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A Triangulated Approach to Fostering Student Engagement in Art and Design Education: Integrating Padlet, UFUTURE, and EON-XR

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ABSTRACT

This study examines a multi-platform strategy to enhance student engagement in art and design education. Traditional teaching methods often struggle to promote dynamic collaboration and personalised creative expression in digital contexts. The research explores how to integrate multiple digital tools effectively to create a cohesive, engaging learning ecosystem. A qualitative case study involving 27 art and design students (Graduate Visual Research) analysed their interactions with Padlet for collaborative documentation, UFUTURE for structured course management and assessments, and EON-XR for immersive metaverse content creation. The findings show that integrating these platforms significantly increased student participation and motivation. Padlet facilitated robust peer feedback and idea-sharing, while UFUTURE provided an efficient framework for administrative tasks and progress tracking. Notably, EON-XR enabled students to transcend 2D work, enhancing spatial understanding and supporting innovative virtual exhibitions. The combined use of these platforms demonstrates that a strategically implemented digital toolkit can foster a more holistic and engaging learning environment than reliance on a single platform. The study concludes that this multi-platform model presents a valuable framework for educators aiming to modernise art and design pedagogy and improve student outcomes.

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1. INTRODUCTION

The landscape of art and design education is rapidly evolving in response to digital transformation, hybrid learning models, and changing expectations of twenty-first-century learners. Traditional studio-based teaching—once the cornerstone of creative education—relies heavily on face-to-face critique, hands-on experimentation, and social interaction. However, these modes are increasingly challenged by the need for flexible, technology-enhanced learning environments that support both creative autonomy and structured progression (Bergdahl et al., 2024; Waltemeyer et al., 2025).

As higher education transitions into post-pandemic pedagogical models, digital platforms have become essential components of teaching and learning. However, despite their ubiquity, most platforms remain functionally siloed. Learning Management Systems (LMS) like UFUTURE or Moodle excel at managing assessments and administrative tasks, but they often lack the spontaneity and visual interactivity essential for art and design disciplines (Ojo, 2024; Johnston et al., 2024). Conversely, collaborative tools such as Padlet and Miro promote idea exchange and peer engagement but offer limited capacity for formal evaluation or progress tracking (Naamati-Schneider & Alt, 2023). Meanwhile, immersive technologies such as EON-XR and other Extended Reality (XR) applications introduce new creative possibilities but are rarely integrated meaningfully into structured curricula (Burke et al., 2025; Du Plessis et al., 2024).

This fragmentation leads to a persistent pedagogical gap: while students today are digital natives, their learning experiences are often compartmentalised across disconnected platforms. In art and design education, where creative process, critique, and iteration are tightly intertwined, this disconnection can hinder authentic engagement and reflective learning. As a result, educators face the challenge of designing digital ecosystems that not only deliver content efficiently but also sustain the social and creative dynamics of studio culture.

Recent scholarship advocates for multi-platform learning ecosystems that integrate cognitive, social, and experiential learning components (Ki, 2024; Ransanz Reyes et al., 2025). Such integration can cultivate “learning presence,” a multidimensional form of engagement that supports self-direction, collaboration, and creative exploration simultaneously (Amaral et al., 2023; Mena-Guacas et al., 2024). However, empirical studies demonstrating how diverse digital platforms can be strategically combined to create a cohesive learning environment remain limited—especially in art and design contexts.

To address this gap, the present study explores a triangulated digital framework for fostering engagement in art and design education. It integrates three distinct platforms—Padlet, UFUTURE, and EON-XR—each serving a specific pedagogical function: Padlet for collaborative ideation, peer feedback, and visual documentation; UFUTURE for structured course delivery, assessment, and administrative coordination; and EON-XR for immersive, metaverse-based creative experiences and exhibitions.

By combining these tools within a single pedagogical ecosystem, the study seeks to determine how such integration can enhance student engagement, creative performance, and satisfaction in higher education art and design programs.

Accordingly, this paper addresses the central research question:

How can the integration of Padlet, UFUTURE, and EON-XR create a cohesive and engaging digital learning environment in art and design education?

To answer this question, the paper first reviews recent literature on student engagement and digital learning platforms, then outlines the methodological approach of a qualitative case study conducted with graduate visual research students. The findings and discussion sections analyse the pedagogical affordances and synergistic effects of the three platforms, culminating in a framework that redefines digital engagement for creative disciplines.

2. PROBLEM STATEMENT

Although digital technologies have become integral to higher education, their application in art and design education often remains fragmented and functionally limited. Most institutions rely on single-platform solutions such as Learning Management Systems (LMS) for administrative tasks or collaborative apps for idea sharing that fail to capture the multidimensional nature of creative learning. This lack of integration weakens the alignment between creative exploration, structured assessment, and immersive visualisation, which are essential components of art and design pedagogy (Ojo, 2024; Johnston et al., 2024; Naamati-Schneider & Alt, 2023).

The problem is compounded by the fact that traditional studio-based learning emphasises dynamic peer interaction, critique, and spatial thinking—elements that are difficult to replicate using isolated digital tools. Studies show that while platforms like Padlet enhance collaboration (Naamati-Schneider & Alt, 2023; Waltemeyer et al., 2025) and LMS platforms like UFUTURE improve organisation and tracking (Ki, 2024; Johnston et al., 2024), each tool addresses only a single layer of student engagement. Similarly, Extended Reality (XR) environments such as EON-XR have demonstrated potential for immersive visualisation (Burke et al., 2025; Du Plessis et al., 2024), yet they are rarely embedded into broader pedagogical workflows that connect creative practice with assessment and reflection.

Consequently, students experience learning environments that are technologically rich but pedagogically disjointed. This disconnect reduces engagement, limits collaboration, and creates a lack of continuity between conceptual development, practical work, and feedback processes. While recent studies advocate multi-platform integration to bridge cognitive, social, and experiential engagement (Mena-Guacas et al., 2024; Ransanz Reyes et al., 2025; Bergdahl et al., 2024), empirical research on how to implement such systems effectively in art and design education remains scarce.

Therefore, this study addresses the lack of a cohesive, evidence-based model for integrating diverse digital platforms into a unified learning ecosystem that sustains the creative, collaborative, and reflective dimensions of art and design pedagogy. To respond to this gap, the present research proposes and examines a triangulated digital framework that strategically integrates Padlet, UFUTURE, and EON-XR. The study investigates how these platforms, when used together, can foster higher levels of student engagement, creativity, and satisfaction than when used in isolation.

3. LITERATURE REVIEW

Student engagement has long been recognised as a critical factor in higher education, encompassing behavioural, emotional, and cognitive dimensions (Turner et al., 2024). Within creative disciplines, engagement also includes experimentation, critique, and reflective practice that sustain creative momentum and autonomy. Recent studies underscore that digital environments can meaningfully extend studio-based learning, offering opportunities for both synchronous and asynchronous participation (Bergdahl et al., 2024; Waltemeyer et al., 2025). In art and design education, engagement is often linked to authentic, project-based experiences that promote visual and conceptual thinking (Du Plessis et al., 2024). A primary challenge for educators is maintaining creative authenticity during the transition to hybrid or online modalities. Scholars contend that well-designed digital ecosystems can replicate and even enhance the collaborative and exploratory qualities of physical studios (Amaral et al., 2023; Burke et al., 2025).

Digital tools have reshaped how educators and students interact, document, and critique creative work. Platforms such as Padlet, Miro, and Google Jamboard provide flexible spaces for collaboration, enabling visual idea-sharing and formative feedback (Naamati-Schneider & Alt, 2023; Waltemeyer et al., 2025). In art and design contexts, these tools serve as dynamic extensions of sketchbooks and critique walls, supporting both individual and collective reflection (Mena-Guacas et al., 2024). At the same time, Learning Management Systems (LMS) such as UFUTURE, Moodle, and Canvas remain essential for course organisation, assessments, and communication (Ojo, 2024; Johnston et al., 2024). LMS platforms can scaffold learning pathways and establish accountability, though they are often perceived as administrative rather than creative spaces (Ki, 2024). Recent analyses suggest that LMS integration with social or

collaborative tools enhances student satisfaction and motivation (Study, 2024; Ransanz Reyes et al., 2025). Emerging technologies, particularly Extended Reality (XR) platforms like EON-XR, are gaining traction as transformative tools in design pedagogy. XR enables learners to visualise form, space, and texture in immersive environments, fostering deeper spatial understanding and empathy for materiality (Du Plessis et al., 2024; Burke et al., 2025; Study, 2025). VR and AR in studio learning have been shown to boost creativity, collaboration, and reflective engagement (Study, 2025; Study, 2024).

Despite the proliferation of digital tools, most research focuses on adopting single platforms. Studies often evaluate Padlet for collaboration (Naamati-Schneider & Alt, 2023), LMS for organisation (Johnston et al., 2024), or XR for immersive visualisation (Burke et al., 2025) in isolation. However, contemporary learners operate across multiple digital spaces, and pedagogical models need to reflect this fluidity (Bergdahl et al., 2024).

Recent reviews call for integrative frameworks that bridge cognitive, social, and experiential dimensions of learning (Ki, 2024; Ojo, 2024; Mena-Guacas et al., 2024). In higher education, hybrid ecosystems that combine structured management with interactive and immersive tools have been shown to improve engagement, digital literacy, and creative output (Study, 2025; Study, 2024; Study, 2025). This combination lets educators tailor pedagogical functions—collaboration, assessment, and visualisation—without over-relying on a single technology (Radianti et al., 2020; Turner et al., 2024). For art and design disciplines, such triangulated systems are particularly valuable. Integrating Padlet for co-creation, UFUTURE for structured delivery, and EON-XR for spatial exploration aligns with the multimodal and iterative nature of creative practice. This synergy supports constructivist learning principles, enabling students to engage cognitively through structured tasks, socially through collaboration, and experientially through immersive creation (Amaral et al., 2023; Du Plessis et al., 2024; Ransanz Reyes et al., 2025). This study builds upon these insights by examining how such an integrated, three-platform model can enhance engagement and learning outcomes in graduate art and design education.

4. RESEARCH DESIGN

This study employed a qualitative descriptive design using an open-ended survey to explore how integrating multiple digital platforms—Padlet, UFUTURE, and EON-XR—influences student engagement in art and design education. The qualitative approach was chosen because it allows participants to express their experiences, perceptions, and reflections in their own words (Creswell & Poth, 2018). This method is particularly suitable for investigating educational practices where subjective experiences, creative processes, and affective engagement are central to learning outcomes. The open-ended survey design also gave students flexibility to elaborate on specific experiences with each platform, offering nuanced perspectives that structured questionnaires or quantitative metrics might overlook.

The study was conducted within a Graduate Visual Research course in a Master of Arts and Design program at a public university in Malaysia. The course was designed to cultivate students' ability to conceptualise and communicate visual ideas through both traditional and digital mediums. A total of 52 postgraduate students participated voluntarily. Participants represented various design specialisations, including visual communication, fine art, and multimedia design. All students were required to use Padlet, UFUTURE, and EON-XR throughout the semester as part of their coursework, giving them direct experience to reflect on in the survey. The university's institutional review board approved the study. Students were informed of the study's purpose and assured that participation would not affect their course grades. Informed consent was collected before data collection.

To ensure that responses addressed comparable experiences, all participants engaged with the same three platforms, each fulfilling a distinct pedagogical role within the course structure:

Table 1 *Comparable experiences and pedagogical role according to the platform*

Platform	Purpose and Use in Course	Key Pedagogical Function
Padlet	Used for collaborative brainstorming, documentation of project ideas, and peer feedback. Students shared mood boards, sketches, and weekly progress updates.	Fosters peer learning, visual collaboration, and community building.
UFUTURE	Served as the main course management system, hosting course materials, assignment submissions, announcements, and grading.	Provided organisational structure, an assessment framework, and a communication channel.
EON-XR	Introduced during the later phase of the course for immersive creation and virtual exhibition of final projects. Students used it to design 3D/AR experiences.	Encourages creative experimentation, spatial understanding, and immersive presentation.

4.1 Data Collection

Data were collected through an open-ended online survey distributed at the end of the 14-week semester. The survey aimed to gather in-depth reflections on students' experiences with each platform and their perceptions of engagement, creativity, and learning motivation. The survey consisted of ten open-ended questions, organised around three key dimensions of engagement:

- (i). Cognitive Engagement – understanding and learning effectiveness through each platform.
- (ii). Social Engagement – collaboration, feedback, and sense of community.
- (iii). Creative Engagement – opportunities for experimentation, innovation, and self-expression.

Surveys were conducted via Google Forms to ensure accessibility and anonymity. Students were encouraged to provide detailed responses and examples from their coursework.

4.2 Data Analysis

The qualitative survey responses were analysed using thematic analysis (Braun & Clarke, 2006). This method enabled systematic identification of key patterns in engagement and learning experiences across the three platforms.

Analysis proceeded through the following stages:

- (i). Familiarisation: All survey responses were read multiple times to gain an overall understanding of participants' perspectives.
- (ii). Initial Coding: Statements were coded according to key ideas related to engagement (e.g., motivation, collaboration, creativity, usability, integration).
- (iii). Theme Development: Related codes were grouped into broader thematic categories that captured recurring patterns in the data.
- (iv). Theme Refinement: Themes were reviewed and refined to ensure internal consistency and distinctiveness.
- (v). Interpretation: Final themes were aligned with the literature on digital engagement and creative pedagogy to form the study's analytical framework.

4.3 Limitations

Because the study relied on self-reported perceptions, the data are inherently subjective and may not capture all aspects of actual engagement behaviour. Furthermore, the relatively small sample size (n=52) and single-institution context limit the findings' generalizability. Nevertheless, the qualitative depth of open-ended responses offers valuable insights into the ways digital ecosystems influence learning in creative disciplines.

5. RESULTS AND DISCUSSION

A total of 52 students completed the survey. This mix reflects a balanced representation of students engaged in both conceptual and practice-based learning contexts within the creative disciplines. Participants reported varied levels of engagement with Padlet, UFUTURE, and EON-XR. Although some students indicated using each platform very often or often, many provided general comments that did not specify frequency. Approximate text-coded responses suggest that Padlet and UFUTURE were used most frequently, while EON-XR was adopted less consistently, typically in project-based or experiential tasks.

"I did not use Padlet very often, but when lecturers used it for group discussions it allowed everyone to post their thoughts and exchange ideas easily." "EON-XR was used only a few times, but it really helped me visualise the topic in 3D."

These findings indicate that while engagement across platforms was uneven, each tool served a distinct pedagogical function that contributed to overall learning interaction. Responses related to Padlet emphasised collaboration, creativity, and ease of participation. Students valued Padlet's visual and interactive features, describing it as

"a fun and easy way to collaborate and share ideas."

The platform's intuitive interface supported peer-to-peer engagement, brainstorming, and feedback sharing, fostering collective creativity. Several participants noted that Padlet was particularly effective for visual brainstorming and reflective sharing, but less suited to complex project documentation.

"The sticky note format and editable boards made Padlet a simple but powerful space for class discussions."

UFUTURE was consistently described as the learning ecosystem's organisational backbone. Students highlighted its value in managing course materials, submissions, and instructor communications, referring to it as

"a structured and clear system that keeps learning organised."

While its role was primarily functional, participants acknowledged that effective navigation and communication through UFUTURE enhanced academic engagement and task management. EON-XR generated the strongest emotional responses, particularly regarding immersion, motivation, and conceptual understanding. Students credited the 3D and AR/VR environments with helping them

"visualise complex or abstract design concepts" and "experience design more realistically."

The immersive dimension of EON-XR facilitated embodied learning, consistent with experiential learning theory. Nevertheless, several participants noted barriers such as hardware limitations, unstable internet connections, and the need for clearer training.

"EON-XR sparked me to explore more of its features as a new way to showcase our project output. It helps me understand complex forms by seeing them from every angle."

Common challenges included technical lag, limited integration with other tools, and occasional navigation difficulties.

“The most useful part of UFUTURE is the structured layout for course materials and assessments... but sometimes it loads slowly or crashes during exams.”

When considering all three platforms together, students emphasised complementarity and integration. They described the trio as contributing to a “triangulated” learning experience:

- (i). • UFUTURE served as the administrative and content hub;
- (ii). • Padlet functioned as a collaborative workspace;
- (iii). • EON-XR provided an immersive, hands-on environment.

“Using Padlet, UFUTURE and EON-XR made the class feel more dynamic. Padlet encouraged quick sharing of opinions, UFUTURE kept resources organised, and EON-XR was especially interesting for visualising projects.”

However, participants called for improved integration and additional training to help them transition seamlessly between platforms.

Table 2 Summary of Thematic Frequencies by Tool

Platform	Padlet	UFUTURE	EON-XR
Collaboration	24	14	6
Creativity	18	7	12
Immersion/Engagement	7	5	22
Usability	5	16	8
Suggestions/Improvements	9	10	9

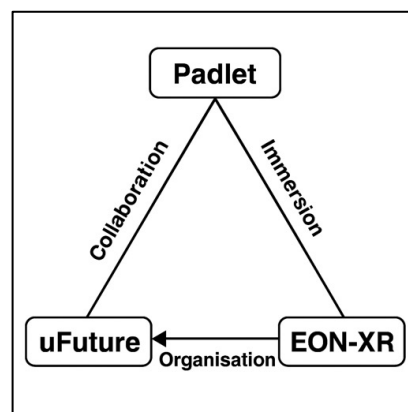


Figure 1 Conceptual Model of Triangulated Engagement Using Padlet, UFUTURE, and EON-XR

The Triangulated Engagement Framework conceptualises how three digital learning platforms—Padlet, UFUTURE, and EON-XR—interact to create a multidimensional ecosystem for student engagement in art and design education. Each platform represents a distinct pedagogical node, addressing one of three dimensions of engagement: social-collaborative, structural-academic, and experiential-immersive. Together, these dimensions support the development of cognitive, behavioural, and affective engagement (Fredricks, Blumenfeld, & Paris, 2004). Grounded in constructivist, connectivist, and experiential learning theories, the framework recognises learning as an active process of construction, social interaction, and embodied experience (Vygotsky, 1978; Siemens, 2005; Kolb, 1984). By integrating these pedagogical lenses, the model positions engagement as an interconnected process that moves fluidly between ideation, organisation, and application—key phases in creative education.

The Triangulated Engagement Framework operates through a continuous cycle among three core digital nodes, beginning with Padlet, the social–collaborative node that enhances social and cognitive engagement through brainstorming, real-time reflection, and co-construction of knowledge (Vygotsky, 1978; Wenger, 1998) as a “digital studio wall.” This connects directly to UFUTURE, the structural–academic node that serves as the course’s organisational backbone; grounded in connectivism (Siemens, 2005) and self-regulated learning (Zimmerman, 2002), UFUTURE provides the procedural infrastructure for scheduling, assignments, and structural clarity necessary to formalise and organise the initial ideation generated on Padlet. Guidance and materials from UFUTURE then transition students to EON-XR, the experiential–immersive node at the apex of the framework, which utilises 3D and AR/VR simulations to transform abstract concepts into embodied practice aligned with Kolb’s (1984) Experiential Learning Theory, allowing students to “walk through” and test their designs. The cycle closes as students return to Padlet to share their EON-XR outputs for peer critique and reflection, completing a recursive loop in which Padlet sparks the initial idea, UFUTURE structures the developmental process, and EON-XR brings the concept to life through spatial visualisation.

Table 3 *The Triangulated Engagement Framework synthesises core principles from major educational paradigms, as shown below*

Theoretical Lens	Key Concept	Application within Framework
Constructivism (Vygotsky, 1978)	Knowledge is constructed through social interaction	Padlet supports collaborative meaning-making
Connectivism (Siemens, 2005)	Learning occurs through connected digital networks	UFUTURE organises distributed learning resources
Experiential Learning (Kolb, 1984)	Knowledge emerges through experience and reflection	EON-XR enables embodied design exploration
Multidimensional Engagement (Fredricks et al., 2004)	Engagement integrates cognitive, behavioural, and affective domains	The combined use of all three platforms

By uniting these theories, the framework operationalises engagement not as a static construct, but as a dynamic interaction across digital, social, and experiential spaces. To effectively implement this framework, educators should:

- (i). Design sequentially – scaffold learning activities so each tool corresponds to a specific stage of the creative process (ideation → organisation → immersion).
- (ii). Ensure integration – embed Padlet discussions in UFUTURE modules and connect EON-XR outputs back to Padlet for critique.
- (iii). Support accessibility – provide clear guidance, technical support, and alternative pathways for learners with limited device access.
- (iv). Encourage reflection – use Padlet as a reflective journal where students articulate insights gained from EON-XR experiences.
- (v). Adopt holistic assessment – measure engagement using both qualitative reflections and digital analytics.

When implemented coherently, this model promotes creative autonomy, collaborative reflection, and experiential understanding, equipping learners with the digital fluency and design thinking needed for 21st-century creative practice.

6. CONCLUSION

The Triangulated Engagement Framework demonstrates that student engagement in art and design education is inherently multidimensional. By aligning Padlet, UFUTURE, and EON-XR across social, structural, and experiential dimensions, the model cultivates an integrated learning ecosystem where creativity, organisation, and immersion converge. This framework not only enhances engagement but also redefines how students experience learning, transforming passive participation into active, reflective, and embodied creation.

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9. AUTHOR CONTRIBUTIONS

Zainuddin Ibrahim contributed to the conceptualisation, methodology, validation, formal analysis, investigation, resources, and data curation. He also contributed to writing the original draft, reviewing and editing the manuscript, visualisation, and project administration.

10. CONFLICT OF INTEREST DECLARATION

I hereby certify that the article is the author's original work. The article has not received prior publication and is not under consideration for publication elsewhere. This manuscript has not been submitted for publication, nor has it been published in whole or in part elsewhere. I attest that I am the sole author and contributed significantly to the work, the validity and legitimacy of the data, and the interpretation of the data for submission to IJELHE.

11. DECLARATION OF GENERATIVE AI IN THE WRITING PROCESS

During the preparation of this work, the authors used CHATGPT minimally to shorten some selected sentences. After using this tool, the authors reviewed and edited the content as needed and took full responsibility for the publication's content.

12. DATA AVAILABILITY/SUPPLEMENTARY MATERIALS

The datasets used and analysed during the current study are available from the author on reasonable request.

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