

Digital game design for sustainable mobility: a community approach to behavioural transformation in onlife urban environments

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Abstract

This research presents a case study examining how transformational game design promotes sustainable mobility through community psychology approaches in onlife environments. The MUV platform¹, developed as University of Palermo spinoff, demonstrates practical integration of behavioural change models with game design principles. Longitudinal data from 2,856 users across European cities show 33.8% average carbon footprint reduction, with 14.9% daily-to-monthly active user retention. The platform's sport-as-metaphor framework transforms routine mobility decisions into engaging activities whilst supporting empowerment and social equality. Findings establish that university-led digital innovations can achieve meaningful individual and collective behavioural change, providing replicable pathways for scaling community psychology interventions addressing climate challenges.

Keywords: game design, sustainable mobility, community psychology, behavioural change, digital transformation, university innovation.

Riassunto. *Progettazione di giochi digitali per la mobilità sostenibile: un approccio comunitario alla trasformazione comportamentale negli ambienti urbani Onlife*

Questa ricerca presenta un caso studio che esamina come il game design trasformativo promuova comportamenti di mobilità sostenibile attraverso approcci di psicologia di comunità negli ambienti onlife. La piattaforma MUV, sviluppata come spinoff dell'Università di Palermo, dimostra l'integrazione pratica di modelli di cambiamento comportamentale con principi di game design. I dati longitudinali di 2.856 utenti in città europee mostrano una riduzione

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media dell'impronta carbonica del 33,8%, con il 14,9% di retention utenti attivi giornaliere/mensili. Il framework sport-come-metafora della piattaforma trasforma le decisioni di mobilità routinarie in attività coinvolgenti, supportando empowerment ed equità sociale. I risultati stabiliscono che le innovazioni digitali guidate dalle università possono ottenere cambiamenti comportamentali significativi individuali e collettivi, fornendo percorsi replicabili per scalare interventi di psicologia di comunità nell'affrontare le sfide climatiche.

Parole chiave: game design, mobilità sostenibile, psicologia di comunità, cambiamento comportamentale, trasformazione digitale, innovazione universitaria.

1. Introduction

The contemporary urban landscape is increasingly characterised by what Floridi (2014) defines as onlife environments, hybrid spaces where the boundaries between online and offline experiences become blurred, creating new contexts for human interaction and decision-making. Digital technologies permeate daily mobility choices within these environments, transforming how individuals navigate urban spaces and make transportation decisions. Examples include ride-sharing applications like Uber and Lyft that influence modal choice decisions, navigation apps such as Google Maps that shape route preferences, and bike-sharing platforms like Citybike that affect micro-mobility adoption patterns (Shaheen & Cohen, 2019; Djavadian and Chow, 2017). This digital transformation presents unprecedented opportunities for behavioural intervention, particularly through community psychology approaches that recognise the interconnected nature of individual actions and collective well-being.

The transport sector represents one of the most polluting industries, accounting for approximately one quarter of global greenhouse gas emissions, with over 60% attributable to private vehicles (International Energy Agency, 2021). Traditional approaches promoting sustainable transportation through policy interventions, infrastructure development, or economic incentives often fail to address the psychological and social dimensions of behavioural change, overlooking the complex interplay between individual motivation, social norms, and environmental constraints.

Community psychology offers a distinctive perspective on this challenge by emphasising the reciprocal relationship between individuals and their social environments. Rather than focusing solely on individual behaviour modification, community psychology interventions seek to create systemic changes that support collective well-being whilst empowering individuals to make meaningful choices (Kloos *et al.*, 2020). This approach is particularly relevant in addressing mobility behaviours, which are inherently social phe-

nomena influenced by community norms, infrastructure availability, and collective action towards environmental sustainability (Nielsen *et al.*, 2021; Bamberg *et al.*, 2015).

1.1 Digital tools and community psychology frameworks

Within onlife environments, mobile applications mediate transportation decisions while social media platforms shape perceptions of mobility options and environmental responsibility. However, the proliferation of digital mobility services has introduced new challenges: decision fatigue from abundant choices, superficial gamification prioritising engagement over genuine change, and digital divides creating inequities in access to sustainable options, particularly affecting vulnerable populations including elderly users, low-income communities, and individuals with limited technological literacy (Martens, 2016; Lupton, 2015).

Community psychology's ecological perspective provides a framework for understanding how digital interventions can promote sustainable mobility behaviours at multiple levels simultaneously. Bronfenbrenner's (1979) ecological systems theory suggests that behavioural change occurs through interactions between individual characteristics and environmental systems. Digital platforms offer unique opportunities to influence these levels by creating virtual communities, facilitating social comparison, and providing realtime feedback about collective environmental impacts.

The empowerment principle is particularly relevant to digital mobility interventions. Research demonstrates that effective digital empowerment requires user agency in data control, meaningful participation in platform governance, and transparent algorithms that respect user autonomy (Van Dijk, 2020; Ragnedda & Muschert, 2013). Effective interventions should enhance individuals' capacity to make informed choices and contribute to collective goals, requiring digital experiences that respect user autonomy while providing clear information about the consequences of mobility choices for personal and community well-being.

1.2 Game design as transformational tool

Game design principles offer powerful tools for creating digital interventions that align with community psychology values. Unlike traditional gamification that overlays game elements onto existing activities, transforma-

tional game design creates entirely new interaction paradigms, making sustainable choices inherently rewarding and meaningful (McGonigal, 2011). The sport metaphor in digital interventions has proven particularly effective in health and environmental contexts, as it naturally combines individual achievement with collective goals while maintaining intrinsic motivation through competence development and social connection (Hamari *et al.*, 2014; Seaborn and Fels, 2015).

Games naturally create “flow” experiences characterised by deep engagement, intrinsic motivation, and optimal challenge levels (Csikszentmihalyi, 1990). They uniquely bridge individual and collective action by creating shared experiences and common goals, fostering collective efficacy – the belief that groups can effectively achieve goals together (Bandura, 2000). This characteristic makes game design particularly suited to addressing environmental challenges requiring coordinated collective action.

The following sections explore how these theoretical foundations integrate into practical digital interventions for sustainable mobility, using the MUV platform¹ as a case study of university-led innovation in transformational game design.

2. Theoretical framework

Designing effective digital interventions for sustainable mobility requires a comprehensive understanding of behavioural change mechanisms and psychological principles underlying human motivation. This section examines theoretical foundations informing game-based approaches to mobility transformation, exploring how established behavioural models integrate with innovative design strategies to create meaningful change in urban transportation patterns.

Contemporary behavioural science offers robust frameworks for understanding and facilitating behaviour change, each providing unique insights into the complex dynamics of human decision-making (Michie *et al.*, 2014; Prochaska and Velicer, 1997; Ajzen, 1991). When applied to mobility contexts, these models reveal the multifaceted nature of transportation choices and highlight the potential for digital interventions to address multiple determinants simultaneously.

¹ MUV platform website: <https://www.muvgame.com>. The platform provides gamified tools for sustainable mobility tracking and community engagement.

2.1 Behavioural change models for digital interventions

Three theoretical models provide valuable frameworks for designing digital mobility interventions: the Behaviour Change Wheel (BCW), Fogg's Behaviour Model (FBM), and Self-Determination Theory (SDT). Each offers distinct perspectives on behavioural change mechanisms while complementing others in creating comprehensive intervention strategies.

The Behaviour Change Wheel (Michie *et al.*, 2011) provides a systematic approach to designing interventions based on three core components: capability (physical and psychological capacity to perform behaviour), motivation (psychological and amotional factors influencing action, including reflective processes and habits), and opportunity (external factors, such as infrastructure availability, social norms, and environmental cues, that facilitate or constrain behaviour).

Fogg's Behaviour Model focuses on the precise moment when behaviours occur. According to FBM, behaviour happens when three factors converge simultaneously: sufficient motivation, adequate ability, and effective prompt (Fogg, 2009). This model emphasises timing and context in behavioural interventions. Mobile applications are uniquely positioned to deliver prompts at optimal moments, such as when users plan journeys or make real-time transportation decisions.

Self-Determination Theory focuses on psychological needs supporting intrinsic motivation and sustained behavioural change. SDT identifies three basic needs: autonomy (feeling volitional and self-directed), competence (feeling effective and capable), and relatedness (feeling connected to others) (Deci & Ryan, 1985, 2000). Interventions supporting these needs foster intrinsic motivation, which is associated with greater persistence than behaviours driven by external rewards.

2.2 From habit loops to game loops: neurological Foundations

Understanding the neurological basis of habit formation provides crucial insights for designing effective game-based interventions. Habits operate through a documented neurological cycle: cue, routine, and reward (Duhigg, 2012). This cycle becomes increasingly automatic through repetition, as neural pathways strengthen and conscious effort decreases. Importantly, anticipation of reward drives motivational power in established habits.

Game loops share striking structural similarities with habit loops, suggesting games can be powerful tools for habit formation and modification (Schell, 2014). Games rely on the cyclical structure of challenge, reward, and

expansion phases. Players engage with challenges that, upon completion, yield rewards. These rewards unlock new opportunities, enabling skill development and progression. The anticipation phase between reward and expansion is marked by dopamine release, creating a neurochemical foundation for sustained engagement (McGonigal, 2011).

The conceptual alignment between habit and game loops provides a scientific foundation for using game design principles in behavioural interventions. By designing challenge-reward cycles that mirror neurological patterns underlying habit formation, games can potentially accelerate the development of sustainable mobility habits.

2.3 Transformational games versus traditional gamification

The distinction between *transformational games* and traditional gamification approaches is crucial for understanding game design potential in promoting sustainable mobility behaviours. Traditional gamification typically overlays game elements such as points and badges onto existing activities without fundamentally altering the underlying experience or addressing deeper motivations for behavioural change.

Transformational games are designed to generate profound individual and collective changes by reshaping beliefs, values, and behavioural patterns. As Bogost (2007) argues, games can serve as persuasive media that embed real-world logics into game mechanics, creating experiences that naturally guide players towards desired outcomes.

Purpose-oriented play represents the first defining characteristic, where gameplay transcends entertainment to address specific societal goals. Empowerment constitutes the second characteristic, as transformational games equip players with tools, knowledge, and motivation to achieve personal and collective goals. Real-world impact defines the third characteristic, where ingame actions translate into tangible outcomes beyond the game environment.

The online multiplayer game *Eco* exemplifies transformational environmental game design (Strange Loop Games, 2018; Squire and Jenkins, 2003). Players collaborate to build a sustainable civilisation within a reactive ecosystem where every action affects the entire world, requiring careful resource management to avoid environmental collapse. With over 250000 engaged players, *Eco* demonstrates how games can create intrinsic motivation for environmental stewardship by making sustainable behaviour essential for collective success, while system-level feedback helps players understand how individual actions aggregate into collective outcomes.

The theoretical frameworks examined provide a foundation for developing comprehensive digital interventions addressing psychological, social, and neurological dimensions of behavioural change. The following section explores how these principles have been applied in developing the MUV platform, demonstrating practical integration of behavioural science and transformational game design.

3. The MUV case study: evidence from longitudinal implementation

The MUV (Mobility Urban Values) platform represents a paradigmatic example of university-led technological innovation addressing pressing societal challenges through evidence-based design. Developed as a spinoff from the University of Palermo, MUV demonstrates the practical application of theoretical frameworks examined previously, integrating behavioural science principles with transformational game design to create a comprehensive intervention for sustainable urban mobility.

The platform functions by tracking users' transportation choices through GPS and device sensors, converting sustainable mobility behaviours (walking, cycling, public transport use) into game points within a sport-like competitive framework. Users form teams representing neighborhoods, companies, or social groups, competing in tournaments where collective environmental performance determines success. Real-time feedback shows individual and team carbon footprint reductions, while social features enable sharing achievements and strategies with community members.

MUV operates at the intersection between habit and game loops, converting routine mobility decisions into engaging experiences through carefully designed mechanics. The platform fundamentally reimagines urban transportation as a collective sporting activity, transforming how users perceive daily travel choices. This approach exemplifies universities' role in fostering innovation that bridges academic research with real-world impact.

A distinctive methodological feature is MUV's integration of rigorous scientific measurement with practical market deployment. The platform's CO₂ emission reduction methodology has been validated by RINA in accordance with ISO 14064-2 standards (ISO, 2019), ensuring environmental impact claims meet international scientific standards while supporting commercial sustainability goals.

3.1 Platform design and game mechanics

MUV's architectural design reflects a sophisticated understanding of behavioural change mechanisms², integrating multiple theoretical frameworks into a cohesive user experience, promoting sustainable mobility through intrinsic and extrinsic motivations. The platform employs a multi-layered approach addressing capability, motivation, and opportunity simultaneously, following the BCW framework.

The primary innovation lies in the systematic application of sport as a metaphor for sustainable mobility transformation. This approach builds upon extensive research demonstrating that sport metaphors effectively enhance motivation, goal-setting, and social engagement in behavioural interventions (Burke *et al.*, 2015; Consolvo *et al.*, 2008). The sport framework fundamentally reframes the entire mobility experience within a coherent athletic paradigm, addressing a critical gap in mobility behavioural interventions: transforming routine, unconscious travel decisions into conscious, motivated choices.

Sport naturally integrates the three psychological needs identified in SDT: autonomy (choice in participation modes), competence (progressive skill development), and relatedness (team membership and competition) (Ryan & Deci, 2017; Ntoumanis *et al.*, 2021).

The sport-as-metaphor operationalises through narrative transformation where individual trips become “performance”, modal choices represent different “disciplines”, communities form “teams” with shared performance goals, and environmental impact becomes measurable “athletic achievement”. This conceptual reframing activates intrinsic motivational drivers and reduces psychological resistance by shifting focus from environmental duty to personal mastery and collective success.

MUV's multi-modal gamification architecture accommodates diverse transport modes within a unified competitive framework. The architecture incorporates hierarchical point systems reflecting actual environmental impact rather than arbitrary mechanics, with scoring algorithms incorporating modespecific sustainability coefficients validated against ISO standards. Walking and cycling receive higher point values, public transport receives moderate scores, and private vehicle use receives less points, creating clear incentive structures aligned with environmental objectives.

Progressive competition structures systematically build from individual habit formation through peer competition to complex team dynamics. Users

² The MUV platform is available for download on iOS and Android app stores, with implementations currently active in multiple European cities.

engage through individual training sessions focused on personal improvement, peer-based challenges activating social motivation, or team-based tournaments featuring strategic coordination. This progression maintains user autonomy over participation intensity while providing clear pathways for increased engagement.

3.2 Community psychology principles implementation

MUV's implementation demonstrates how digital platforms can effectively address multiple levels of behavioural intervention simultaneously through evidence-based design principles (Trickett, 2009; Wandersman and Florin, 2003). The platform's design reflects Bronfenbrenner's (1979) ecological systems theory by creating interventions spanning individual, interpersonal, community, and societal levels.

At the individual level, MUV supports three basic psychological needs through carefully designed choice architectures based on established behavioural economics principles (Thaler & Sunstein, 2008). Autonomy is fostered by maintaining complete user control over participation timing, intensity, and competitive involvement. The voluntary tracking system requires deliberate activation, ensuring sustainable choices feel self-directed. Competence development occurs through progressive architecture, enabling users to develop mastery through increasing challenge complexity. Relatedness is cultivated through team structures, social leaderboards, and collaborative challenges, creating multiple pathways for social connection.

At interpersonal and community levels, MUV facilitates social influence processes that shift norms around mobility choices through mechanisms established in social psychology research (Cialdini and Goldstein, 2004; Schultz *et al.*, 2007). The platform makes sustainable behaviours visible through social feeds and leaderboards, creating opportunities for social modelling. Community-level interventions are implemented through neighbourhood and city-wide competitions, creating collective goals and shared identity around environmental sustainability.

The platform's integration with existing mobility infrastructure operates as a motivational enhancement layer that complements rather than replaces available transport options. This infrastructure-agnostic approach ensures broad applicability while focusing on behavioural transformation rather than technological dependency.

3.3 Measurable impacts: individual and collective outcomes

Through implementation across multiple European cities, MUV has generated substantial evidence of effectiveness in promoting sustainable mobility behaviours. Longitudinal data collected between 2022-2024 from all community implementations (2,856 active users) demonstrated that participants reduced their mobility-related carbon footprint by an average of 33.8% compared to personal baselines. This substantial reduction reflects the capacity of behavioural interventions to drive meaningful environmental change without requiring policy restrictions or infrastructure modifications.

Behavioural change penetration rates vary substantially (19.20-39.18%), with an overall average of 31.29% of active participants achieving measurable emission reductions. Penetration rates demonstrate an inverse relationship with reduction magnitude, suggesting broader participation involves more modest individual changes, while focused engagement generates more profound behavioural transformation. This finding has important implications for scaling strategies, indicating platforms can simultaneously achieve broad reach and deep impact through differentiated engagement pathways.

From an engagement perspective, the platform achieved a Daily Active Users to Monthly Active Users (DAU/MAU) ratio of 14.9% over the 2022-2024 period, indicating strong user retention typical of successful mobile applications. The presence of active competitions correlated with a 41.84% increase in user participation, confirming the effectiveness of game dynamics in sustaining long-term engagement beyond initial novelty effects.

The platform's dual approach, combining bottom-up behavioural change with top-down policy formulation, establishes a reinforcing loop where individual actions inform systemic improvements. Mobility data collected serves multiple purposes: reinforcing intrinsic motivations by visualising personal progress, enabling organisations to develop evidence-based mobility management plans, and providing insights for urban mobility policies and Sustainable Urban Mobility Plans (SUMP) (European Commission, 2019).

Digital literacy improvements represent an important secondary outcome, particularly relevant to supporting healthy technology use patterns among diverse user populations. Users demonstrate enhanced confidence with mobile technology and improved understanding of privacy and data management issues, supporting digital inclusion in increasingly technology-mediated urban environments.

At the collective level, MUV's success in engaging diverse demographic groups provides evidence of potential for promoting equitable access to sus-

tainable mobility benefits. The platform's design effectively addresses barriers that might otherwise limit access to sustainable transportation options, ensuring interventions do not exacerbate urban inequalities.

The empirical validation successfully transitioned from research prototype to commercial implementation through MUV Srl SB, established in 2020 to transform theoretical principles into market-viable solutions. This transition demonstrates how university-led innovation can create a lasting impact beyond academic research, establishing sustainable pathways for scaling evidence-based interventions to address societal challenges.

4. Discussion: critical analysis and implications

The MUV case study provides valuable insights into the potential and limitations of game-based approaches to sustainable mobility, offering a foundation for critical assessment of transformational game design as a community psychology intervention (Trickett, 2009; Kloos *et al.*, 2020). This analysis examines the strengths and constraints of the approach, explores broader implications for community psychology practice, and considers the distinctive role universities can play in developing technology-mediated social interventions.

4.1 Critical assessment of the game design approach

The sport-as-metaphor framework demonstrates both significant potential and important limitations as a behavioural change mechanism. The approach's primary strength lies in its ability to reframe environmental responsibility from moral obligation to skill-based achievement, reducing psychological resistance and maintaining intrinsic motivation (Ryan & Deci, 2017; Deci & Ryan, 2012). The 33.8% average carbon footprint reduction suggests this reframing can produce meaningful behavioural change when appropriately implemented.

However, several contextual factors influence the framework's effectiveness. The inverse relationship between participation breadth (19.20-39.18% penetration rates) and reduction magnitude indicates that universal applicability may be limited. The sport metaphor may resonate differently across cultural contexts where competitive athletics hold varying social significance (Hofstede, 2001). Additionally, the approach's effectiveness appears dependent on existing community social capital and technological infrastructure, potentially limiting scalability in resource-constrained environments.

The game design approach also raises questions about long-term sustainability beyond active platform engagement. While the 14.9% DAU/MAU ratio demonstrates sustained engagement, the research has not yet established whether behavioural changes persist after users discontinue platform use or whether the approach facilitates genuine habit formation versus temporary compliance with game mechanics (Gardner, 2015; Wood and Neal, 2007).

Comparison with alternative behavioural change approaches reveals both advantages and trade-offs. Traditional policy interventions offer broader reach but lower engagement levels, while purely educational approaches may enhance awareness without producing behavioural change (Stern, 2000; McKenzieMohr, 2011). The MUV approach occupies a middle ground, achieving adequate reach with substantial impact among engaged users, suggesting complementary rather than replacement value within comprehensive sustainability strategies.

4.2 Broader implications for community psychology practice

The MUV case study demonstrates how digital platforms can extend community psychology principles into new domains while raising questions about integrating technology-mediated and traditional community-based interventions (Kloos *et al.*, 2020; Trickett, 2009). The platform's success in addressing multiple ecological levels simultaneously suggests that well-designed digital tools can indeed facilitate systemic change, challenging assumptions that technology-mediated interventions necessarily focus on individual behaviour modification.

The empowerment framework's application to digital contexts reveals both opportunities and tensions (Zimmerman, 2000; Perkins & Zimmerman, 1995). While the platform successfully supports autonomy, competence, and relatedness through choice architectures and social features, questions remain about whether digital empowerment translates into broader community capacity for addressing non-technology-mediated challenges. The 41.84% increase in participation during competitions suggests that digital engagement can mobilise collective action, but the sustainability of this mobilisation beyond the gaming context requires further investigation.

The approach's transferability to other social challenges presents both promise and complexity (Wandersman & Florin, 2003). Mental health promotion, social integration, and civic engagement could potentially benefit from similar game-based reframing strategies. However, each domain pre-

sents unique ethical considerations, cultural sensitivities, and outcome measurement challenges that would require careful adaptation of the fundamental approach.

Integration with traditional community psychology methods remains an underexplored area requiring systematic investigation (Trickett, 2009). Digital platforms could potentially serve as engagement mechanisms that facilitate subsequent face-to-face community development work or as data collection tools that inform traditional intervention design. Alternatively, they might function as standalone interventions that complement but do not require integration with traditional approaches.

4.3 Universities as innovation hubs for social change

The University of Palermo's role in supporting MUV's development illustrates a distinctive model for academic engagement with societal challenges that extends beyond traditional research dissemination (Boyer, 1990; Sandmann *et al.*, 2008). The transition from research prototype to sustainable business model demonstrates how universities can create a lasting impact while maintaining a commitment to social benefit rather than profit maximisation.

This approach addresses a critical gap in translating community psychology research into scalable practice (Trickett, 2009; Wandersman, 2003). Traditional academic publishing rarely produces interventions with the reach and sustainability necessary to address systemic social challenges. The university led social enterprise model provides an alternative pathway that preserves scientific rigour whilst enabling real-world implementation and continuous improvement based on empirical feedback.

The interdisciplinary collaboration required for MUV's development, integrating environmental psychology, game design, computer science, and urban planning, exemplifies universities' unique capacity to facilitate knowledge synthesis across traditional departmental boundaries (Klein, 2008; Lattuca, 2001). This collaborative capacity may be essential for addressing complex social challenges that resist single-discipline solutions.

However, the model also presents challenges and limitations. The transition from academic research to commercial sustainability requires expertise in business development, legal structures, and market dynamics that may not align with traditional academic career pathways (Sandmann *et al.*, 2008; Boyer, 1990). Additionally, maintaining community psychology values while scaling interventions through commercial mechanisms requires careful governance structures and ongoing accountability measures.

The social benefit corporation model adopted by MUV Srl SB provides one framework for addressing these tensions, but broader institutional changes may be necessary to support university-led social innovation systematically. Academic promotion and tenure systems, funding mechanisms, and performance metrics would need adaptation to recognise and reward this form of engaged scholarship effectively (Glassick *et al.*, 1997; Boyer, 1990).

5. Conclusions and future directions

This research examined how transformational game design can serve as an effective tool for promoting sustainable mobility behaviours within onlife urban environments, using the MUV platform as a paradigmatic example of university-led innovation in community psychology intervention. The findings establish that digital technologies, when designed with explicit attention to community psychology principles, can achieve meaningful behavioural change at both individual and collective levels while supporting empowerment and social equity.

The theoretical integration of behavioural change models with transformational game design provides a robust framework for developing digital interventions addressing complex, multi-level determinants of sustainable mobility. The sport-as-metaphor approach demonstrates how strategic reframing can transform routine transportation decisions into engaging, skill-based activities that reduce psychological resistance whilst building genuine competence. Empirical evidence of 33.8% average carbon footprint reduction confirms the scalability and effectiveness of this approach.

The university's role in developing MUV exemplifies how academic institutions can bridge theoretical knowledge and practical application while maintaining a commitment to social benefit and scientific rigour. The platform's progression from research prototype to sustainable business model provides a replicable pathway for translating community psychology research into scalable interventions addressing pressing societal challenges.

Future research should examine several critical areas to advance understanding game-based community psychology interventions (Kloos *et al.*, 2020; Trickett, 2009). Long-term sustainability studies are essential to determine whether behavioural changes persist beyond active platform engagement and whether they generalise to other pro-environmental behaviours. Crosscultural validation of game-based frameworks requires systematic testing across diverse cultural contexts to ensure universal applicability whilst respecting cultural sensitivities.

Methodological innovations should explore optimal integration of digital

platforms with traditional community psychology approaches, investigating how technology-mediated interventions can complement face-to-face community development work (Wandersman & Florin, 2003). Research on governance models for university-led social enterprises could inform broader efforts to scale evidence-based interventions whilst maintaining community psychology values.

Applications to other social challenges represent a promising avenue for expanding community psychology's impact in digital contexts. Mental health promotion, social integration, and civic engagement could benefit from similar game-based empowerment approaches, contributing to the growing field of digital community psychology (Doherty & Doherty, 2018; Mohr *et al.*, 2013).

As communities worldwide navigate challenges of climate change and digital transformation, this research provides evidence that university-led innovation in transformational game design can create technology-mediated interventions that enhance rather than compromise psychological well-being and social cohesion. The MUV platform demonstrates that digital technologies developed with community psychology principles can serve as powerful tools for addressing global challenges while supporting local empowerment and collective action towards a sustainable future.

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