 2025; Francis et al., 2025; Jisc, 2023). However, according to Chen et al. (2025), students are not fully prepared, exhibiting limited prior knowledge, experience, or confidence in using GenAI effectively. A notable gap exists in their understanding of academic integrity, with many students not perceiving AI use in coursework as a breach, considering it akin to brainstorming or tutoring services, while simultaneously acknowledging it could be cheating (Attewell, 2025). Interestingly, Chen et al. (2025) and Attewell (2025) found that students without

direct experience of AI tools are less interested in learning about them, which could disadvantage them in an AI-driven job market. To address the need to understand ethical and appropriate use of GenAI for learning, students universally request explicit guidance from instructors in course syllabi and university policies (Chen et al, 2025; Schwartzkoff, 2024; Attewell, 2025). They emphasise the need for practical support, clear policies, consistent guidance, and training in how to use AI responsibly, including skills like prompt writing and fact-checking.

Institutional responses and AI literacy frameworks in higher education

HE institutions are responding with various strategies and AI literacy frameworks to improve student and staff readiness. Each of these is a response to contextual needs acknowledging the culture of learning at the institution and challenges of AI integration into learning. At the University of Sydney, for instance, a co-designed "AI in Education" guide provides clear ethical guidelines (for example, check what is allowed, acknowledge AI, be cautious/critical, develop skills, do not enter sensitive information, be creative) demonstrating AI's potential to boost learning (Liu & Bridgeman, 2025; Schwartzkoff, 2024). Similarly, the University of Florida's "AI Across the Curriculum Initiative" aims to create an "AI-ready workforce" through pedagogical and curricular development (Chen et al., 2025). Institutions are also working to provide access to core AI tools, such as Microsoft Copilot and Google Gemini, to prevent widening digital divides and enhance learning experiences.

A combination of curriculum innovation, training, ethical guidance, and technology access helps prepare students to understand, use, and critically engage with AI responsibly in their studies and future careers (Attewell, 2025; Robert et al., 2025). Wang et al. (2023) propose models such as the technological-cognitive-ethical and the KSAVE (knowledge, skills, attitudes, values, and ethics) for AI literacy, emphasising practical application and critical evaluation alongside personal responsibilities. Andreas Horn (UNESCO, 2025) outlines three key pillars for AI literacy: conceptual understanding of AI systems, critical questioning of their behaviour and biases, and creative application in practice. Another approach taken at Harvard is shared by Acar (2023) that details five key skills for GenAI use that students require and a four-step framework to learn these. The University of Groningen, Netherlands, has a publicly available online module ‘Introduction to the Critical AI Literacy’ that uses AI-generated video to share concepts (EduSupport, n.d.). As a final example (among many more), the "EThICAL" GenAI Readiness Framework by Luckin et al. (2022) offers a structured, seven-step approach to help educators achieve AI literacy, progressing from initial engagement with AI possibilities to iterative refinement of its use.

UNESCO’s AI Competency Framework and implications for student learning

UNESCO has taken a leadership role in Al literacy by developing "twin" AI competency frameworks for both students and teachers, designed to prepare individuals to be responsible and creative citizens and educators in an AI-driven world and to provide a global reference for national frameworks, teacher training, and assessment parameters (Cukurova & Miao, 2024; Miao & Shiohira, 2024; UNESCO, 2025). The UNESCO AI Competency Framework for Students is the first global framework of its kind, outlining 12 competencies across four dimensions: Human-centred mindset, Ethics of AI, AI techniques and applications, and AI system design. These competencies span three progression levels: Understand, Apply, and Create, with the goal of fostering critical judgment of AI solutions, awareness of civic responsibilities, foundational AI knowledge, and inclusive, sustainable AI design. The framework is explicitly anchored in

principles of human rights, inclusion, and equity, aiming to empower students to make meaningful use of AI, critically evaluate its implications, and contribute to ethical AI regulations (Miao & Shiohira, 2024; UNESCO, 2025). The framework encourages students to understand AI as human-led and to critically examine its presence in education and society, including risks like surveillance, bias, and the potential to undermine human intellectual skills and privacy (Chen et al., 2025; Miao & Shiohira, 2024). Pedagogical methodologies suggested within the framework emphasise problem-based and project-based learning, and scenario-based practices, often with an emphasis on local relevance and social inclusion (Miao & Shiohira, 2024). This framework, therefore, provides clear guidance to educators on the aspirational qualities for student competence in AI. As such, it provided clear direction to the design process for the student-facing resource AI Power Up created by a CoP within the researcher's own context, UniSQ. These theoretical perspectives informed both the pedagogical intent of the AI Power Up resource and the selection of a design-based research methodology, which foregrounds learning as situated, iterative, and socially negotiated.

What uniquely distinguishes the AI Power Up resource is its direct operationalisation of UNESCO's holistic, rights-based competency framework translated through a localised Community of Practice (CoP) at UniSQ. Unlike top-down institutional mandates or standalone asynchronous tool-training modules, AI Power Up employs a design-based research methodology that distinctly foregrounds AI literacy as a situated, iterative, and socially negotiated learning process. By synthesising UNESCO's aspirational global competencies, such as critical judgment, civic responsibility, and inclusive design, with a deeply contextualised CoP model, AI Power Up uniquely bridges the gap between high-level global ethical frameworks and the socially negotiated, context-driven realities of student learning.

Methodology

This study focused on the conception, design, and deployment of the AI Power Up resource within UniSQ during 2024–2025. The project brought together academics, learning designers, librarians, and professional staff participating in the AIPP Community of Practice, each contributing their disciplinary knowledge and lived experiences. When working with emerging educational technologies, methodological decisions must acknowledge their complexity, rapid evolution, and the human experiences that shape their use (Creswell, 2014). In the context of AI in higher education, this includes students, academics, and professional staff who interact with AI in varied and sometimes unpredictable ways.

The collaborative nature of DBR strengthens research by integrating theory with practice, adding rigour to both the development process and the intended resource output (Anderson & Shattuck, 2012; Design-Based Research Collective, 2003). In settings where variables and outcomes are unpredictable, the inherent "messiness" of DBR enables authentic, contextually grounded solutions that collectively support university members. Whether through building AI resources, discussing policy, or fostering ethical and informed student practice. The collective design process empowers individuals to contribute meaningfully, improving educational practice through DBR's pragmatic grounding and iterative cycles (Wang & Hannafin, 2005). Data informing the DBR cycles consisted of community-of-practice discussions, meeting artefacts, draft iterations, anecdotal student and staff feedback, and engagement metrics collected through the learning management system. These inputs were reviewed collaboratively, allowing the research team to surface shared themes, refine design decisions, and evaluate emerging insights.

DBR recognises the importance of contextual factors, particularly the regional and digital affordances of one's university environment. This lens enabled the researchers to explore both internal and external assumptions, knowledge, and understandings of AI, and to deepen relationships between learners, educators, and AI systems. By foregrounding lived experiences, contextual nuances, and socio-technical dynamics, DBR contrasts with positivist approaches that emphasise quantifiable outcomes. Instead, it supports exploration of meaning-making, agency, ethics, and the evolving role of AI in higher education. Domains where student behaviours and perceptions are deeply shaped by institutional expectations, learning cultures, and technological capabilities.

Consistent with DBR principles, the study progressed through interconnected cycles of analysis, design, implementation, and evaluation (McKenney & Reeves, 2013). The analysis stage identified institutional challenges regarding staff and student readiness for AI through discussions, anecdotal insights, and environmental scanning of global AI literacy frameworks. The design stage centred on collaborative ideation within a cross-institutional CoP, with iterative brainstorming, drafting, and refinement. Implementation involved embedding the resource across diverse higher education contexts, followed by evaluative reflection informed by engagement metrics, user feedback, and practitioner insights.

Although DBR strengthens ecological validity and supports practitioner ownership, it does have limitations. Its iterative nature relies on ongoing collaboration and can limit replicability due to contextual specificity (Anderson & Shattuck, 2012). Despite this, DBR's grounding in authentic contexts makes it well-suited to examining AI-enhanced learning innovations within rapidly changing digital landscapes. These cycles continue to inform the ongoing development of the AI Power Up resource, which is being updated to support emerging approaches to AI-enhanced learning, including guidance for building AI fluency and deeper critical thinking. Ethical considerations reflected the collaborative and practitioner-focused nature of the project, emphasising voluntary participation, respect for practitioner voice, and reflexive awareness of the researchers' dual roles in supporting learning while promoting responsible and ethical AI use.

Method & Design Process

First defined by Jean Lave and Etienne Wenger in their 1991 work Situated learning, and later developed by Wenger and others, the CoP approach is well substantiated. Put simply, a CoP is a group of people working collaboratively toward a shared goal. The student resource AI Power Up was created by one such CoP, the AIPP. AIPP is an initiative of a core team of staff within a regional Australian University, UniSQ. This team, part of the Learning and Teaching Futures portfolio, has the broad remit of supporting digital pedagogy within a university whose programs are delivered largely online.

At the start of 2023, when the impact of AI in HE was becoming apparent, the AIPP was formed. Eschewing much of the deficit discourse that surrounded AI in HE at that time, the AIPP's focus was to harness the power of AI to enhance the quality of learning and teaching experiences at UniSQ. By leveraging the affordance of AI technologies, the project sought to reimagine traditional approaches to education, improve student outcomes, and foster innovation in teaching and assessment methods. This CoP has, in the intervening period, grown to over 150 members and is a true cross-institutional collaboration, drawing from most Schools and Departments within the University.

While initial needs assessments within AIPP sessions identified staff knowledge and usage of AI as a key challenge, this quickly turned to improving student understanding of AI. An AIPP project sub-group of 15

members, drawing from various university sections, formed in September 2024 to address this need. This involved the sharing of practice and anecdotal evidence of student engagement with AI. Notably, far from the headlines and inbuilt fears suggesting that AI would be used by students to cheat, the community consistently reported that many students were afraid to use AI. Repeated conversations about AI and its negative impact on academic integrity saw students fearful of its use and subsequently missing out on the opportunity to enhance their own learning journey with AI. It was this fear that the community sought to address. The AIPP goal was to create a student-facing resource that enhanced student understanding of the advantages and responsibilities of using AI for learning in a way that supported academic integrity. Guided by UNESCO's AI Competency Framework for Students (Miao & Shiohira, 2024), the AIPP's overarching aim was the empowerment of all stakeholders.

Having identified this shared goal, the development of the resource subsequently followed an iterative approach through collective brainstorming sessions at AIPP sub-group project meetings, interspersed with asynchronous collaboration on Google Docs, consistent with McKenney and Reeves' (2013) model of Design-Based Research. These sessions included discussions in three key stages: Analysis and exploration; Design and construction; and Evaluation and reflection. The analysis and exploration stage involved reflection within the CoP as participants shared their specific context and needs surrounding student use of AI. The collective aspirations and enthusiasm of the large CoP soon saw the initial brainstorm of desired inclusions in the student resource bloom into an almost unending and certainly unwieldy list, with elements as diverse as ‘using AI as a creative partner,’ ‘AI intellectual property,’ and ‘structuring prompts.’ The most complex and time-intensive stage of the process was the design and construction stage. Guided by the four elements of UNESCO's AI Competency Framework for Students (Miao & Shiohira, 2024) and a shared understanding of student needs, CoP members distilled an extensive brainstorm into four key sections: AI Foundations, AI for Learning, AI for Academic Writing and Research, and AI for Assessment. Each section maps to specific UNESCO competencies, from building conceptual AI knowledge and a human-centred mindset, to developing the ethical reasoning needed to navigate AI principles and regulatory frameworks. The final stage brought together academics, librarians, learning advisors, and educational technologists to collaboratively write and design the resource. After this iterative development process, AIPP members, having created the resource and been empowered by a sense of ownership, were the first to embed it within their own courses. This sparked a final stage of reflection and evaluation, allowing for further development of the resource. Given the pace of innovation in AI, it is expected AIPP participants will remain in this stage for many years.

The AI Power Up Resource

Based on the collaborative efforts of the AIPP and informed by UNESCO’s AI competency framework (Miao & Shiohira, 2024), the AI Power Up resource was designed not only to raise awareness of artificial intelligence but also to foster AI literacy through a student-centred, ethically grounded approach. The key challenge in creating this resource was ensuring it was suitable for everyone, in any discipline, that it aligned with the current UniSQ approach to the use of AI with assessment, and that it was generic enough for sustainability throughout 2025. The resource had the following learning objectives: 1. Recognise fundamental AI concepts and their applications in your learning; 2. Make informed decisions about ethical AI use in academic contexts; 3. Apply AI tools appropriately within your discipline; 4. Identify the limitations of AI and the importance of human oversight.

Figure 1. AI Power Up: Supercharge Your Learning Resource

AI Power Up was designed to develop two interrelated capacities: AI awareness, namely foundational understanding of what AI is, its capabilities, and its presence in everyday contexts; and AI literacy, encompassing the ethical judgment and accountability skills needed to determine when and how AI should be used. The resource was shaped by two complementary pedagogical frameworks: Universal Design for Learning (UDL) principles (CAST, 2018), ensuring flexibility, autonomy, and inclusivity through multiple means of representation, engagement, and action; and Miao and Shiohira's (2024) Progression Level 1 design principles (Cultivate, Develop, Acquire, Identify, and Explore), which guided content sequencing from foundational awareness through to ethical and contextualised AI use. Together, these frameworks informed a modular structure of four non-sequential modules, each addressing a distinct dimension of AI in higher education. Module 1: AI Foundations builds conceptual understanding of AI definitions, strengths, and limitations, supporting UNESCO's AI techniques and applications competency through scaffolded, multimodal content. Module 2: AI for Learning cultivates a human-centred mindset and ethical awareness, aligned with UNESCO's first competency, through scenario-based reflection and branching activities. Module 3: AI for Academic Writing develops practical AI literacy through guided experimentation with tools such as grammar checkers and content generators, emphasising responsible and informed use. Module 4: AI for Assessment explores ethical and transparent AI use in assessment contexts, supporting human-led decision-making and flexible engagement with multimodal resources.

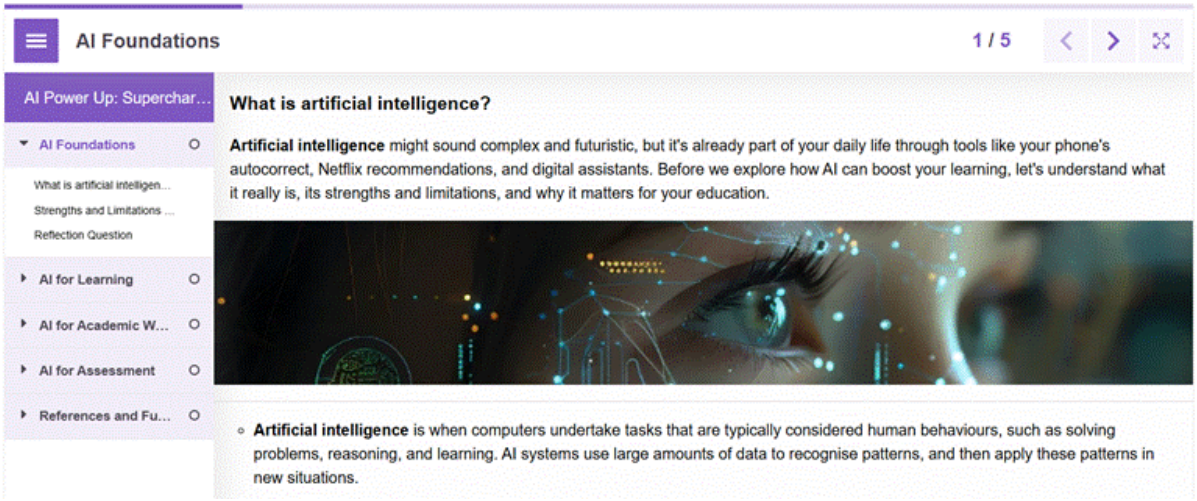

Figure 2. The Four Modules Within the Resource

Interactive Learning with H5P

To promote active, student-centred learning, the resource integrated two tools selected for their pedagogical strength and alignment with UDL principles: H5P interactive content and AI-assisted educational video. H5P (HTML 5 Package) was adopted for its well-evidenced capacity to support metacognitive skills of reflection and self-regulation (Ellis & Goodyear, 2013, as cited in Jacob & Centofanti, 2024; Mutawa et al., 2023), with its affordances deployed across flash cards for knowledge checks, hotspotted images to chunk technical content, and sequenced thematic chapters to support digestible, self-paced navigation. Mutawa et al. (2023) further demonstrate that H5P enhances learner motivation and equitable participation in asynchronous settings, which are qualities particularly important for UniSQ's predominantly online cohort.

Innovative Video Technologies

Video was incorporated as a core asynchronous tool to support self-paced, on-demand learning (Al-Balas et al., 2020; Banihashem et al., 2022; Chu et al., 2019; Englund et al., 2016; Han et al., 2013). Drawing on Maddock's (2021) typology of educational video, a presentation-style format was adopted, with videos designed to be short-form (2–4 minutes) and thematically focused, consistent with evidence that segmented, concise video supports deeper engagement and content retention (Chu et al., 2019; Englund et al., 2016; Koumi, 2006). Each video was complemented by supporting text and curated links to validated sources, enabling learners to trace information provenance and develop critical evaluation skills. Production was facilitated through Synthesia (www.synthesia.io), an AI-assisted platform that enabled the creation of customisable, life-like avatars with control over voice, tone, and on-screen elements, thereby significantly streamlining the production process while maintaining high production quality.

Designing for Sustainability

Sustainability was embedded into AI Power Up from the outset, with the resource designed to be accessible, equitable, and adaptable across UniSQ's diverse online cohort, whether accessed via Moodle, a public website, or offline formats for incarcerated students (CAST, 2018). Its modular structure allows learners to engage non-sequentially and enables educators to contextualise and embed components within their own disciplinary settings, while ongoing alignment with UNESCO's AI competency framework (Miao & Shiohira, 2024) ensures coherence across contexts.

Rather than a static product, AI Power Up functions as a dynamic, shareable resource intended to evolve alongside developments in AI technology and pedagogy. Its open design invites modification and reuse within and beyond UniSQ, offering a transferable model for institutions seeking to support AI literacy in ways that are inclusive, ethically grounded, and responsive to change.

Discussion

This study examined the design and early implementation of AI Power Up through the lenses of socio-cultural learning theory, experiential learning, and critical digital pedagogy. Viewed collectively, these perspectives position AI-enhanced learning not as an individual or technical endeavour, but as a socially situated, reflective, and ethically mediated practice. The findings from this design-based research case study suggest that when AI literacy is framed as a shared institutional responsibility and is supported through a mediating artefact and a CoP, students are better positioned to exercise informed judgment, agency, and ethical awareness in their engagement with AI. In this sense, AI Power Up functions not merely as an informational guide, but as a pedagogical intervention that scaffolds learning through participation, reflection, and critical inquiry.

Learning with AI as a socially situated and reflective practice

The design and early uptake of AI Power Up reinforce socio-cultural accounts of learning in which understanding develops through participation in shared practices and engagement with mediating artefacts rather than through individual instruction alone. From this perspective, AI is not positioned as a stand-alone tutor or productivity tool, but as a cultural and cognitive artefact whose meaning and use are shaped by institutional norms, disciplinary expectations, and social interaction. The resource provided a common reference point across courses and disciplines, supporting the development of shared language and expectations around ethical and effective AI use. This aligns with socio-cultural learning theory, which emphasises that learning is embedded within communities of practice and shaped by collective meaning-making.

Experiential learning theory further illuminates how students may develop AI literacy through cycles of action, reflection, and adaptation. The interactive elements and scenario-based prompts within AI Power Up were intentionally designed to encourage learners to experiment with AI tools, reflect on outcomes and ethical implications, and refine their practices over time. Rather than prescribing correct or incorrect uses of AI, the resource emphasised reflective judgment, metacognition, and informed decision-making. These

qualities are increasingly important in AI-mediated learning environments, where students must navigate uncertainty, ambiguity, and evolving technological capabilities.

Critical digital pedagogy provides an additional layer of interpretation by foregrounding questions of agency, power, and responsibility. By challenging deficit narratives that frame AI primarily as a threat to academic integrity, AI Power Up sought to reposition students as ethical actors capable of making context-sensitive decisions about AI use. The resource's focus on transparency, human oversight, and ethical reasoning reflects a pedagogical commitment to supporting students not only to use AI, but to critically interrogate its role in knowledge production, assessment, and academic practice. Taken together, these theoretical perspectives suggest that AI literacy is most effectively developed when learning is treated as a socially situated, reflective process embedded within authentic academic contexts.

Critical reflection on design choices and implementation

While AI Power Up was intentionally designed to empower students and provide clarity around AI use, several design choices and implementation factors warrant critical reflection. One key tension lay in balancing the need for consistent institutional guidance with the risk of over-prescription. Although the resource aimed to support student agency, its positioning as a university-wide guide could be interpreted as normative or compliance-oriented if embedded without contextualisation by educators. This highlights the importance of academic mediation in ensuring that AI literacy resources are framed as supportive scaffolds rather than fixed rules. The collaborative development process, facilitated through a CoP, was a significant strength of the project, enabling cross-disciplinary input and shared ownership. However, reliance on voluntary participation also introduced limitations.

Willing academics embedded the resource, through a hyperlinked icon, into their own course learning management system (LMS), and freely contextualised it within the course to meet the needs of their own discipline. Acting as what Rogers (1995), in his Diffusion of Innovation theory, would call "innovators" and "opinion leaders," these academics not only shared with their students, but with their colleagues. As a consequence of this peer-to-peer sharing of practice, there was likely more uptake within the university. As a result, student exposure to the resource depended in part on local advocacy rather than systematic integration across all courses. This raises questions about how such initiatives can be sustained and normalised beyond early adopters. Initial student engagement metrics in the LMS revealed the resource receiving 2596 views by 582 users in its first trimester of implementation.

Evaluation at this stage is also necessarily limited. While early engagement metrics and anecdotal feedback suggest positive reception, these data do not yet provide insight into how students' AI practices, ethical reasoning, or learning outcomes change over time. Nor do they capture how students interpret and enact the guidance provided within diverse disciplinary and cultural contexts. As with many design-based research initiatives, the strength of ecological validity is accompanied by challenges in producing generalisable or longitudinal evidence.

Finally, while the resource is explicitly aimed to promote inclusivity and equity through modular design, multimodal content, and offline accessibility, ongoing reflection is required to ensure these intentions translate into practice. Students' access to AI tools, prior digital confidence, language background, and cultural understandings of authorship and integrity all shape how AI literacy initiatives are experienced.

These factors underscore the need for continued refinement, contextual adaptation, and critical evaluation as AI Power Up evolves.

Limitations of the study

This study has several limitations. As a design-based research case study conducted within a single regional Australian university, findings are context-specific and not intended to be generalisable. At the time of writing, evaluation data are primarily descriptive, comprising engagement metrics and anecdotal feedback rather than systematic measures of learning impact or longitudinal change in student AI practices. Additionally, participation in both the CoP and the resource implementation was voluntary, which may reflect a self-selecting group of early adopters rather than representative institutional uptake.

Scalability and institutional transferability

While AI Power Up was developed within the UniSQ context, its underlying design principles of human-centred framing, reflective engagement, and alignment with global competency frameworks are scalable across diverse HE settings. The modular structure and open design allow institutions to adapt content to local policies, disciplinary norms, and technological infrastructures rather than adopting a one-size-fits-all solution.

While several institutional AI literacy initiatives have emerged in recent years, AI Power Up differs in several important respects. Where the University of Sydney's co-designed guide (Schwartzkoff, 2024) and Harvard's GenAI skills framework (Acar, 2023) primarily offer advisory or conceptual guidance, AI Power Up is a fully developed, multimodal learning resource grounded in an explicit theoretical framework and embedded within a CoP. Unlike the University of Florida's curriculum-wide initiative (Chen et al., 2025), which targets workforce readiness at a systemic level, AI Power Up addresses the immediate, discipline-agnostic needs of individual learners within a regional, predominantly online context. Its distinctive contribution lies in combining the UNESCO AI Competency Framework for Students (Miao & Shiohira, 2024) with UDL principles and DBR methodology to produce a resource that is simultaneously ethically grounded, pedagogically inclusive, openly accessible, and designed to evolve, potentially offering a replicable model for institutions that lack the resources to develop large-scale curricular reform.

Cultural adaptability and equity considerations

Cultural adaptability remains a critical consideration in the design of AI literacy resources. Interpretations of academic integrity, authorship, and acceptable AI use vary across cultural, disciplinary, and national contexts. While UNESCO’s framework provides a valuable global reference point, local adaptation is essential to ensure relevance and inclusivity. The design of AI Power Up, including its modularity and availability in offline formats, offers one approach to addressing equity and access, though further work is needed to examine how such resources are interpreted and enacted across culturally diverse learner cohorts.

Implications for future research

Future research should extend beyond early implementation to examine the longer-term impact of AI literacy resources on student learning practices, ethical reasoning, and academic confidence. Longitudinal and comparative studies across institutions and cultural contexts would offer deeper insight into how students develop AI fluency over time. Further work is also needed to explore discipline-specific adaptations, the role of assessment design in shaping AI use, and the inclusion of student co-design processes to ensure that AI literacy initiatives reflect learner perspectives and lived experiences.

Future Evaluation Framework

To move beyond descriptive engagement metrics and capture systematic measures of learning impact, future iterations of AI Power Up will implement a longitudinal evaluation framework. This framework is designed to assess both the acquisition of cognitive AI skills and the evolution of students' ethical and practical AI behaviors over time. The planned evaluation approach comprises four key pillars: Quantitative instruments, performance indicators, structural assessment, and learning analytics, as shown in Table 2.

Table 2. Longitudinal evaluation framework.

Evaluation Pillar	Methodology & Instruments	Target Measurement
Quantitative Instruments	Longitudinal administration of the Artificial Intelligence Literacy Scale. (Miao & Shiohira, 2024).	Core AI constructs: technological awareness, practical use, critical evaluation, and ethical understanding. (Miao & Shiohira, 2024).
Performance Indicators	Criterion-referenced and ipsative assessments via authentic, scenario-based tasks (Liu & Bridgeman, 2025)	Transferability, adaptivity, creativity, and ethical decision-making (aligning with UNESCO) (Miao & Shiohira, 2024).
Structural Assessment	Triangulating data from "Lane 1" (secure) and "Lane 2" (open) assessments.	Genuine foundational capability acquisition versus responsible AI application and student agency (Liu & Bridgeman, 2025)

Learning Analytics	Combining self-reported surveys with dynamic LMS behavioral/clickstream data.	Longitudinal changes in self-regulated learning (SRL) capabilities and the identification of distinct learner profiles (Luckin et al., 2022).

Conclusion

This paper has presented AI Power Up as a design-based response to the growing need for coherent, ethical, and pedagogically grounded support for student engagement with generative AI in higher education. Developed through a cross-institutional CoP at a regional Australian university, the resource was informed by the UNESCO AI Competency Framework for Students and grounded in socio-cultural learning theory, experiential learning, and critical digital pedagogy. Together, these perspectives shaped an approach to AI literacy that positions learning as socially situated, reflective, and ethically mediated rather than purely technical or compliance driven.

Rather than offering prescriptive guidance on AI use, AI Power Up functioned as a mediating artefact that supported shared understanding, reflective judgment, and student agency across disciplines. Early implementation suggests that institutionally aligned, student-facing resources can help reduce confusion, counter deficit narratives, and foster more confident and ethical engagement with AI, particularly in predominantly online learning contexts.

As a DBR case study, the findings are necessarily context-specific and reflect early-stage implementation. However, the principles underpinning AI Power Up, such as human-centred framing, modular design, reflective practice, and collaborative development, offer a transferable foundation for institutions seeking to operationalise AI literacy in ways that are adaptable to local cultures, policies, and learner needs.

As GenAI continues to reshape higher education, initiatives such as AI Power Up highlight the importance of moving beyond reactive or tool-focused responses. Supporting students to engage critically and responsibly with AI requires sustained pedagogical attention, institutional collaboration, and an ongoing commitment to ethical, inclusive, and reflective learning practices.

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Compliance with Ethical Standards

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Appendix

Video Artefact 1

Technology Demonstrators. (2025). *AI Powerup – Introduction* [Video]. YouTube. https://youtu.be/f0YrqnyY480

Video Artefact 2

Technology Demonstrators. (2025). *AI Powerup – Exploring AI and Gen AI* [Video]. YouTube. https://youtu.be/gvC0gUFm76I

Video Artefact 3

Technology Demonstrators. (2025). *AI Powerup – Ethical AI use & academic integrity* [Video]. YouTube. https://youtu.be/A1_oC69I7H8

Video Artefact 4

Technology Demonstrators. (2025). *AI Powerup – AI academic writing and research* [Video]. YouTube. https://youtu.be/HNsgHADTA7M

Video Artefact 5

Technology Demonstrators. (2025). *AI Powerup – Using AI in assessments* [Video]. YouTube. https://youtu.be/3-QCpLekhto

Video Production Note:

All AI-assisted video artefacts embedded in the resource were produced by the authors, with Lachlan Mears leading the production using Synthesia for video generation and Microsoft Copilot for initial script development. Videos were published under the UniSQ EdTech "Technology Demonstrators" YouTube channel for institutional consistency and accessibility.