Innovative Strategies for Distance Learning: Gamification, Serious Play, and Miro in the Development of Project Management Competencies

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Abstract

The transition to distance learning during the COVID-19 pandemic created significant challenges for higher education, particularly in maintaining student engagement and developing professional project management competencies. This paper examines how integrating Miro, a digital collaboration tool, with gamification techniques and serious play methodologies addresses these challenges within an online project management module. Miro's platform facilitates real-time collaboration, whilst gamification elements and digitally adapted serious play recreate experiential learning environments typically found in face-to-face settings. Our findings suggest that Miro enhanced student engagement, allowing for effective idea sharing, real-time knowledge exchange, and improved task organisation. Gamification elements, such as badges and certificates, motivated active participation, though some students experienced cognitive overload and mental fatigue due to prolonged screen time and fragmented attention. Additionally, limitations in the digital adaptation of serious play, particularly the absence of hands-on engagement, impacted kinaesthetic learning and creativity. In response, we introduce the Digital Learning Ecosystem framework, which emphasises the balance between digital engagement, cognitive load, and student well-being. This framework underpins practical recommendations for enhancing the effectiveness of digital tools such as Miro, gamification, and serious play in fostering engagement and developing competencies in online learning environments.

Keywords: Distance learning, project management, gamification, serious play, student engagement, cognitive load, digital collaboration.

1. Introduction

The COVID-19 pandemic (Barber et al., 2021; Sonjit et al., 2021b) engendered a prompt and manifest transition in higher education from traditional in-person instruction to online modalities, thereby exposing both the latent strengths and inherent limitations of digital learning environments. Whilst universities demonstrated an ability to maintain continuity in education, this abrupt shift highlighted pervasive challenges in fostering student engagement, interactivity, and the development of skill sets, particularly in disciplines where practice-based, kinaesthetic learning is paramount (Ahmad et al., 2022; Antonopoulou & Dacre, 2015; Babieva et al., 2022; Gkogkidis & Dacre, 2021). Courses that rely heavily on synchronous, collaborative interactions, such as project management (Dacre et al., 2019; Gkogkidis & Dacre, 2020a), were especially affected, as remote learning modalities struggled to coalesce the immediacy and cognitive depth characteristic of in-person learning environments (Horita et al., 2021; Numan et al., 2022).

The reliance on predominantly asynchronous, lecture-based approaches in online learning environments has revealed a salient lacuna in the development of core professional and project management competencies such as teamwork, decision-making, leadership, and creative problem-solving (Chen, 2022; Dacre & Kockum, 2022b; Eggleton et al., 2021). These competencies, which are often imbued with tacit, dynamic processes, are difficult to replicate through conventional digital pedagogies, thereby raising critical questions regarding the extant efficacy of these modalities (Biedroń et al., 2021; Jaca, 2022). As the post-pandemic educational landscape continues to evolve, the imperative emerges to ascertain how sustainable, immersive digital frameworks can be developed to foster not only content delivery but also the complex competencies required for professional success (Dacre et al., 2019; Kamssu & Kouam, 2021; Rahiem, 2020).

In this vein, emerging pedagogical innovations such as gamification and serious play have shown promise in addressing some of these endemic challenges (Antonopoulou & Dacre, 2015; Dacre et al., 2015; Dacre et al., 2018; Gkogkidis & Dacre, 2020b). Gamification, which employs game design elements such as progression metrics and reward systems, is leveraged to enhance student engagement and motivation (Dacre et al., 2015; Dacre et al., 2018; Gkogkidis & Dacre, 2021; Rivera & Garden, 2021). Concurrently, serious play, emphasising experiential, hands-on learning through structured play, has been highlighted for its potential to foster deep, critical thinking and transferable professional skills (Antonopoulou & Dacre, 2015; Gkogkidis & Dacre, 2021; Masalimova et al., 2021; Tite et al., 2021; Zabala-Vargas et al., 2021). Nonetheless, despite their potential,

the integration of these methods in fully online settings remains underexplored, particularly regarding their ability to replicate the kinaesthetic and immersive aspects of face-to-face learning, which are often pivotal to engagement (Chu & Fowler, 2020).

This research aims to delineate and evaluate the integration of Miro, a digital collaboration platform, with gamification and serious play methodologies to fill this extant gap (Freitag et al., 2022; Johnson, 2022; Paepcke-Hjeltness, 2021). Miro's synchronous, visual collaboration tools, such as interactive digital whiteboards, propose a heuristic solution, potentially replicating elements of physical group work and fostering a more nuanced engagement with practice-based learning in remote environments (Gopinathan et al., 2022). This study, therefore, examines the potential for these tools to coalesce into a more holistic and effective online learning experience, particularly within a project management module.

Through a systematic investigation, the research not only aims to contribute to the corpus of knowledge on sustaining student engagement (Aladsani, 2022; Gibbes & Skop, 2022) and competency development (Argelagós et al., 2022; Dacre et al., 2019) in remote learning but also to evaluate the implications of these pedagogical adaptations on student well-being (Ahmad et al., 2022; Babieva et al., 2022). Specifically, this study will explore how these approaches may mitigate cognitive load and alleviate the adverse effects of mental fatigue associated with prolonged online learning (Horita et al., 2021). Contextualising the findings within the broader discourse on post-pandemic education allows this research to provide practical insights for educators while simultaneously making a theoretical contribution to ongoing discussions regarding the future of digital learning (Jang & Lee, 2021).

2. Literature Review

The integration of technology into higher education has increasingly focused on enhancing student engagement and fostering the development of critical professional competencies (Agrati et al., 2021; Capone & Lepore, 2022; Hina et al., 2020). Digital tools, such as collaboration platforms, have evolved from supporting traditional face-to-face teaching to becoming essential components in fully remote learning environments (Gopinathan et al., 2022; Novikova et al., 2022). This transition has encouraged the exploration of gamification and serious play as innovative strategies for creating immersive and interactive learning experiences (Antonopoulou & Dacre, 2015; Dacre et al., 2015; Dacre et al., 2018; Gkogkidis & Dacre, 2020b, 2021; Zhang & Yu, 2022).

2.2 Gamification in Higher Education

The incorporation of gamification within higher education has witnessed significant growth over the past decade, as educators increasingly leverage game mechanics to stimulate participation and motivation (Camacho-Sánchez et al., 2022; Dacre et al., 2015; Dacre et al., 2018; Zabala-Vargas et al., 2021; Zolkina et al., 2020). Gamification, in essence, entails embedding elements such as badges, points, and leaderboards to incentivise student engagement (Dacre et al., 2018; Rivera & Garden, 2021). Whilst these mechanics have been lauded for their capacity to foster short-term engagement, particularly in virtual learning environments where traditional pedagogical approaches may falter, the depth of learning outcomes achieved through gamification is still under scrutiny (Dabbous et al., 2022; Dacre et al., 2015; Gkogkidis & Dacre, 2021; Hammill et al., 2021).

Extant research suggests that gamification can enhance attendance and participation in online educational settings (Camacho-Sánchez et al., 2022; Dacre et al., 2018). For instance, in virtual classrooms, where the immediacy of face-to-face interaction is often absent, gamified elements imbue the learning experience with a sense of progression, engendering a perception of achievement that motivates continued participation (Dabbous et al., 2022). However, critics also underscore the potential for gamification to rely excessively on extrinsic motivators such as rewards, potentially failing to cultivate intrinsic, meaningful engagement with the learning material (Ahmad et al., 2022; Dacre et al., 2015; Dacre et al., 2018). In this vein, the extent to which gamification facilitates the development of complex cognitive skills, including critical thinking and problem-solving, remains contested (Pàmies-Vilà et al., 2022). Some studies suggest that while gamification fosters task completion, it may not substantively enhance deeper cognitive engagement (Rivera & Garden, 2021).

In order to address these limitations, research has turned to blended approaches that combine gamification with other pedagogical methods, such as experiential learning and collaborative activities (Gkogkidis & Dacre, 2021). These approaches aim to transcend mere rewards and coalesce around strategies that engage students in more profound, reflective interactions conducive to the development of critical skills (Argelagós et al., 2022; Dacre et al., 2019; Eggleton et al., 2021; Medvedeva et al., 2022). In this context, the integration of gamification with serious play holds promise, as the two strategies may complement each other by balancing motivation with deeper, reflective learning processes (Antonopoulou & Dacre, 2015; Gkogkidis & Dacre, 2021).

2.3 Serious Play and Experiential Learning

Serious play, an inherently experiential learning strategy, is predicated on the principle that students learn most effectively through active engagement. This modality, imbued with constructivist epistemology, involves learners navigating complex, real-world problems in a simulated, risk-free environment (Gkogkidis & Dacre, 2020b, 2021). Through hands-on and collaborative tasks, serious play encourages learners to build their understanding through hands-on, collaborative activities that simulate real-world challenges (Antonopoulou & Dacre, 2015; Zhang & Yu, 2022). This pedagogical approach has proven especially effective in disciplines such as project management, where teamwork, creativity, and problem-solving are central to both academic and professional success (Zabala-Vargas et al., 2021).

One of the main challenges in adapting serious play to fully online environments is the difficulty in replicating the kinaesthetic, tactile nature of the activities that typically define serious play in physical classrooms (Dacre et al., 2018; Gkogkidis & Dacre, 2021; Whewell et al., 2022). Digital platforms like Miro and Mural afford partial solutions by facilitating visual, synchronous collaboration, albeit without the tangible manipulation of physical objects that often defines serious play in traditional environments (Freitag et al., 2022; Paepcke-Hjeltness, 2021). However, despite the limitations, research suggests that these digital platforms still provide valuable opportunities for students to engage in collaborative problem-solving and reflective thinking (Johnson, 2022). Adapting serious play methods to these digital formats, instructors can maintain some of the key benefits of experiential learning while addressing the practical constraints of remote education (Masalimova et al., 2021).

2.4 Digital Collaboration Platforms: Miro in Remote Learning

In the context of remote education, digital collaboration platforms such as Miro, Mural, and Lucidspark have become essential tools for maintaining student interaction and engagement (Yüksel et al., 2023). Miro, in particular, provides a virtual space for real-time collaboration, allowing students to engage in group activities, visual problem-solving, and interactive learning (Freitag et al., 2022). Its features, such as digital whiteboards, sticky notes, and diagramming tools, mimic the physical tools used in traditional classrooms, making it a valuable resource for replicating face-to-face collaboration in online settings (Johnson, 2022).

Miro has been widely employed in diverse academic disciplines ranging from business to design, facilitating teamwork, creative thinking, and project

management (Gopinathan et al., 2022). Research underscores the platform's capacity to mitigate the pervasive sense of isolation endemic to remote learning environments, primarily by enabling synchronous collaboration (Johnson, 2022). However, the absence of physical presence, non-verbal cues, and spontaneous social interactions can impede the development of cohesive team dynamics and affective engagement (Chu & Fowler, 2020). Despite these constraints, Miro's synchronous collaborative capacities render it a potent tool for online learning, particularly when integrated with strategies such as gamification and serious play (Antonopoulou & Dacre, 2015; Dacre et al., 2018; Johnson, 2022).

2.5 Theoretical Gaps and Rationale for This Study

The literature on distance learning, gamification, serious play, and digital collaboration platforms reveals several gaps in understanding how these methods can be integrated to support professional competency development in fully online settings. Whilst gamification has shown efficacy in enhancing student engagement (Camacho-Sánchez et al., 2022; Dabbous et al., 2022), its impact on deeper cognitive learning remains underexplored (Ahmad et al., 2022; Bedregal-Alpaca et al., 2020). Likewise, serious play, while an effective experiential learning framework (Gkogkidis & Dacre, 2020b; Zabala-Vargas et al., 2021), encounters challenges when adapted to digital formats due to the inherent limitations in kinaesthetic engagement and collaboration (Chu & Fowler, 2020; Paepcke-Hjeltness, 2021). Digital tools like Miro provide opportunities for real-time interaction (Freitag et al., 2022; Gopinathan et al., 2022), yet their potential to fully replicate the immersive qualities of in-person learning is still in question (Masalimova et al., 2021; Ng et al., 2022). Thus, this study seeks to address these theoretical gaps by investigating the integration of Miro, gamification, and serious play within an online project management module. Specifically, this research aims to explore how these tools may engender a more interactive and effective learning environment, thereby contributing to the broader academic discourse on post-pandemic education (Jang & Lee, 2021; Kamssu & Kouam, 2021). Additionally, the study will explore how these strategies may alleviate cognitive load and mental fatigue, which have become pressing concerns in remote learning environments (Babieva et al., 2022; Horita et al., 2021).

3. Methodology

We draw on grounded theory as an overarching analytical framework that enables the derivation of theoretical insights directly from the data itself, unencumbered by pre-existing assumptions (Charmaz, 2006; Glaser & Strauss, 2017). This inductive methodology is particularly well-suited when exploring under-

researched domains, as it facilitates the generation of theory grounded in participants' lived experiences (Corbin & Strauss, 1990).

3.1 Use of Miro, Gamification, and Serious Play

Miro's digital collaboration platform constituted the primary tool for synchronous student collaboration in a remote learning context (Freitag et al., 2022; Gopinathan et al., 2022). However, Miro lacked certain gamification features, so additional elements were integrated through the Blackboard learning platform. This allowed the incorporation of digital badges and certificates to recognise and reward student achievements, thereby fostering a sense of progression and accomplishment (Camacho-Sánchez et al., 2022; Dabbous et al., 2022). We also deliberately avoided the use of leaderboards in our gamification strategy, as the module was structured to encourage collaboration rather than competition. Instead, the focus was on collective achievement, using non-competitive rewards to motivate students and promote a supportive, cooperative learning environment (Rivera & Garden, 2021). Additionally, serious play methodologies were adapted for the digital sphere to promote creativity, reflective thought, and collaborative problem-solving in a low-risk, exploratory environment (Gkogkidis & Dacre, 2021).

3.2 Participant Selection

Purposive sampling was employed (Palinkas et al., 2015) to recruit participants from a cohort of final-year undergraduate students enrolled in a fully online project management module. This sampling technique was applied to ensure participants possessed pertinent, direct experience with the digital tools under scrutiny, such as Miro, gamification, and serious play. Given the emergent nature of this study, the decision to maintain a smaller sample size fostered a more granular, in-depth exploration of individual experiences (Mason, 2010). As recommended in qualitative research, the interviews were conducted until a point of thematic saturation was reached, ensuring that new data no longer contributed additional insights (Guest et al., 2006).

3.3 Data Collection

Semi-structured interviews were employed to elicit rich, qualitative data, a method well-suited for capturing participants' nuanced perspectives while affording the flexibility to probe emergent themes (Kallio et al., 2016). These interviews lasted between 25 to 40 minutes, allowing participants to reflect on their interactions with Miro's visual collaboration tools, gamification elements like achievement badges, and the role of serious play in cultivating critical skills. The

semi-structured format provided both the structure needed to address key research themes and the flexibility required for participants to delve into the minutiae of their experiences (Bryman, 2016).

3.4 Analytical Framework

For the analysis, grounded theory principles were integrated with elements of the Gioia methodology to structure and interpret the qualitative data (Corbin & Strauss, 1990; Gioia et al., 2013). Grounded theory's inductive approach is particularly relevant when exploring the dynamic, complex nature of online learning environments (Charmaz, 2006). This methodology allows theoretical insights to be engendered directly from the data, circumventing perceived limitations inherent in pre-existing frameworks (Glaser & Strauss, 2017). In concert with grounded theory, the Gioia methodology provided a systematic coding process, distinguishing first-order concepts from second-order themes and culminating in aggregate dimensions (Gioia et al., 2013). This approach allows us to distil students' varied experiences into key theoretical insights, offering clarity on how digital tools impact engagement, teamwork, and cognitive load.

4. Findings

4.1 Digital Collaboration and Peer Interaction

Our initial findings indicate that Miro's digital collaboration features may play a significant role in facilitating synchronous student interaction and replicating elements of in-person teamwork. The platform's visual tools, such as digital whiteboards and sticky notes, appeared to allow for real-time idea sharing, potentially fostering a sense of shared responsibility and peer collaboration. A key observation here, drawn from student feedback, is that the platform helped in building relationships in virtual spaces, which was crucial for creating a collaborative learning environment under remote conditions. Despite the success in fostering real-time collaboration, challenges around maintaining engagement in asynchronous tasks remain evident. Some students encountered difficulties in sustaining the same level of interaction outside scheduled sessions, particularly when coordinating group work across different time locations and digital platforms. This suggests that while Miro may simulate some aspects of in-person interaction, there are still limitations, particularly in maintaining peer feedback and engagement asynchronously.

4.2 Experiential Learning and Digital Resources

The adaptation of serious play methodologies to a digital context through the use of Miro, appeared to promote creative problem-solving and experiential learning.

Our preliminary findings suggest that Miro enabled students to engage in exploratory tasks within a collaborative, low-risk environment. Understanding concepts through virtual activities was a recurring theme, as students found the platform useful in organising and articulating their ideas visually, which facilitated comprehension. Gamification elements, such as digital badges and certificates, may have contributed to a heightened sense of progression and accomplishment, enhancing motivation and engagement. However, the fully digital nature of serious play activities seemed to limit the kinaesthetic and immersive experiences typically associated with physical environments. The absence of physical interaction was seen as a significant challenge, especially when students were accustomed to tactile engagement in learning. This reveals a tension between digital reflection opportunities provided by Miro and the experiential learning typically gained through physical materials.

4.3 Student Well-being

Our findings also highlight significant concerns regarding student well-being, particularly with respect to cognitive load and mental fatigue. Cognitive fatigue from prolonged online learning emerged as a prominent issue, with students reporting mental strain from prolonged screen time and the need to navigate multiple digital tools. The asynchronous nature of some elements of the course added to the stress, as students found it difficult to balance independent learning with the demands of digital collaboration. Challenges with digital focus and attention were particularly acute, with students indicating that maintaining sustained attention during remote learning was more difficult than in physical classrooms. While Miro's real-time interaction capabilities fostered engagement during synchronous sessions, the absence of non-verbal cues and physical presence contributed to feelings of isolation and disengagement over time. Moreover, the study-life balance in remote learning, compounded by the challenges of asynchronous communication, appeared to exacerbate the overall strain on some students' well-being.

4.4 Competency Development

Despite the challenges outlined, our initial findings suggest that Miro, alongside gamification, may have contributed to the development of key project management competencies such as teamwork, decision-making, and problem-solving. Students cited improvements in their ability to manage and coordinate group tasks, particularly in virtual environments, which required them to adopt new strategies for collaboration. Unexpected digital skill acquisition was also observed, with students noting that using tools like Miro enhanced their digital

literacy and their ability to work in virtual teams, skills that are increasingly relevant in both academic and professional contexts. Some limitations also emerged with respect to the depth of skill development in virtual environments. Miro did not fully replicate the critical thinking and problem-solving depth typically associated with in-person learning. The application of theory in digital practice was another theme that emerged, as students indicated that while they could apply theoretical concepts within Miro, the lack of physical interaction limited the full experiential aspect of the learning process.

5. Discussion

5.1 Digital Collaboration

Our findings underscore that while platforms such as Miro are effective in facilitating synchronous collaboration, they exhibit limitations in maintaining engagement during asynchronous activities. This reinforces existing evaluations of digital collaboration platforms, where engagement seems concentrated within specific time frames and is less effective when students are left to work independently (Chu & Fowler, 2020; Freitag et al., 2022). What this suggests is that while tools like Miro address some of the challenges of remote learning, they do not resolve deeper issues related to asynchronous learning and peer interaction. Moreover, the assumption that real-time digital tools can simply replace face-to-face collaboration overlooks the nuanced dynamics of student engagement. While Miro does enable virtual collaboration, the lack of physical presence and spontaneous interactions weakens the sense of community and shared responsibility that often characterizes successful teamwork in traditional classrooms (Gopinathan et al., 2022; Ng et al., 2022).

5.2 Reflections on Gamification and Serious Play

The use of gamification in this study, particularly the integration of badges and certificates, appears to confirm its capacity to drive short-term engagement. Yet, this aligns with what is already well-documented in the literature: gamification's motivational impact is often extrinsically based and tends to focus more on surface-level engagement rather than deep learning (Ahmad et al., 2022; Camacho-Sánchez et al., 2022). Deliberately excluding competitive elements, such as leaderboards, our research highlights that collaboration and cooperative learning can still be incentivized without fostering a competitive atmosphere. This challenges the prevalent assumption that competition is necessary for motivation in gamified environments (Rivera & Garden, 2021). However, this also exposes the limits of non-competitive gamification strategies in developing deeper cognitive skills. While students were motivated by rewards, further research is

required to ascertain whether this motivation translated into enhanced critical thinking or problem-solving skills. This is consistent with literature suggesting that gamification often fosters compliance with tasks but may not necessarily drive deeper engagement with the learning material (Dabbous et al., 2022; Pàmies-Vilà et al., 2022). As such, a continued focus on extrinsic motivators risks oversimplifying student engagement, reducing it to reward-based participation rather than fostering intrinsic, meaningful interactions with content.

The use of serious play further illustrates these challenges. While it fostered reflective and creative problem-solving in a digital environment, the lack of kinaesthetic engagement in serious play exercises significantly diluted its intended effect. Previous research points to the importance of physical, hands-on experiences in serious play, particularly for disciplines where tactile and experiential learning are crucial (Paepcke-Hjeltness, 2021). Our findings confirm that digital adaptations of serious play hold some limitations in their ability to replicate the depth of kinaesthetic learning found in face-to-face environments. This points to a key area for future inquiry: how can digital tools incorporate or simulate the physicality of learning, perhaps through augmented reality or other immersive technologies?

5.3 Implications for Student Well-being

Our findings regarding student well-being present a critical challenge to the growing adoption of remote learning technologies. The significant cognitive strain reported by students is consistent with earlier studies that highlight the negative impact of prolonged screen time and the fractured attention demanded by multiple digital platforms (Babieva et al., 2022; Horita et al., 2021). This suggests that, despite the progress made in integrating digital collaboration and gamification tools, there remains a risk of cognitive overload in remote learning environments. While tools like Miro can foster synchronous engagement, they also contribute to the mental fatigue experienced by students, as the constant demand to switch between tasks and platforms may exacerbate cognitive load. This reflects broader concerns that integrating more digital tools into the learning environment without careful consideration of user experience and cognitive limits could worsen learning outcomes rather than improve them (Avon et al., 2021). The tension between fostering engagement and managing cognitive load presents an important area for further research. While students' engagement may increase in the short term through interactive tools, this should not come at the cost of their mental well-being. This finding challenges the notion that more technology

necessarily equates to better learning outcomes in online settings (Zainal Badri et al., 2022).

5.4 Towards a Digital Learning Ecosystem

This study suggests the need for an integrated approach to digital learning environments, one that carefully balances engagement, well-being, and competency development. Based on these insights, we introduce a Digital Learning Ecosystem (Figure 1) to conceptualise how these components interact to influence learning outcomes. This framework situates student well-being considerations, particularly cognitive load, as a central factor in designing effective digital learning environments.

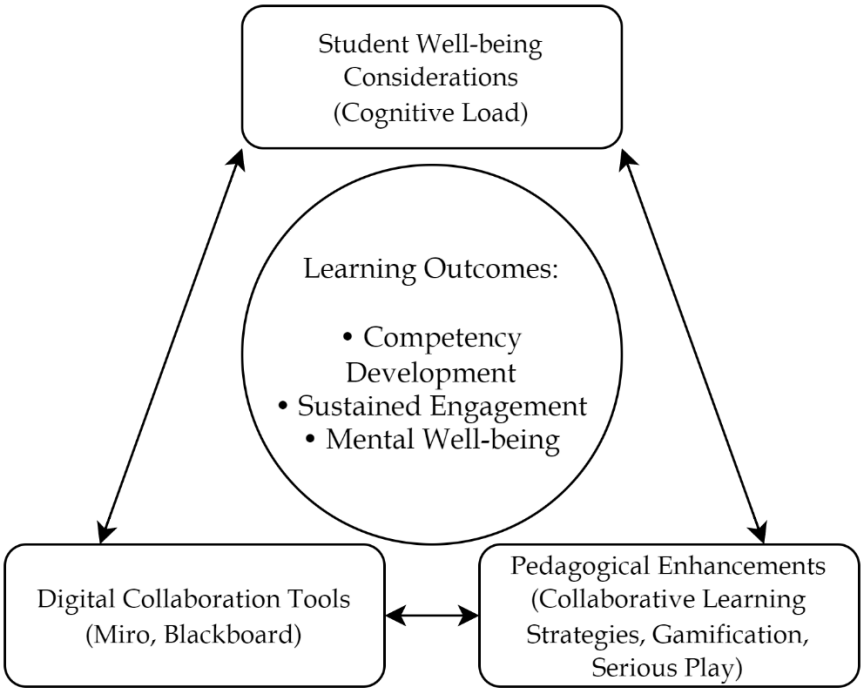

Figure 1: Digital Learning Ecosystem

This ecosystem comprises three interdependent components. The first of these is the role of digital collaboration tools, such as Miro and Blackboard, which facilitate synchronous interaction and promote collaborative peer engagement. Despite their utility in enabling real-time collaboration, these platforms exhibit limitations in sustaining student engagement during asynchronous tasks, highlighting the need for a more seamless integration of learning modalities across both synchronous and asynchronous contexts (Agrati et al., 2021).

The second component pertains to pedagogical enhancements, particularly the use of collaborative learning strategies such as gamification and serious play.

These strategies are recognised for their potential to foster student motivation and support experiential, practice-based learning. However, their efficacy in digital environments is frequently constrained by the absence of kinaesthetic engagement. In order to overcome this limitation, the incorporation of immersive technologies, including virtual and augmented reality, offers a promising avenue for creating more interactive and engaging learning experiences that better replicate the hands-on elements of in-person learning (Avinash et al., 2022).

Finally, student well-being, especially cognitive load and mental fatigue, presents a critical challenge in remote learning environments. Without due attention to these aspects, even the most advanced digital tools risk undermining their own educational objectives. Thus, future learning environments must be consciously designed to alleviate cognitive strain, either through the rationalisation of digital platforms or through the more thoughtful structuring of learning tasks and activities (Babieva et al., 2022).

These three components, when considered together, form a cohesive framework that seeks to foster competency development, sustained engagement, and cognitive well-being. The Digital Learning Ecosystem framework asserts that an effective digital learning environment must integrate these elements in a balanced and holistic manner, ensuring that technological innovations are leveraged not only to enhance learning outcomes but also to safeguard the mental and emotional well-being of students.

6. Conclusion

In this research, we sought to investigate how digital tools, specifically Miro, gamification strategies, and serious play, can be effectively integrated into remote learning environments to address engagement, competency development, and student well-being. Exploring these tools within a project management module allowed us to uncover several critical insights that challenge prevailing assumptions in the literature (Gopinathan et al., 2022; Paepcke-Hjeltness, 2021).

6.1 Contribution to Knowledge

Whilst platforms such as Miro enable synchronous collaboration, they fall short in fostering engagement during asynchronous activities (Johnson, 2022). This highlights a previously underexplored gap in the digital learning discourse, suggesting that the synchronous benefits of digital tools cannot easily translate into consistent engagement without further pedagogical innovation (Ahmad et al., 2022). Our study adds to the growing body of literature that cautions against an

over-reliance on digital tools as simple replacements for face-to-face learning (Agrati et al., 2021; Babieva et al., 2022).

Moreover, our analysis suggests that non-competitive gamification, while engendering short-term motivation, may not foster the deeper cognitive engagement necessary for long-term educational outcomes (Camacho-Sánchez et al., 2022; Rivera & Garden, 2021). This finding challenges the prevailing notion that gamification strategies are universally beneficial, particularly when employed without careful adaptation to the specific learning context (Dabbous et al., 2022; Hartt et al., 2020). Thus, we argue that the integration of gamified elements should be approached with a critical lens, emphasising their combination with reflective, intrinsically motivated tasks to ensure alignment with educational objectives (Kurt et al., 2022).

Perhaps most significantly, this research introduces the Digital Learning Ecosystem framework as a key contribution to knowledge. This framework highlights the interdependence between digital collaboration tools, pedagogical enhancements, and student well-being, positing that an effective digital learning environment must address these components in a balanced manner (Ahmad et al., 2022; Babieva et al., 2022). Specifically, by situating student well-being and cognitive load as central concerns, the framework offers a new theoretical model for conceptualising how digital learning tools should be designed and employed (Agrati et al., 2021; Gillett-Swan, 2017).

6.2 Contribution to Practice

Practically, this research affords several critical insights for educators and educational technologists aiming to optimise distance learning environments post-COVID-19 (Sonjit et al., 2021a, 2021c). Our findings delineate the need to embed digital tools, such as Miro, within a broader pedagogical strategy that prioritises student well-being and mitigates cognitive overload (Horita et al., 2021). One of the key practical contributions is the realisation that the number of platforms students must navigate should be streamlined (Baboolal-Frank, 2021; Novikova et al., 2022). The complexity and cognitive strain caused by the constant switching between multiple digital tools detracts from the overall learning experience (Agrati et al., 2021; Babieva et al., 2022). Rationalising these platforms, or ensuring better integration between them, is an essential step toward creating more efficient and less stressful remote learning environments (Gong et al., 2022).

Furthermore, our study underscores the dual-edged nature of non-competitive gamification. Practitioners may want to focus on creating models of gamification that blend extrinsic rewards with opportunities for intrinsic motivation through more reflective, collaborative tasks (Dacre et al., 2015; Rivera & Garden, 2021). The absence of leaderboards in our study, which fostered a non-competitive learning environment, provides a useful model for educators who wish to encourage collaboration over competition (Parra-González et al., 2020). However, the use of gamified elements must be re-evaluated for their impact on long-term cognitive outcomes rather than just short-term engagement boosts (Hartt et al., 2020).

Our findings also highlight the limitations of existing digital tools in replicating kinaesthetic learning, particularly in disciplines like project management that rely on hands-on collaboration (Gkogkidis & Dacre, 2020a). As a practical recommendation, educators should explore how emerging immersive technologies, such as artificial intelligence (Brookes et al., 2020; Dacre & Kockum, 2022a), augmented or virtual reality, can bridge this gap (Gillett-Swan, 2017; McFaul & FitzGerald, 2020). These technologies may offer opportunities to simulate kinaesthetic experiences in online environments, ensuring that the experiential learning dimension is not entirely lost in the digital transition (Garris & Fleck, 2022).

6.3 Limitations and Future Research

The relatively small sample size, while facilitating in-depth exploration, limits the generalisability of our findings (Guest et al., 2006; Palinkas et al., 2015). Moreover, the research's focus on a project management module means that the conclusions drawn may not fully apply to other disciplines where different pedagogical needs and challenges exist. In order to strengthen the validity and applicability of our findings, future research should broaden the scope by incorporating larger, more diverse student cohorts across a variety of academic subjects. Another key limitation is the short-term nature of the study, which precludes a comprehensive analysis of the long-term impact of digital tools on student well-being and learning outcomes (Ahmad et al., 2022). Future research should incorporate longitudinal studies to evaluate how these tools influence not just immediate engagement but also sustained academic performance and cognitive well-being over time (Babieva et al., 2022).

A critical direction for future research is the development of hybrid learning models. Our findings suggest that the binary choice between fully online or entirely in-person learning environments is an overly simplistic framework

(Kamssu & Kouam, 2021). A hybrid approach, which blends the strengths of both modalities, could offer a more comprehensive solution to the complexities of modern education. The combination of online tools for asynchronous tasks with in-person kinaesthetic interactions has the potential to provide a more balanced and effective learning experience (McFaul & FitzGerald, 2020; Ng et al., 2022). Further exploration into how these hybrid models may mitigate cognitive load and improve engagement will be essential in shaping the future of education (Ahmad et al., 2022).

6.4 Concluding Remarks

The insights from this study advocate for a reimagined approach to digital learning, one that transcends the mere adoption of new tools to embrace a more integrated, student-cantered framework that prioritises cognitive well-being and reflective engagement. As the future of education increasingly leans toward a blend of models, the ability to synthesise in-person and digital learning elements will likely be critical in creating a more inclusive, flexible, and effective educational landscape. This research lays the groundwork for future inquiry into how these evolving models can evolve to meet the diverse needs of learners while maintaining a balance between engagement and mental well-being.

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