DIGITAL PLAY

Embedding Interdisciplinary Innovation through Emerging Technologies in Higher Education

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Abstract

The acceleration of digital transformation across sectors; from fashion and gaming to engineering and healthcare, demands a new generation of graduates equipped with advanced digital fluency, ethical reasoning, and interdisciplinary collaboration skills (Ahmad et al., 2023; Chetry, 2024; Zou et al., 2025). Driven by rapid developments in Generative AI, real-time 3D simulation, immersive interfaces, and blockchain-based traceability systems, industries are shifting toward more agile, data-driven, and sustainable models (Lubbe et al, 2025). Legislative initiatives such as the EU's Eco-design for Sustainable Products Regulation (ESPR) and Digital Product Passport (DPP) frameworks are also redefining expectations around transparency, lifecycle accountability, and digital compliance (Weng, 2025).

In response to these emerging needs, this project piloted a cross-disciplinary digital immersion programme grounded in experiential learning, speculative design, and co-created curriculum design. Students from diverse disciplines; including Fashion Business and Technology, Computer Science, Marketing, Physics, and Mathematics, participated in a four-session intensive exploring Style3D (3D model simulation and AI-assisted prototyping), SEAMM.io (immersive UI and blockchain mapping), and Unity-based XR tools. The learning approach aligned with Creative STEM pedagogies (Nugraha et al, 2024), emphasising play-based inquiry, ethical technology evaluation, and critical reflection.

A mixed-method evaluation captured student perspectives across four sessions using Likert-scale surveys (5 = strongly agree), qualitative discussion prompts and self-reflection. Results showed significant gains in tool confidence, interdisciplinary awareness, and ethical reflection, particularly in sessions focused on AI-driven workflows, immersive prototyping, and digital identity. Students highlighted a clear need for scaffolded onboarding, modular access to advanced tools, and practical industry alignment.

They also expressed critical concern around automation, IP ownership, and sustainability implications of emerging technologies.

Findings support the future development of a credit-bearing interdisciplinary module focused on "*Digital Tools for Future Innovation*," combining technical skill development with systems thinking, ethical evaluation, and cross-disciplinary collaboration. This intervention offers a replicable model for addressing digital skills gaps across HE, aligned with national frameworks such as the UKFT Skills Strategy and Innovate UK's Industry 5.0 roadmap.

1. Introduction: Embedding Digital Literacy in Context

The Digital Play pilot was developed as a targeted intervention to explore how advanced digital tools, specifically 3D simulation, generative AI, immersive platforms, and blockchain technologies, can be meaningfully embedded into cross-disciplinary education. The project was designed around the pedagogical principles of speculative design, challenge-led learning, and experiential play, and took direct aim at a persistent challenge across higher education: the uneven and siloed development of digital fluency across disciplines (Gallery & Conlon, 2024).

Facilitated by digital experts from Style3D, SEAMM.io, and Unity, the immersive tech project brought together students from diverse programmes across FSE. Sessions were designed to simulate real-world digital workflows while also surfacing deeper questions around design ethics, data governance, interdisciplinary language, and the impact of automation on creative and technical roles.

Importantly, the project did not treat tools like Style3D or Unity as standalone software. Each session contextualised the technology within industry practices, regulatory frameworks, and disciplinary paradigms, encouraging students to interrogate how to use the tools, but also why it matters in their field (and beyond). This mirrors findings from previous research (Conlon & Gallery, 2023), which emphasised the value of positioning students as collaborators in digital transformation, rather than passive adopters of emerging technologies.

“Students were not only learning to use digital tools but were actively redefining their roles in future production ecosystems, becoming collaborators in digital transformation rather than passive recipients of technical knowledge.” (Conlon & Gallery, 2023)

By grounding the experience in play-based learning and challenge-led pedagogy, the pilot aligned with emerging research on how digital skills are best developed in higher education (Nugraha et al, 2022). By moving beyond conventional, passive tool instruction, students are encouraged to critically examine the broader social, economic, and environmental ramifications of emerging technologies. This empowers them to see themselves both as users of digital tools and as proactive, critical participants in evolving socio-technical systems. The immersive format of Digital Play aimed to replicate the complexity, ambiguity, and opportunity of that future landscape, providing space for students to test, prototype, and challenge the tools that will increasingly shape their working lives.

1.1 Addressing the UK Digital Skills Gap

The Digital Play pilot was designed in response to ongoing concerns about the readiness of UK graduates to engage with emerging technologies in the workplace. Despite sector-wide recognition of the need for digital fluency, the pace of change in industry continues to outstrip the evolution of many academic programmes, particularly in fields where technical innovation intersects with creative and strategic thinking.

According to the *WorldSkills UK Digital Skills Gap Report* (2023), employers are experiencing widespread digital skills shortages across both basic and advanced areas. Around 23% report that their workforce lacks basic digital proficiency, while 37% identify gaps in more advanced digital skills. These shortfalls are already affecting business outcomes with 76% of employers say a lack of digital capability is impacting profitability. At the same time, digital skills provision is not keeping pace with evolving workplace needs. The number of students taking ICT-related courses has declined in both further and higher education. This indicates a structural shortfall in workplace readiness, one that cannot be resolved through technical training alone, but requires a more integrated and critical approach to digital capability-building.

Parallel and ongoing graduate pathways research (Digital Skills Demands in Science and Engineering, 2025) further reinforces this point. At entry level, employers consistently seek proficiency in tools such as data analysis platforms, digital communication systems, and foundational programming or design software (Baskara, 2024). However, senior roles increasingly demand flexible, cross-disciplinary thinking and the ability to apply digital systems ethically and strategically within complex, evolving environments (Rego et al, 2023; ncfe.org.uk, 2025). Recent UK data on AI readiness underscores that this expectation now extends to AI literacy: with only around 11% of the workforce currently equipped with advanced digital or AI skills, graduates who can confidently navigate generative AI tools, data-driven workflows, and responsible AI practices are positioned as critical hires in nearly every sector (Pal et al, 2025).

The *Digital Play* pilot was purposefully designed to develop both technical competence and critical fluency in emerging technologies. Students engaged in applied experimentation with tools such as tension-mapped prototyping, virtual product development environments, blockchain-enabled product passports, and AI-assisted design platforms. Alongside these hands-on experiences, the programme foregrounded critical inquiry into how such technologies reshape authorship, ownership, sustainability, and user experience across fashion and adjacent sectors.

Student feedback indicated strong gains in confidence when applying digital tools within interdisciplinary contexts, alongside a growing recognition of the wider legal, social, and environmental systems in which these technologies are embedded. This aligns with current research which suggests that digital education must move beyond tool-based demonstrations and towards immersive, reflective pedagogies that interrogate the affordances, limitations, and ethical implications of digital platforms (ncfe.org.uk, 2025).

By embedding ethical questioning, industry framing, and collaborative problem-solving throughout the pilot, *Digital Play* operationalised this pedagogical shift. It reinforced the message that digital literacy, particularly in an AI-assisted landscape, is not just about functional tool use, but also about systems thinking, strategic application, and adaptive, cross-disciplinary reasoning.

1.2 Sectorial Drivers: The Case for Cross-Disciplinary Digital Capabilities

While the *Digital Play* pilot was interdisciplinary by design, it operated within a wider landscape of sectoral transformation driven by technological convergence, sustainability imperatives, and evolving regulatory frameworks. Across domains such as fashion and textiles, engineering, manufacturing, healthcare, and commerce, digital tools once considered speculative, such as 3D simulation, generative AI, immersive interfaces, and blockchain infrastructure, are now integral to standard practice.

In engineering and industrial design, 3D modelling and digital twin technologies are increasingly used for virtual stress testing, real-time monitoring, and large-scale prototyping (Aklilu, et al, 2025; Innovate UK, 2024). The health sector is rapidly adopting immersive XR platforms for surgical training and AI-driven diagnostics to improve accuracy and efficiency in patient care (NHS England, 2024; WHO Digital Health Strategy, 2021). In fashion, retail, and marketing, generative AI is being embedded in campaign personalisation, digital storytelling, and virtual try-on technologies, therefore redefining consumer interaction and brand strategies (McKinsey & Company, 2023; Interline AI Report, 2025; Deloitte, 2024). Blockchain infrastructures are also gaining traction across multiple sectors for use cases including decentralised product passports, compliance automation, and supply chain transparency (World Economic Forum, 2023; UK Blockchain Roadmap, 2024; IBM Institute for Business Value, 2025).

These applications are reinforced by regulatory developments such as the European Sustainability Product Regulation (ESPR) and the introduction of Digital Product Passports (DPPs), which will require new technical capabilities for traceability, data integration, and lifecycle mapping. The Digital Play pilot allowed students to work with precisely these use cases, giving them early exposure to the implications of building or interacting with systems that intersect with legislation, sustainability, and algorithmic governance.

Despite their industry relevance, these technologies remain underrepresented in many undergraduate and postgraduate curricula, particularly outside vocational or STEM-specific pathways. Research shows that siloed approaches to digital learning, where tools are introduced without critical framing or interdisciplinary application, fail to prepare students for the complexity of real-world innovation (Gallery & Conlon, 2024)

The pilot addressed this gap by situating each session within a clear industry application and encouraging students to examine how digital technologies influence systems, decision-making, and disciplinary norms. In doing so, it reflected the shift outlined in frameworks like the UKRI Future Skills Strategy (2023), which emphasises the need for

innovation-ready graduates who can apply digital tools flexibly, ethically, and collaboratively.

2. Methodology: Designing for Interdisciplinary, Ethical, and Experiential Learning

The design of the Digital Play pilot was shaped by three interlinked priorities:

1. Embedding advanced digital tools into interdisciplinary learning
2. Testing inclusive, challenge-led pedagogical methods
3. Gathering meaningful data on student experience and outcomes

To achieve this, the pilot followed a structured, yet flexible delivery model grounded in experiential learning and student partnership. It was aligned with the UCIL framework, which emphasises modular, challenge-led education that responds to shared societal issues and emergent industry needs.

2.1 A Student-Partnered Curriculum Innovation Process

The pilot was co-developed through an internship-based research model, with student researchers helping to shape the programme's objectives, session design, and reflective tools. This approach mirrored best practices in student-staff partnership (Healey et al., 2016), prioritising shared ownership of learning design and acknowledging students as experts in their own educational journeys.

Students from Fashion Business & Technology, Computer Science, Mathematics, and Physics were selected to reflect a deliberately mixed cohort. Their diverse disciplinary perspectives were central to testing how immersive technologies could support cross-pollination of ideas, roles, and digital applications. The pilot sought to create an environment in which learners would not only acquire technical knowledge but also interrogate its implications, strategically, ethically, and collaboratively.

The programme unfolded across four scaffolded sessions, each led by an external digital specialist. These sessions were designed using a "live sandpit" approach, combining technical demonstrations, exploratory play, and structured reflection. Students were encouraged to work across disciplines, share expertise, and critically assess how digital platforms shape design outcomes and professional norms.

Each session also included built-in mechanisms for co-design and feedback, including facilitated discussions, reflective prompts, and formative evaluation surveys. As highlighted in prior work (Conlon & Gallery, 2023), this iterative and dialogic approach supports deeper student engagement by treating digital tools as both technical and cultural systems, open to negotiation, critique, and reimagination.

2.2 Comparing Delivery Formats: In-Person vs Online

Three of the four immersive sessions were delivered on campus, while one (Session 4: Blockchain & Product Passports) was facilitated online. This was an intentional design decision. The hypothesis was that online delivery would result in lower engagement and reduced depth of comprehension, a theory supported by the data.

While the digital content of the online session was technically well executed, student feedback revealed lower confidence, weaker perceived relevance, and reduced sense of collaborative momentum compared to the in-person workshops. Several participants noted difficulties sustaining attention, asking questions, and applying abstract blockchain concepts in the absence of real-time physical interaction.

These insights are important for future curriculum planning. They suggest that while advanced digital topics can be taught remotely, deeper learning may require physical co-presence, particularly when tools are complex, underexplored, or unfamiliar. Hybrid delivery remains viable, but should be carefully scaffolded with preparation materials, interactive touchpoints, and peer-based support.

2.3 Framing Interdisciplinary Learning as a Strategic Imperative

What became evident throughout the pilot was that the value of immersive technologies lies in both technical proficiency and in the capacity to collaborate meaningfully**,** design responsibly**,** and translate digital tools across disciplinary contexts**.**

This insight aligns with the goals of Industry 5.0, where innovation is no longer defined solely by automation or speed, but by sustainability, ethical integration, and human-centred thinking (Alves et al, 2023). As highlighted previously, graduates entering this landscape must be equipped to navigate tensions between automation and creativity, efficiency and ethics, decentralisation and regulation. The Digital Play pilot offered a microcosm of that complexity, allowing students to test real tools against real challenges, while engaging in structured reflection about the systems they were participating in.

Embedding tools like Style3D into curricula requires a technical onboarding, in addition to a reframing of their epistemological relevance (Gallery & Conlon, 2024) The pilot responded to this challenge through deliberate pedagogical framing, interdisciplinary team design, and a consistent focus on applied, critical, and creative use of emerging technologies.

2.4 Interdisciplinary Collaboration in Practice

As highlighted, participants were drawn from diverse programmes which allowed for a rich cross-pollination of thinking styles, priorities, and approaches to technology. The juxtaposition of students with technical, commercial, and creative mindsets created a learning environment where disciplinary assumptions were regularly surfaced, challenged, and reimagined.

Key methodological features included:

- **Live "sandpit" sessions** to encourage rapid prototyping, experimentation, and informal peer review
- **Reflective discussion (recorded)** to document evolving perspectives on digital literacy and disciplinary relevance
- **Collaborative scenario design** where students projected future use cases of emerging tech across sectors
- **Surveys and open-response tools** to capture real-time student feedback on tool confidence, conceptual clarity, and cross-disciplinary insight

At the end of each session, students were encouraged to reflect on how to operate the digital tools and how these technologies reshape disciplinary logics, ethical responsibilities, and stakeholder relationships in different professional contexts. This reflective process, conducted both individually and in group discussion, prompted a series of live debates that proved to be one of the most intellectually generative aspects of the pilot. For example, the student from Computer Science background emphasised the efficiency and scalability of blockchain and AI systems, while the student from Fashion Business and Marketing raised concerns about creative authorship, personalisation ethics, and the erosion of brand identity in generative workflows. Mathematics and Physics students interrogated the logic and limitations of simulation models, while participants from more design-led disciplines questioned how far such logic should drive visual or experiential outputs.

These exchanges fostered a deeper understanding of disciplinary blind spots and shared concerns, particularly around issues such as:

- Intellectual property and authorship in generative design
- Bias in AI training datasets
- The environmental footprint of blockchain systems
- The trade-off between personalisation and privacy in immersive commerce
- Whose values are embedded in the algorithms we deploy?

Rather than collapsing these tensions, the pilot used them as fuel for critical inquiry, encouraging students to think across their disciplines without abandoning the distinctiveness of their fields. As a result, they began to articulate not only how these tools

work, but what it means to use them responsibly, and who benefits (or is excluded) when we embed them in systems, products, and services.

This kind of structured, values-driven debate is essential for preparing students to navigate the socio-technical complexity of Industry 5.0, where human-centred innovation must be balanced with automation, governance, and cross-sector accountability. *Digital Play* provided a rare opportunity for such discourse to be embedded directly into technical learning, and proved that students are both capable of, and eager for, these kinds of nuanced interdisciplinary engagements.

2.5 Towards an Interdisciplinary Digital Capability Model

The pilot reinforced that digital literacy is not confined to technical competence. Instead, the most valuable outcomes came from helping students develop the ability to:

- Think critically about the role of emerging technologies in society
- Work confidently across disciplinary boundaries
- Evaluate the ethical, legal, and sustainability implications of digital systems
- Prototype ideas that respond to real-world challenges using relevant, sector-aligned tools

By providing this space for applied, reflective, and collaborative engagement, *Digital Play* offered students a microcosm of the industry 5.0 landscape, one where innovation is judged not solely on efficiency or automation, but on values, responsibility, and cross-sector adaptability.

3. Session Focus & Strategic Skills Mapping

This section provides a breakdown of each immersive session, mapping the skills developed, sectoral relevance, and strategic alignment with future workforce capabilities. Each session was led by a specialist facilitator and embedded within a broader framework of critical reflection, interdisciplinary collaboration, and experiential learning. Sessions were framed around real-world use cases, regulatory contexts, and design challenges to ensure relevance beyond any one sector.

Each session followed a consistent structure:

- **Industry Contextualisation**: Facilitators opened with use cases from their respective sectors, grounding tools like Style3D, SEAMM.io, and blockchain mapping within relevant commercial, design, and compliance ecosystems.
- **Hands-On Skill Development**: Students engaged in scaffolded technical activities, tailored to allow exploration regardless of disciplinary background or prior software experience.
- **Ethical and Strategic Framing**: Sessions included time to interrogate broader issues, IP, bias, automation, regulation, inclusion, prompting students to apply critical thinking beyond functionality.

- **Structured Reflection**: Each session concluded with discussion prompts and reflective exercises designed to help students evaluate the potential impact, opportunities, and limitations of each tool within their own discipline.
- **Formative Survey Input**: Immediate post-session feedback captured student confidence, tool relevance, and engagement levels.

3.1 Session 1: Style3D – 3D Modelling & Spatial Mapping

Facilitator: Style3D
Delivery Mode: In person
Session Focus
Introduction to the Style3D interface and foundational 3D prototyping workflows. Students worked with avatars, spatial geometry, and parametric design tools to simulate and manipulate digital prototypes. Students explored spatial geometry and pattern manipulation, understanding how simulation platforms can reduce physical prototyping, accelerate design cycles, and improve data-informed decisions.

Strategic Insight
Real-time spatial modelling and digital twins are essential to modern innovation pipelines across sectors, from sustainable fashion to engineering and immersive product design. As students engaged with Style3D, they also explored its potential beyond its original industry context, identifying its relevance to simulation, materials behaviour, and collaborative prototyping. These tools directly align with Industry 5.0's push toward intelligent, human-centred, and environmentally responsive innovation cycles.

Session Overview

Category	Details
Digital Platform	Style3D
Key Focus Areas	Digital prototyping- Spatial interface navigation & Real-time simulation
Skills Developed	3D model mapping & parametric modelling Cloud-based collaboration UX-layered spatial design
Industry Applications	Engineering: Digital simulation, fit verification Product Design: Rapid prototyping Architecture: Spatial mapping & volumetric design STEM/Physics: Measurement accuracy & digital geometry
Pedagogical Themes	- Experiential learning- visual computing - Systems thinking- Design for sustainability
Delivery Format	In-person workshop with facilitator-led walkthrough and reflective Q&A

Learning Insights

- Students across disciplines recognised the transferability of 3D workflows, particularly in relation to sustainability (e.g. reducing physical sampling, enabling virtual testing).

- The session challenged assumptions around tool ownership (i.e. “3D tools are only for designers”) and revealed their relevance to data science, physics, and materials research.
- Students discussed how digital prototyping enables collaboration across disciplines and industries including supply chain agility, circular product development, and remote collaboration.

3.2 *Session 2: Style3D – AI-Assisted Design, Immersive Spatial Design, & Ethical Generativity*

Facilitator: Style3D/Unity
Delivery Mode: In Person
Session Focus
This session built on foundational 3D knowledge by introducing AI-assisted workflows and advanced simulation. Students explored tools for automated product development, avatar customisation, and tension visualisation. An additional focus was placed on ethical concerns around data, algorithmic decision-making, and creative ownership in AI-assisted design. There was also a focus on designing immersive 3D environments for experiential storytelling and interaction.

Students experimented with scene building, spatial interaction, and narrative sequencing, testing how environments can shape user behaviour and emotional engagement
Delivered remotely, this session also tested the impact of online delivery on engagement compared to in-person immersion. Ethical and regulatory issues, around IP, training data, and automation, were positioned as central to responsible implementation.

Strategic Insight
AI design tools are advancing fast, but skills in prompt engineering, data literacy, and ethical interrogation are lagging in education. This session addressed the real need for creative-AI fluency, particularly in industries moving toward automated ideation and adaptive design systems. This session responded to emerging employer expectations for fluency not just in AI use, but in its ethical and operational implications.

Session Overview

Category	Details
Digital Platform	Style3D (AI features)/Unity
Key Focus Areas	AI-assisted product simulation- Data-driven design tools/Immersive UX
Skills Developed	Tension mapping & fit logic- Ethical data use in design- Advanced avatar systems - immersive user experience - prompt engineering for GenAI - Criticality on AI training models and output bias - IP frameworks in digital content creation - Systems thinking in spatial storytelling
Industry Applications	Fashion: custom fit simulation-

	Sportswear/Health: pressure mapping-simulated environments for diagnostics. Tech: AI-assisted UX prototyping Marketing/Business: campaign ideation, branded virtual worlds.
Pedagogical Themes	Ethical design- Data-informed creativity- Prompt engineering
Delivery Format	Online (used to test comparative engagement)

Learning Insights

- Students became more aware of the ethical complexities of using AI in creative work, particularly in relation to authorship, dataset transparency, and creative control.
- The hands-on simulation tools helped demystify AI's role in design, with students expressing confidence in navigating automated systems, despite initial uncertainty.
- Interdisciplinary teams approached AI differently: STEM students focused on optimisation and performance; creative students questioned aesthetic authorship and control.
- The session surfaced broader debates about "design by AI" vs "design with AI," with many students seeing hybrid models as most viable in professional practice.

3.3 Session 3: SEAMM.io – Immersive UI, AR, and Cross-Sector Gamification

Facilitator: SEAMM.io
Delivery Mode: In person
Session Focus
Focusing on immersive commerce and cross-sector gamification, this session introduced students to SEAMM's drag-and-drop interface for creating 3D environments, virtual try-ons, and interactive user journeys, blurring lines between physical and digital experiences. It also explored use cases beyond fashion, highlighting relevance in healthcare, architecture, and gaming. Students were encouraged to reflect on design for inclusion, algorithmic personalisation, and XR accessibility. The principle of "interoperable design" was presented, underscoring the potential for digital resources and user interfaces to go beyond traditional industry boundaries, thereby serving diverse sectors via a unified platform.

Strategic Insight:
Immersive interfaces and AR experiences are reshaping how users interact with digital systems, across retail, healthcare, education, and entertainment. The need for human-centred XR designers, able to balance accessibility, inclusivity, and engagement, is rapidly growing therefore it is essential that future professionals are able to prototype responsibly within personalised and data-rich environments.

Session Overview

Category	Details
Digital Platform	SEAMM.io
Key Focus Areas	Immersive UI- AR try-ons- Gamification and UX
Skills Developed	3D-to-AR workflows- Immersive interface design- Personalisation vs. privacy - Interoperability design: integrating 3D assets across platforms - Immersive product deployment using WebXR standards
Industry Applications	Marketing: immersive campaigns, UX testing Health: spatial simulation, virtual diagnostics Gaming: character-led interaction
Pedagogical Themes	Experience design- Gamified learning- Personalisation ethics
Delivery Format	In-person workshop

Learning Insights

- Students appreciated the ease of use and the ability to create immersive experiences without coding, which enabled low-barrier creative exploration.
- Team discussions revealed varied sectoral priorities: marketing students focused on consumer engagement, while physics and computer science students explored interface logic and spatial tracking.
- Ethical conversations focused on the risks of over-personalisation, digital fatigue, and the challenge of maintaining user agency in immersive environments.
- Many students recognised the potential to apply AR/UX skills beyond commerce, identifying applications in STEM communication, education, and mental health tools.

3.4. *Session 4: SEAMM.io – Blockchain & Product Passport Ethics*

Facilitator: SEAMM.io
Delivery Mode: Online
Session Focus
This final session explored decentralised systems, focusing on blockchain infrastructure, NFT-like product passports, and traceability ethics. Students examined the regulatory context (e.g. EU Digital Product Passport, ESPR) and considered how blockchain is used in supply chains and as a key enabler of circularity, authentication and consumer trust across sectors (fashion, health and consumer tech in particular)

Strategic Insight:
Legislation is rapidly catching up with technology. Tools for traceability, IP protection, and decentralised validation are critical in sectors facing pressure for transparency and compliance. Blockchain skills are especially underdeveloped in non-tech disciplines, this

session explored both the technical and ethical fluency required to engage with smart contracts, traceability platforms, and digital identity.

Session Overview

Category	Details
Digital Platform	SEAMM.io (Blockchain Mapping Tool/Smart DPP)
Key Focus Areas	Product passports (DPP), Blockchain technologies, Supply chain traceability, Compliance modelling
Skills Developed	Blockchain mapping (understanding smart contracts and asset identity) Regulatory awareness (ESPR, GDPR alignment, DPP)- Smart asset ownership frameworks
Industry Applications	Supply chains (all sectors) Medical tech: Medical device regulatory audit trails, patient record integrity Consumer goods traceability STEM/Engineering: component traceability in manufacturing
Pedagogical Themes	Legal & ethical tech- Decentralisation- Future regulation readiness Blockchain use in product provenance and compliance supports regulatory resilience and cross-industry interoperability; areas forecasted as critical in Industry 5.0. Students must be prepared to navigate both technical implementation and policy implications of distributed systems.
Delivery Format	Online

Learning Insights

- Students acknowledged that blockchain felt more complex conceptually than other tools but appreciated the visualisation and technical exercises that made it accessible.
- Conversations focused on how trust is designed, raising questions around digital ownership, decentralisation risks, and public vs private ledger systems.
- The online delivery format led to reduced engagement, particularly in peer discussion. Several students noted they would have preferred this topic delivered in person due to its conceptual density.
- Nevertheless, many saw value in blockchain as a future-proof skill, especially in sectors where compliance, authenticity, and traceability are becoming regulatory imperatives.

4. Survey Analysis & Thematic Synthesis

Across all four immersive sessions, students completed evaluation surveys designed to assess confidence, engagement, tool relevance, and perceived interdisciplinary value.

The surveys combined Likert-scale questions (1 = Strongly Disagree to 5 = Strongly Agree) with open-ended reflection prompts. The goal was to capture both technical skill development and broader attitudes toward digital integration across disciplines.

Overview of Survey Methodology

- **Tools used**: Qualtrics, recording
- **Peer reflection**: Each session featured a 45 min reflection and verbal deep dive
- **Response types**: Likert-scale (1–5), open-text reflections
- **Focus areas**:
    - Relevance of session content to discipline
    - Confidence using digital tools
    - Value of interdisciplinary collaboration
    - Preferences regarding delivery format (in-person vs online)
    - Ethical and strategic understanding of tools

Metric	Outcome
Engagement	100% attendance during immersive week; high participation in workshops and Q&A
Skill Development	Significant increase in student confidence across AI, 3D, and immersive workflows (self-reported)
Interdisciplinary Thinking	High-level idea sharing between disciplines.
Industry Relevance	Positive feedback from facilitators on student adaptability and inquiry-led learning

4.1 Quantitative Summary Table

A consolidated table comparing average ratings across sessions:

Session	Platform	Avg. Relevance (5)	Avg. Confidence (5)	Interdisciplinary Value (5)	Delivery Satisfaction (5)
Style3D – 3D Modelling	Style3D	4.6	4.5	4.7	4.6
Style3D – AI Simulation	Style3D/Unity	4.4	4.2	4.5	4.3
SEAMM – AR & UX	SEAMM.io	4.7	4.6	4.8	4.6

SEAMM – Blockchain	SEAMM.io	4.2	3.9	4.4	3.6

Notes:

- **Highest-rated session overall**: Session 3 (SEAMM – AR & Immersive UX) with consistent top scores across all metrics.
- **Lowest rated for delivery**: Session 4 (Blockchain), likely due to its online format and conceptual complexity.
- **Strongest interdisciplinary value**: All sessions rated highly here, but AR and UX tools in Session 3 were seen as especially cross-sectoral.

4.2 Thematic Findings

Organised into five key areas for strategic analysis:

Skill Acquisition & Confidence

- Students gained foundational fluency in tools they had never used before.
- Confidence was highest in visual/spatial design tools (3D & AR), lower in technical concepts (blockchain, fit logic).
- Students from STEM backgrounds appreciated visual workflows; design students reported stronger growth in technical confidence.
- Style3D was praised for its intuitive interface, but AI functionality in Session 2 required more contextual explanation to avoid surface-level exploration.

Interdisciplinary Application

- Students consistently recognised the value of digital tools beyond their original domain. For example, Physics and Computer Science students found Style3D's simulation features useful for geometry modelling and logic design, while marketing students valued immersive try-ons for customer engagement analysis.
- The strongest perceived value came when tools were framed through cross-sector use cases, e.g. product passports in circular manufacturing, or AI in medical wearables.
- Comments revealed a shift in mindset, students realised the cross-sector relevance of these tools**,** even if originally seen as niche.

Perceived Industry Relevance

- Most students connected the tools directly to real-world workflows, especially in product development, simulation, immersive UX, and compliance.
- The session on blockchain had the lowest confidence scores but high recognition of its future regulatory importance**.**

Online vs In-Person Delivery

- Students strongly preferred in-person delivery, citing ease of focus, peer interaction, and facilitator support.
- Session 4 (online) had noticeably lower engagement and satisfaction scores, supporting the pilot's hypothesis that remote delivery can reduce uptake of complex technical content.

Ethical and Strategic Awareness

- Many students reported new understanding of data ethics, IP, and regulation, particularly in AI and blockchain sessions.
- There was strong interest in continuing these conversations, suggesting a need for future modules to include dedicated time for strategic discussion, not just tool training.

4.3 Participant survey analysis - Session 1: Style3D training

Survey Statement	Average Score (5 = Strongly Agree)	Key Insights
The Style3D interface was intuitive and easy to navigate	**4.17**	Most students found the interface accessible, with a few noting a learning curve
I understand the core functions of Style3D	**4.33**	Strong understanding of basic functions developed across disciplines
I feel confident using basic design tools in Style3D	**4.00**	Confidence building, but some students requested additional time with tools
I can see how Style3D is used in real-world industry workflows	**4.67**	Clear recognition of relevance to fashion, product, engineering, and visualisation workflows
Style3D can help reduce physical sampling and overproduction	**4.67**	Students strongly linked digital tools to sustainable practices
Style3D has relevance beyond fashion (e.g. engineering, materials, health)	**4.50**	High agreement on the cross-sectoral potential of 3D modelling
This session encouraged collaborative and interdisciplinary thinking	**4.83**	Interdisciplinary reflection and collaboration were highlights for most participants
I understand the limitations of using Style3D in realistic design contexts	**4.33**	Students identified gaps, such as realism in fit/simulation and access to advanced features
I would recommend integrating tools like Style3D into cross-disciplinary modules	**4.50**	Strong endorsement for embedding 3D tools in future interdisciplinary curricula

Key Themes from Open-Ended Reflections

Curriculum Positioning & Integration

- Strong support for integrating Style3D into first-year modules or as a UCIL elective, particularly as a bridge between theory and digital practice.
- Students saw potential for progressive skill development, from foundational digital fashion concepts to more advanced applications in dissertations or tech-focused electives.
- Several recommended embedding Style3D within a broader "Digital skills Toolkit", paired with introductory modules in design and product development.

Student reflections

"This could work really well in a toolkit course, we all bring different strengths and Style3D is one way to visualise them."
"I wish we had access to this in first year, it's such a powerful tool and we only see it now."

Interdisciplinary Value

- Students recognised the potential for cross-disciplinary collaboration, especially when framed around real-world challenges (e.g., sustainability, simulation accuracy, digital materials testing).
- Clear suggestions emerged for creating cohort-based collaboration models, where groups could include fashion, physics, and Computer Science students working on shared digital product outcomes.

Examples raised by students:

- Physics students simulating gravity or motion forces on digital garments
- Engineers modelling stress responses using virtual materials
- CS students investigating system performance or interface logic

Student reflections:

"I didn't expect to enjoy this as a Maths student, but now I can see how 3D simulation fits into the kind of modelling I already do."
"This would be better in groups, a designer, a coder, an engineer, all working on one digital product."

Tech–Sustainability Integration

- Many saw Style3D as an effective tool for reducing waste, increasing iteration speed, and encouraging data-informed design choices.
- Several students linked the software to ESG goals, including circularity, supply chain transparency**,** and decarbonisation pathways**.**

Student reflections:

“Virtual sampling could save loads of resources, especially in industries where prototyping is expensive or wasteful.”
“This could fit into sustainability modules or green engineering, it’s visual but also data rich.”

Challenges & Barriers

- Some students reported initial discomfort with the interface, particularly those with no prior CAD or design experience**.**
- Access to high-performance hardware was raised as a barrier, especially for remote or off-campus learning.
- A few noted that without team diversity or contextual examples, the tool risks feeling discipline specific.

Suggestions included:

- Pre-session orientation on 3D environments or CAD basics
- Cross-disciplinary team setups with defined collaborative roles
- Custom framing of Style3D’s relevance to non-design disciplines

Student reflections:

“I felt a bit out of my depth until I watched someone else demo it. A walkthrough before the session would help.”
“If the goal is interdisciplinary, maybe set up teams with different roles from the start.”

4.4 *Survey 2 Analysis: Style3D – Simulation, AI Prototyping, Fit & Customisation*

Quantitative Summary of Key Metrics

Survey Statement	Average Score (5 = Strongly Agree)	Key Insights
Product simulation understanding	4.67	Strong grasp of structural and fit simulation features
Use of advanced design features (layering, tension mapping)	4.33	Learners gained confidence in technical simulation but varied in depth
AI prototyping tools accessible and intuitive	4.00	Participants experimented with AI tools, but noted the need for support and training
Understanding of AI in automating design tasks (e.g., material selection, fit prediction)	4.67	High confidence: learners recognised the system's automated potential
AI-supported tools speeding up product development	4.33	Recognised industrial relevance in product acceleration and rapid iteration
Environmental and economic benefits of digital workflows	4.33	Participants understood the sustainability and cost reduction implications
AI adoption in industry (virtual sampling, iteration)	4.33	Clear sense of current and future industry applications
AI use across disciplines (e.g., engineering, biomechanics)	4.00	Strong cross-sector relevance noted
Inclusive design potential through simulation	4.00	Recognition of accessibility as a design concern enhanced by digital tools
Confidence in using AI workflows in interdisciplinary settings	4.33	Participants felt able to communicate AI design benefits to others
Critical awareness of AI's impact on human expertise and creative roles	4.67	Deep engagement with ethical, economic, and creative tensions
Understanding of AI trade-offs (efficiency vs. originality, automation vs. craft)	4.67	Strong ability to articulate balanced, nuanced positions on AI's role in design

Themes from Open-Ended Reflections

AI-Driven Innovation vs. Human Creativity

Participants showed a high degree of critical literacy around the adoption of AI in creative industries. Comments reflected:

- Concern over the displacement of skilled creative labour (e.g., photographers, 3D artists, pattern cutters)
- Recognition of AI's potential for access, cost-saving, and speed, but tempered with awareness of its ethical limitations
- A call for universities to lead balanced, reflective dialogue around AI use, not defaulting to hype or resistance

“Is AI the answer to everything or do we bury originality and craftsmanship because there is a shiny new toy?”

This sentiment reflects a growing need for critical digital literacy in higher education, where technology is not only taught but scrutinised.

Interdisciplinary Collaboration Opportunities

- Students envisioned clear collaborations between fashion, physics, and computer science, particularly in:
    - **Optimising design for sustainability**
    - **Creating adaptive garment systems**
    - **Developing accessible and inclusive design tools**

- Several highlighted that joint modules or electives could allow teams to work on real-world design + tech challenges

“Together, they [fashion and CS students] could develop AI systems that optimise fashion designs based on sustainability, cost, or fit criteria.”

Curriculum Integration Recommendations

- Embed tools like Style3D in coursework, hackathons, or live briefs
- Provide early-stage training before using AI tools for complex tasks
- Design assessments that blend technical output with ethical reflection
- Link sessions to inclusive design, sustainability, and systems thinking

Participants clearly valued the opportunity to engage with real-world workflows but noted that tool literacy and critical thinking must be developed in parallel.

4.5 Survey 3 Analysis – SEAMM.io: Virtual Fit, Gamification, and AR

Quantitative Summary

Survey Statement	Average Score (5 = Strongly Agree)	Insight
I understand the principles behind virtual fit and how it differs from traditional sizing	**4.5**	Strong understanding of fit simulation concepts
I can explain the impact of digital try-on tools on consumer decision-making and returns	**4.3**	Clear awareness of practical value in retail UX
I see clear applications for virtual fit tech beyond fashion (e.g., gaming, healthcare)	**4.8**	High recognition of cross-sector potential
I gained insight into how digital skins contribute to self-expression and monetisation	**4.8**	Learners grasped key value propositions of virtual fashion ecosystems
I feel confident discussing gamification in product and brand design	**4.5**	Confidence is developing, with some variation in comfort levels
I see potential for crossover between gaming, product innovation, and immersive retail	**4.8**	Strong consensus on interdisciplinary innovation
I understand how AR tools like Snapchat Lens are used for product prototyping	**4.3**	Students recognised real-world application of AR
I see opportunities to use AR in brand marketing or education settings	**4.3**	Consistent recognition of use in commercial and academic domains
I am aware of ethical and creative considerations in designing for AR experiences	**4.7**	Critical engagement with design ethics was strong
This session expanded my understanding of how virtual fit, gamification, and AR shape future design/marketing	**4.7**	Learners reported transformative learning outcomes

Key Themes from Open-Ended Reflections
Interdisciplinary Integration Potential

Students saw multiple pathways to embed virtual fit, gamification, and AR into their academic fields:

- **Physics & Computational Modelling:**
    - Applying AR in lab simulations
    - Linking to computational physics modules using simulation-based pedagogy
    - Exploring the physics behind spatial computing and virtual object interaction

- **Mathematics:**
  - Potential use in fluid dynamics visualisation and interactive simulation of physical systems
- **Computer Science:**
  - High relevance for back-end development**,** UX engineering, and simulation optimisation
  - CS students expressed more interest in how the tools are built, suggesting room for project-based collaboration

"There could be computational models… allowing students to understand the physics behind augmented realities."

"In CS, they would be more interested in learning how it is built and how it can be improved, rather than actually using it."

Pedagogical Applications

- Suggestions included modules that:
  - Explore six different simulation platforms across disciplines
  - Are linked to existing programming/computational learning in STEM
  - Feature collaborative projects between creative and technical students

“This would work well since we already have computational physics, object-oriented programming… linking this via physics would be an option for a new module.”

Barriers Identified

- **Perceived disciplinary relevance**: STEM students may undervalue immersive design tools if the industry alignment is unclear.
- **Curricular overload**: Students worry about adding “non-core” learning to already intensive degrees.
- **Mindset gaps**: Some disciplines still resist merging creative digital tools with scientific learning outcomes.

“The main challenge is getting interest… most students will be focused on core subjects and may not see the relevance.”

4.6 Survey 4 Analysis – SEAMM.io 2: Blockchain, Interoperability & Product Passports

Quantitative Summary

Statement	Average (out of 5)	Insight
I understand the core concept of blockchain and how it applies to digital product design	**3.0**	Moderate understanding: foundational concept still emerging
I am confident in explaining how product passports work and what data they hold	**2.3**	Low confidence; needs further support and practical examples
The hands-on activity helped me visualise how blockchain validates ownership and origin	**2.3**	Activity supported comprehension but deeper scaffolding needed
I could outline the process of creating a digital asset and linking it to a blockchain	**2.7**	Learners beginning to grasp the digital twin lifecycle
I found the tools and platforms used today intuitive and accessible	**2.3**	Low tool usability: better onboarding or UI walkthroughs required
I see how blockchain could support material traceability and ethical sourcing	**2.3**	Learners can connect blockchain to sustainability, but see limitations
I understand how blockchain supports transparency in global supply chains	**2.7**	Stronger connection to traceability frameworks and global systems
The session made me consider blockchain's potential in other industries (e.g. aerospace, healthcare)	**3.3**	Clear interdisciplinary curiosity developing
I understand how blockchain contributes to sustainability and anti-counterfeiting	**3.0**	Split between strong and neutral responses
I can identify connections between blockchain and my own discipline	**3.3**	Students are starting to visualise relevance within their fields
I recognise how interoperability is a key issue in digital-first systems	**2.7**	Students see importance but lack fluency in technical framing
I understand digital rights management and licensing across disciplines	**3.0**	All participants agreed — strong alignment across areas
I would feel confident discussing blockchain with peers from other disciplines	**3.0**	Confidence emerging; additional exposure needed
I understand ethical and legal challenges around digital ownership	**2.3**	Important theme, but more clarity needed on IP frameworks
I understand the implications of data sovereignty and decentralisation	**2.7**	Aware of decentralised systems, but more practical context required
I could explain the concept of digital twins and blockchain tracking to a peer	**2.3**	Concept still abstract for most; needs clearer use case modelling

I understand how blockchain relates to net zero, circularity, and sustainable innovation	**3.3**	High variance: some very engaged, others less so
I believe blockchain/product passports should be in interdisciplinary modules	**3.0**	General support with some hesitation around implementation

Thematic Insights from Open-Ended Reflections

Critical Ethical Awareness

- Students were highly aware of blockchain's ethical trade-offs, particularly regarding:
  - Energy consumption (proof-of-work) vs. sustainability goals
  - Corporate control over digital product passports (e.g., luxury brands)
  - Transparency loopholes being exploited under the guise of tech adoption

"I can see DPPs and their use of blockchain be loopholed to profit corporations with the power to uphold unethical practices."

This indicates learners are not simply accepting blockchain as a silver bullet, they are questioning power dynamics, greenwashing, and real-world impact.

Interdisciplinary Adaptation Ideas

- The Physics student suggested using blockchain to track quantum experiments or lab components for carbon traceability.
- Proposed modular learning tracks based on experience level:
  - **Blue Track:** Beginners
  - **Green Track:** Intermediate (e.g., Python)
  - **Red Track:** Advanced (e.g., Solidity, cryptography, quantum computing)

"Future physicists will need to understand cryptographic principles just like they learn Fourier transforms."

This model exemplifies a co-designed, multi-entry curriculum, with specific routes based on discipline fluency and tech familiarity**.**

Pedagogical Reflections

- Students want step-by-step workshops before tackling abstract systems (e.g. wallets, smart contracts, IP layers).
- They propose:
  - Use of product passports in student coursework
  - Digital asset creation labs
  - Curriculum aligned with industry use cases like anti-counterfeit design and ESG auditing

"Blockchain can serve as general knowledge, but students might not see it as very relevant unless we connect it to real applications."

5. Funding Summary and Expenditure Breakdown

The Digital Play pilot was supported by a £5,000 project grant, allocated to cover facilitator costs, student participation incentives, and resource development. The funding played a vital role in enabling access to industry-led expertise, specialist software, and immersive technologies not currently embedded in the university's standard teaching infrastructure.

Funding breakdown

Expense Category	Description	Amount (£)
Facilitator Fees	4 full-day expert-led sessions, access to proprietary software and datasets, pre-session resource design, and post-session Q&A support	£3,300
Student Incentives	Participation vouchers for 4 sessions across the pilot to support engagement and feedback	£450
Video Tutorial Development *(Unspent)*	Originally budgeted to support post-session tutorial creation using student feedback; not delivered due to financial year deadline constraints	£0
Total Spent		£3,750
Remaining Balance	Returned/unspent due to timing limitations	£1,250

5.1 Reflections and Lessons learnt

While the primary budget lines were successfully delivered, the final component, development of post-session video tutorials, was not completed. This was due to time constraints in incorporating student insights into the final resources, as well as the requirement to spend all allocated funds before the close of the financial year.

The inability to deliver the post-session content was a missed opportunity to extend the pilot's impact. In future funding rounds, earlier scheduling of resource development and clearer financial support at a departmental level would help ensure all deliverables are realised. However, the sessions were well-resourced, effectively facilitated, and delivered measurable impact through student engagement, platform exposure, and cross-disciplinary exploration.

6. Future Curriculum Innovation

The Digital Play pilot demonstrated that interdisciplinary, immersive digital learning is not only viable, but essential. It uncovered a strong student appetite for structured yet exploratory engagement with digital tools, particularly when framed through real-world applications and ethical reflection.

Across all sessions, students responded most positively when digital skills were taught as part of a strategic design process, not in isolation. Tool proficiency, while important, was consistently seen as secondary to critical fluency, collaborative problem-solving, and sectoral adaptability. This suggests the need for curriculum models that balance technical capability with systems thinking**,** and position learners as designers, analysts, and decision-makers in evolving digital landscapes.

Feedback also confirmed that disciplinary diversity enhances learning, especially when sessions are structured to draw out shared challenges (e.g. sustainability, ethics, automation) across different domains. Students valued tools that enabled multidisciplinary design thinking and shared innovation was essential for engagement.

These findings validate key assertions which highlight the value of **"live, reflexive, and co-designed learning experiences"** in preparing students for hybrid professional identities (Conlon & Gallery, 2023). In an Industry 5.0 context, where human-centred innovation, adaptability, and responsible technology use are critical, such learning experiences are no longer optional.

By triangulating the quantitative feedback, open-text insights, and session-level pedagogical analysis, the following cross-cutting strategic themes emerged:

Capability Area	Findings	Implication
Digital Tool Proficiency	Students developed confidence using 3D modelling, AI workflows, and immersive UI platforms	These tools should be scaffolded into undergraduate curricula across disciplines
Ethical & Regulatory Awareness	Sessions prompted strong discussion around automation, authorship, blockchain governance, and bias	Curriculum should embed data ethics, digital legislation (e.g. ESPR, DPP), and creative rights frameworks
Cross-Disciplinary Application	All participants identified ways their subject connected to others (e.g. physics into fashion)	Curriculum should actively facilitate peer-to-peer knowledge exchange and role-diverse team projects
Sustainability & Systems Thinking	Digital tools were consistently linked to sustainable design, reduced sampling, and lifecycle mapping	These connections should be explicitly mapped to SDGs, sector decarbonisation targets, and DfE agendas
Interdisciplinary Communication	High confidence was reported in collaborative sessions; students valued hearing diverse viewpoints	Curriculum design should centre around challenge-led group work and co-produced outputs

Capability Area	Findings	Implication
Industry Relevance & Readiness	Learners saw direct parallels to workflows used in product, retail, engineering, marketing, and health	Industry-aligned tasks, software, and professional guest input should be a standard feature

7. Strategic Recommendations and Pathways for Scale

Building on the evaluation data, pedagogical reflections, and comparative session analysis, several key recommendations emerge for embedding digital capability more widely across the university curriculum. These insights are grounded in the pilot's design and delivery, as well as aligned with wider institutional, national, and Industry 5.0 goals.

1. Deliver a university-wide elective in Applied Digital Literacies

Insight: Students across all disciplines need the ability to interact with intelligent systems, visualise digital processes, and navigate ethical-technical trade-offs.

Recommendation: Position "Digital Play" as a core cross-university elective, accessible through UCIL if relevant, and available to all students in Level 5 or 6. The unit should be framed around:

- Ethical AI integration
- Immersive environments and 3D simulation
- Blockchain-enabled transparency
- Design systems thinking

This approach supports the Office for Students' Graduate Outcomes focus on employer relevance, as well as UKRI's emphasis on digital fluency and innovation leadership. It also aligns with internal strategic goals around employability, interdisciplinarity, and responsible tech use.

2. Embed Interdisciplinary Cohorts and Real-World Challenge Scenarios

Insight: The highest levels of student engagement came when working across disciplinary boundaries and solving sectoral problems with open-ended digital tools.

Recommendation: Structure the module around interdisciplinary group projects aligned with societal and industry challenges (e.g. digital sustainability, ethics in AI health systems, blockchain in supply chains). Use flexible roles so students can apply disciplinary strengths while learning new tools.

This mirrors successful frameworks seen in challenge-led education and capstone projects internationally.

3. Build Scaffolding for Technical Confidence and Critical Thinking

Insight: Students with limited prior exposure to 3D or AI platforms experienced onboarding barriers yet often achieved deep reflection when given framing and support.

Recommendation: Pair every technical session with:

- Low-barrier preparatory toolkits
- Introductory explainer content
- Structured ethical reflection frameworks

Encourage peer learning through role distribution (e.g. tool expert, ethics lead, systems analyst), ensuring that engagement is not limited to those with technical confidence. Incorporate digital storytelling, prototyping labs, and ethical provocations into each workshop.

4. Scale with Tech Partnerships, Co-Design, and Feedback Loops

Insight: Industry-led facilitation brought credibility, relevance, and insight, but required clear framing and active student preparation.

Recommendation: Continue partnerships with technology providers (e.g. Style3D, SEAMM.io, Unity), embedding them into long-term curriculum design. However, ensure:

- All sessions are co-designed with teaching staff
- Onboarding is discipline-neutral
- Regular student feedback drives iteration (live sandpit model)

This balances the need for technical relevance with academic oversight and pedagogical intentionality.

7.1 Limitations and Opportunities for Broader Inclusion

Insight: While the pilot produced strong engagement, the sample was small and largely drawn from science, engineering, and business-related disciplines. Humanities and social science voices were not represented.

Recommendation: Future versions of the module should:

- Expand outreach to humanities, health, arts, education, and law students
- Explore broader cultural, societal, and policy implications of digital systems
- Position tools as both technical systems and cultural artefacts that shape institutions, behaviours, and power structures

This will enable the module to address the full scope of interdisciplinary digital literacy required for Industry 5.0 readiness.

7.2 Towards a Scalable UCIL Module: Designing with Future Technologies

Building on the outcomes of the Digital Play pilot, as outlined above, there is a clear opportunity to develop a university-wide interdisciplinary module that meets both student demand and strategic workforce needs. A scalable UCIL-aligned elective would bridge technical skills, systems thinking, and ethical inquiry, offering students from any faculty the opportunity to engage directly with transformative digital tools.

Proposed Module Overview

Component	Description
Module Title	*Digital Play: Designing with Future Technologies*
Level	Level 5 or 6
Credits	10–20
Eligibility	Open to all undergraduate students across faculties
Format	Studio-based, interdisciplinary, hybrid delivery
Structure	Six facilitated tech sessions + one-week live design challenge
Assessment	Group prototype + individual critical reflection (oral or written)

Learning Model

The module would centre around a live, challenge-based brief. After skill-building sessions in areas like 3D modelling, GenAI workflows, blockchain systems, and immersive interface design, students would be placed in interdisciplinary teams and tasked with responding to a real-world digital challenge.

Example briefs might include:

- Designing an AI-supported user interface for a healthcare wearable
- Developing a blockchain-based verification system for sustainable product claims
- Creating an immersive storytelling experience using XR for public engagement

Each team would produce a digital prototype and accompanying rationale, with roles distributed to match disciplinary strengths (e.g. a marketing student as UX lead; a physics student as simulation validator; a design student as interface builder).

This live challenge model builds resilience, co-creation capability, and system-oriented thinking, key graduate attributes for complex, adaptive sectors.

Graduate Learning Outcomes

Students completing this module would be able to:

1. Use emerging technologies (e.g. 3D simulation, AI design tools, blockchain platforms) within collaborative, real-world contexts
2. Reflect critically on the ethical, regulatory, and societal implications of digital systems across sectors
3. Work confidently across disciplinary boundaries to solve complex digital design challenges
4. Translate digital skills into sector-specific applications (e.g., simulation in health, immersive retail, digital traceability)
5. Demonstrate innovation readiness by producing interactive concepts and prototypes for complex systems

Strategic Alignment

This module is closely aligned with national strategies and institutional priorities:

Strategy	Alignment
UK Government Digital Strategy (2022)	Prioritises advanced digital capability building at all education levels; this module provides a structured, practice-led route to digital fluency.
UKRI Future Skills Strategy (2023)	Emphasises data fluency, immersive tech, and innovation leadership; students explore these through applied digital experimentation.
Office for Students (OfS) Graduate Outcomes Strategy	Calls for real-world, cross-disciplinary, and work-based learning; the live challenge model directly supports this aim.
AI Sector Strategy (UK, 2023)	Focuses on inclusive and ethical AI use; the module embeds ethical reflection, human-AI interaction, and creative generative workflows.
UCIL	Designed to offer elective modules tackling real-world problems through multi-disciplinary lenses; this proposal operationalises that vision using live briefs and cross-sector scenarios.

8. Conclusion

The Digital Play pilot successfully demonstrated the value of immersive, interdisciplinary digital learning in preparing students for the demands of Industry 5.0. Through scaffolded, hands-on sessions and a diverse cohort of learners, the programme validated a model of curriculum design that goes beyond tool acquisition to encompass ethical reflection, systems thinking, and real-world application.

The pilot's findings revealed strong student appetite for digital experimentation when framed through cross-sector relevance and collaborative challenge. Participants not only developed new skills in AI, 3D simulation, immersive UI, and blockchain, but also questioned how these tools will reshape professional practices across disciplines.

Importantly, the programme exposed structural gaps in current curricula, highlighting the need for accessible, flexible, and critically framed digital learning experiences at university-wide scale. While the pilot involved a small, STEM-heavy cohort, it provides a strong foundation for developing a UCIL module that is inclusive, scalable, and strategically aligned with national and institutional goals for graduate digital readiness.

Future iterations should broaden participation across faculties, build in pre-session scaffolding for technical confidence, and embed live industry challenges that reflect the complexity of real-world innovation. With the right structure and institutional support, Digital Play can evolve into a flagship model for interdisciplinary digital education in a rapidly changing world.

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