

Embodied Entrepreneurship: Exploring How an Analogue Role- Play Game Develops Entrepreneurial Mindsets in Master's Engineering Students

Dorcas Réamonn

University College Dublin
Belfield,
BÁC 4, Éire
dorcas.reamonn@ucd.ie

Dr. Colin Keogh

Independent Researcher
Éire
colinkeogh@gmail.com

ABSTRACT

This paper presents the *Entrepreneurial Journey Game*, an embodied, role-play-based learning experience designed to strengthen entrepreneurial mindset development and students' comfort with uncertainty. Through improvisation, surprise events, hidden roles, collaborative decision-making, and investor interactions, the game creates a playful but consequential simulation of early-stage entrepreneurial practice. While entrepreneurship simulations often emphasise cognitive problem-solving and business planning, this design foregrounds performative, social, and material modes of play characteristic of analogue role-play, live-action role-play, and tabletop traditions.

Drawing on game studies and performance theory frameworks concerning embodied enactment, uncertainty as a core ludic principle, performative identity, and facilitation, the paper positions the game as an exploration of how analogue, improvisational mechanics can cultivate experiential entrepreneurial mindsets. Using a pre/post mixed-methods survey with master's engineering students at University College Dublin, the study measured shifts in entrepreneurial intention, comfort with uncertainty, creativity, and confidence in practical entrepreneurial tasks. The analysed dataset consists of 26 complete pre- and post-game responses from a cohort of 37 participating students.

Results indicate increased comfort with ambiguity, enhanced creative thinking, and improved confidence in activities such as idea validation, business planning, pitching, and fundraising. Qualitative responses highlight the value of role-play, investor interactions, time-pressured teamwork, and unpredictable constraints. The findings are interpreted not only as educational outcomes, but also as shifts in player experience, enactment, and interactional framing. The paper argues that embodied analogue game-based simulations

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offer distinct benefits for modelling the volatility, ambiguity, social negotiation, and productive failure inherent to entrepreneurial practice.

Keywords

experiential learning, game-based learning, entrepreneurship education, serious games, role-play, higher education pedagogy, creative thinking

INTRODUCTION

Entrepreneurship education has long struggled to reproduce the uncertainty, interpersonal negotiation, decision-making pressure, and rapid iteration characteristic of real entrepreneurial environments (Pittaway and Cope 2007; Heinonen, Ilozor, and Poikkijoki 2006; Fayolle 2013). Traditional lecture-based formats often describe entrepreneurship rather than offering learners lived opportunities to practise it. In engineering education, where students must increasingly integrate innovation, teamwork, creativity, and problem-solving under real constraints, this gap is particularly pronounced (Borrego and Newswander 2010; Daly, Mosyjowski, and Seifert 2014).

Entrepreneurship is characterised by ambiguity, limited information, emergent constraints, and volatile social interaction. These features closely align with the dynamics of game-based learning (GBL). Salen and Zimmerman argue that uncertainty is central to meaningful play, and in entrepreneurship uncertainty is not a side condition but a defining feature of action (Salen and Zimmerman 2003). Games therefore offer a useful structure for making entrepreneurial ambiguity playable: learners can encounter incomplete information, shifting rules, social pressure, and failure within a bounded environment where experimentation is possible.

Role-play and GBL have emerged as promising methods (Lean et al. 2006; Kriz and Auchter 2016) to simulate authentic entrepreneurial dynamics. By combining narrative, improvisation, embodiment, and strategic decision-making, games provide a “safe but serious” arena where learners can experiment, take risks, fail productively, and explore multiple pathways through complex challenges. Prior work in entrepreneurship education identifies the need for pedagogies that cultivate competencies such as creativity, opportunity recognition, mobilising others, and comfort with uncertainty (Neck and Greene 2011; Rae 2006; Lackeus 2015). The European Entrepreneurship Competence Framework (EntreComp) (Bacigalupo et al. 2016) similarly emphasises attitudes and behaviours; valuing ideas, dealing with ambiguity, working with others, rather than only business knowledge.

This paper introduces the *Entrepreneurial Journey Game*, a research-informed, open educational resource co-designed to address these pedagogical challenges. Drawing inspiration from escape rooms, improvisational theatre, and role-playing games, it integrates persona cards, wildcards, investor roles, surprise chance events, and embodied movement to create an interactive entrepreneurial simulation. The game aims to recreate the pressure, ambiguity, and relational dynamics of startup life while enabling structured learning aligned to EntreComp.

In November 2025, a two-hour version of the game was implemented with 37 master’s engineering students at University College Dublin (UCD). A pre-post survey captured shifts in entrepreneurial intention, comfort with uncertainty, creative thinking, and perceived ability in tasks such as ideation, validation, planning, pitching, and fundraising. Twenty-six students completed both the pre- and post-game surveys and form the analysed dataset

for this paper. Open-ended questions provided additional insight into students' concerns, expectations, enjoyment, perceived challenges, and reflections on learning.

The remainder of this paper describes the game's design, methodological approach, findings from the UCD implementation, limitations and implications for game-based entrepreneurship pedagogy.

RELATED WORK

This section situates the *Entrepreneurial Journey Game* at the intersection of embodied analogue play, uncertainty-driven game design, experiential entrepreneurship education, and serious game-based learning. Rather than treating the game only as a teaching tool, the review frames it as a performative social simulation in which entrepreneurial action is enacted through roles, bodies, rules, uncertainty, and interaction.

Embodied and Performative Play

Prior Game Studies scholarship emphasises the role of the body and performance in analogue role-play. Bowman (2018) describes how role-playing games can be "transformative" for players.

Montola (2012) argues that role-play is co-created socially through performance, uncertainty, and negotiated meaning. Goffman (1974) frame analysis and Schechner (2003) performance theory further illuminates how players oscillate between frames of fiction and reality.

Regarding persuasive play, Grace (2019) notes that "if a player can do something in a game, they may be able to do it outside the game" highlighting the potential of games to translate in-game experiences into real-world actions. This principle aligns with the aim of our game. However, it should be noted that students completed the survey only one week after gameplay; they were not tracked long-term to determine whether their behaviour changed, nor was there a control group for comparison.

This paper builds on these traditions by analysing entrepreneurial behaviour as a form of situated performance, linking it to improvisation-based game systems.

Uncertainty as a Ludic Principle

As mentioned in the Introduction, uncertainty is central to game design (Salen and Zimmerman 2003) emerging through randomness, hidden information, negotiation, and emergent systems. Research in Game Studies shows that uncertainty is especially salient in social games and improvisational structures (Costikyan 2013) and pervasive games (Montola 2012). Rather than minimising uncertainty, many larp systems deliberately amplify it to scaffold emotional and social investment.

Our design adopts uncertainty not as a pedagogical inconvenience but as a core mechanic modelling the ambiguity endemic to entrepreneurship.

Entrepreneurship Education and Experiential Learning

Entrepreneurship education increasingly recognises that entrepreneurial competence is not primarily cognitive but behavioural and affective. Neck and Greene (2011) argue that entrepreneurship should be taught "as a method", emphasising action, experimentation, and non-linear learning rather than prescriptive business planning. Experiential

pedagogies including simulations, project-based learning, and design thinking, are widely recommended to cultivate comfort with ambiguity, creativity, and resilience (Kolb 1984; Pittaway and Cope 2007; Politis 2005).

The European Union’s EntreComp framework (Bacigalupo et al. 2016) formalises this view by positioning entrepreneurship as a set of 15 competencies across three competence areas: *Ideas and Opportunities*, *Resources*, and *Into Action*. These competencies stress managing uncertainty, mobilising others, ethical thinking, teamwork, and creativity, dimensions often neglected in lecture-based programmes but central to gameplay.

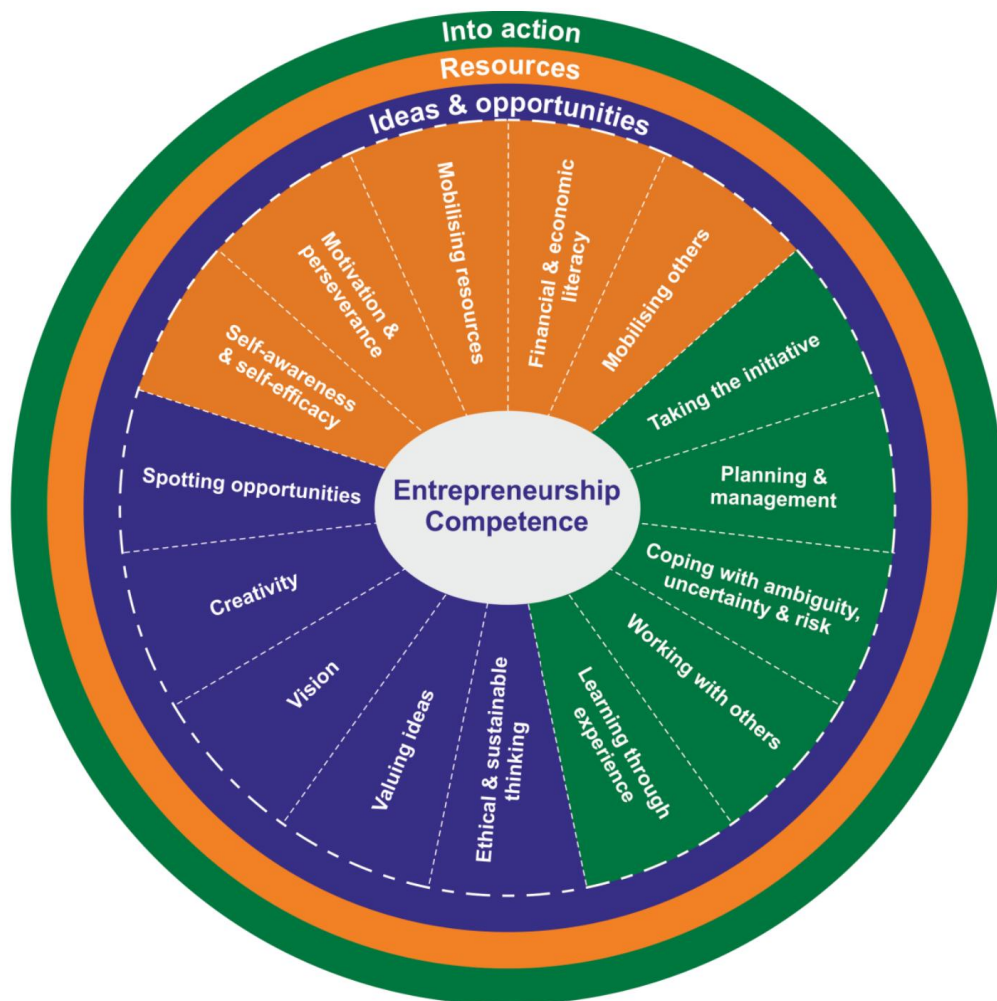


Figure 1: The Entrepreneurship Competence

Game-Based Learning (GBL) and Simulation Games

GBL has shown effectiveness in promoting engagement, autonomy, problem-solving, and situational learning (Gee 2003; Kili 2005; Connolly et al. 2012; Wouters, Spek, and Oostendorp 2011). Games provide immediate feedback, encourage iterative experimentation, and simulate complex systems through simplified but consequential mechanics. In entrepreneurship, digital simulations such as *SimVenture* or *Marketplace Live* model financial, market, or managerial processes, while analogue simulations (e.g., trading games, design sprints, innovation labs) emphasise teamwork and negotiation.

Role-playing games (RPGs) and embodied simulations offer specific affordances for entrepreneurial learning:

- Identity exploration through personas and hidden roles.
- Social negotiation through investors, mentors, and collaborators.
- Improvisation and narrative co-creation under time pressure.
- Emotional engagement through stakes, uncertainty, and dramatic tension.

These characteristics align strongly with entrepreneurial behaviours (Bowman 2010; Felsman, Gunawardena, and Seifert 2020) such as pitching, networking, negotiating, and framing opportunities.

Escape-Room and Improvisation Pedagogy

Recent research in escape-room-based learning highlights the benefits of time pressure, limited information, hidden clues, and unexpected disruptions as sources of authentic problem-solving and creative collaboration (Nicholson, 2015; Clarke et al., 2017; Crossan, 1996; Vera & Crossan, 2005). Improvisational theatre methods have similarly been incorporated into entrepreneurship training to teach adaptability, listening skills, and co-creation. The *Entrepreneurial Journey Game* integrates these approaches with open-ended creative prompts, unpredictable chance events, and investor interactions.

Gaps in Existing Literature

While numerous entrepreneurship simulations exist, few combine:

- Analogue role-play with hidden roles,
- Improvisational investor interactions,
- Chance-based disruptions,
- Embodied movement across space, and
- A structured mapping to EntreComp competencies.

Empirical studies focusing on mindset development, particularly among engineering students, remain limited. This paper addresses this gap by evaluating how an embodied role-play entrepreneurship game influences uncertainty tolerance, creative thinking, and core entrepreneurial skills.

There are limited studies on megagames (Palha et al., 2025), the authors could find no Irish studies on megagames. The Entrepreneurial Journey Game is not presented here as a full megagame in the strict sense, since the UCD implementation involved a single classroom cohort and a relatively short two-hour format. However, the design shares several features associated with megagame practice: team-based role allocation, asymmetric information, facilitator-led adjudication, socially negotiated outcomes, and the potential to scale across multiple interacting teams. Megagame scholarship therefore provides a useful lens for interpreting future versions of the game, particularly if the format expands into larger cohorts, multi-room play, additional investor factions, or more complex inter-team dependencies.

This distinction is important because the contribution of the present paper does not depend on claiming that the studied intervention was a megagame. Rather, the game can be understood as megagame-adjacent: it draws on some of the design logics of large-scale social simulation while operating at a classroom scale. This allows the paper to connect with emerging work on megagames in higher education while remaining precise about what was actually implemented and evaluated.

GAME DESIGN AND PEDAGOGICAL FOUNDATIONS

Entrepreneurship education increasingly emphasises experiential, action-based learning in order to mirror the uncertainty, ambiguity, and rapid decision-making that characterise real entrepreneurial practice. The Entrepreneurial Journey Game was designed as an analogue, embodied simulation that allows students to *act* entrepreneurial rather than merely *learn about* entrepreneurship. The game draws on principles of experiential learning (Kolb 1984), serious games, role-play pedagogy, and improvisational problem-solving, integrating these into an instructional format grounded in both research and practice.

The design was guided by three pedagogical priorities:

1. **Embodied decision-making under uncertainty**
Entrepreneurship is inherently unpredictable; therefore, the game incorporates hidden roles, randomness, investor negotiations, and improvised constraints to create a high-pressure but safe simulation of entrepreneurial problem-solving.
2. **Collaborative creativity and divergent thinking**
Teams must collectively ideate, refine, and test concepts under time pressure. Chance Cards, Challenge Modifiers, and evolving investor demands push students to reframe problems, recombine ideas, and creatively adapt.
3. **Alignment with EntreComp**
The game directly maps to the European Entrepreneurship Competence Framework (EntreComp), particularly:
 - a. Creativity, Vision, Ethical thinking
 - b. Coping with uncertainty, ambiguity and risk
 - c. Mobilising others, Working with others
 - d. Financial and economic literacy
 - e. Mobilising resources

EntreComp served as a structural backbone: each mechanic intentionally targets one or more competencies. For example, the hidden role system aligns with working with others and mobilising others; investor interactions support mobilising resources; and chance events reflect dealing with uncertainty. Table 1 summarises how the game’s core mechanics were mapped to EntreComp-aligned learning objectives.

Game mechanic	Player experience	EntreComp-aligned competency
Role cards and hidden traits	Players adopt entrepreneurial identities while navigating partial information and team dynamics	Working with others; mobilising others; self-awareness
Challenge prompts	Teams frame a user problem and generate possible opportunity spaces	Spotting opportunities; creativity; vision
Challenge modifiers	Teams adapt ideas in response to changing market, technical, or social constraints	Coping with uncertainty, ambiguity and risk; creativity
Chance cards	Random disruptions force rapid reframing, recovery, or strategic pivoting	Taking the initiative; learning through experience; resilience

Investor personas	Students negotiate with unpredictable stakeholders and adapt communication strategies	Mobilising resources; financial and economic literacy; mobilising others
Final pitch	Teams synthesise their idea, defend assumptions, and communicate value under time pressure	Pitching, persuasion, planning and management
Reflection	Students connect game experiences to entrepreneurial practice and personal confidence	Learning through experience; self-efficacy; entrepreneurial identity

Table 1: Mapping Game Mechanics to Player Experiences and EntreComp Competencies

This mapping was not used to reduce the game to a checklist of learning outcomes. Rather, it served as a design scaffold, helping ensure that playful mechanics were meaningfully connected to the entrepreneurial behaviours the session sought to cultivate.

The design also draws on escape-room and mystery-game formats, incorporating narrative elements, surprise mechanics, and playful improvisation to create emotional engagement and psychological safety. The game’s playful framing encourages risk-taking, humour, and experimentation (Sawyer 2004; Edmondson 1999; Amabile 1996), which research suggests are critical for creative performance in STEM learners.

GAME STRUCTURE AND MECHANICS

The Entrepreneurial Journey Game exists in two versions: a short (1-hour) format and a long (3.5-hour) format. For the UCD Engineering Masters implementation, a 2-hour hybrid version was used, adapted to fit a single module session while preserving the key mechanics.

The game unfolds across several structured stages, mirroring the early phases of a startup:

1. *Team Formation*

Participants draw role cards assigning them positions such as CEO, CFO, CTO, Head of Marketing, or Intern. Each card contains:

- **An open role** describing their visible responsibilities and personality
- **A hidden trait** that subtly alters their behaviour
- **A hidden skill** that can influence scoring

These cards are intentionally playful; e.g., the *Hipster CEO* who believes obscure items are the key to success, or the *Beam Me Up Scotty* CTO who must maintain a Scottish accent throughout. These quirks encourage humour, improvisation, and identity play, lowering inhibitions and fostering psychological safety.



Figure 2: Participant Role Cards

2. Challenge Prompt and Problem Framing

Teams receive a *Challenge Prompt* (e.g., “As a commuter, I want a more efficient way to navigate a gridlocked city”). This defines the initial customer problem space.

Challenge Prompt	Challenge Prompt
1. As a consumer, I want to be able to reduce my carbon footprint.	14. As a parent, I want to ensure my teenager learns important life skills such as how to manage your money, how to file taxes, how to maintain a household, and how to apply for jobs.
2. As a business, I want a better way to optimize resources so that I can switch to a four-day work week.	15. As a caring consumer, I want a better way to easily donate to the charities I care about.
3. As an artist, I want a better way to sell my art to interested individuals.	16. As a business owner, I want to be able to show my employees that I value them with small gifts of appreciation.
4. As a local chef, I want a way to experiment with multiple cuisines and share those experiences with customers.	17. As a digital nomad, I want to optimize the way I do remote work.
5. As an individual with a nine-to-five job, I want a way to prevent burnout in my career.	18. As a local business, I want a way to connect with other local businesses and to give each other a helping hand to mutually boost sales.
6. As a college student, I want a way to get my financial life under control and have a solid understanding of where my money is going and how I can save money.	19. As a parent, I want a safe, fun, and engaging way for my kindergartner to learn structural engineering and building concepts.
7. As a local business, I want to be able to reach local and regional consumers to improve foot traffic in my business.	20. As a working parent, I want an easy way to get healthy meals for my family that fits into my busy schedule.
8. As a commuter, I want a more efficient way to commute when I live and work in a gridlocked downtown area.	21. As an entrepreneur, I want a better way to quickly memorialize ideas wherever I am so that I can come back to them later.
9. As a restaurant, I want a way to know which foods my customers like and don't like.	22. As a fitness enthusiast with a job that requires frequent, I want a portable way to maintain my healthy lifestyle.
10. As part of a wedding party, I want a way to write captivating toasts and speeches.	23. As a household, we would like a way to easily track when certain repetitive chores or tasks are done.
11. As an entrepreneur, I want a way to share ideas and thoughts with similar individuals.	24. As a family member with older relatives, I would like a way to stay connected with them through the pandemic.
12. As a business, I want to receive quicker feedback on new products and market experiments.	25. As a consumer, I would like an easier way to garden and maintain seasonal plants that will stay alive.
13. As a consumer, I want a better way to communicate with small online businesses that I purchase goods from.	

Figure 3: Challenge Prompt Sheet

3. Idea Generation

Teams brainstorm potential solutions. Creative chaos is encouraged; hidden roles push divergent thinking (e.g., “use retro-tech,” “communicate only in emojis”). This stage targets *Creativity* and *Vision* within EntreComp.

4. Challenge Modifiers

Teams draw a *Challenge Modifier* (e.g., “Local Market”, “Sustainable Solutions Required”, “Premium Audience”, “Hardware Focused”). These modifiers force teams to pivot or narrow their idea, simulating real-world constraints.

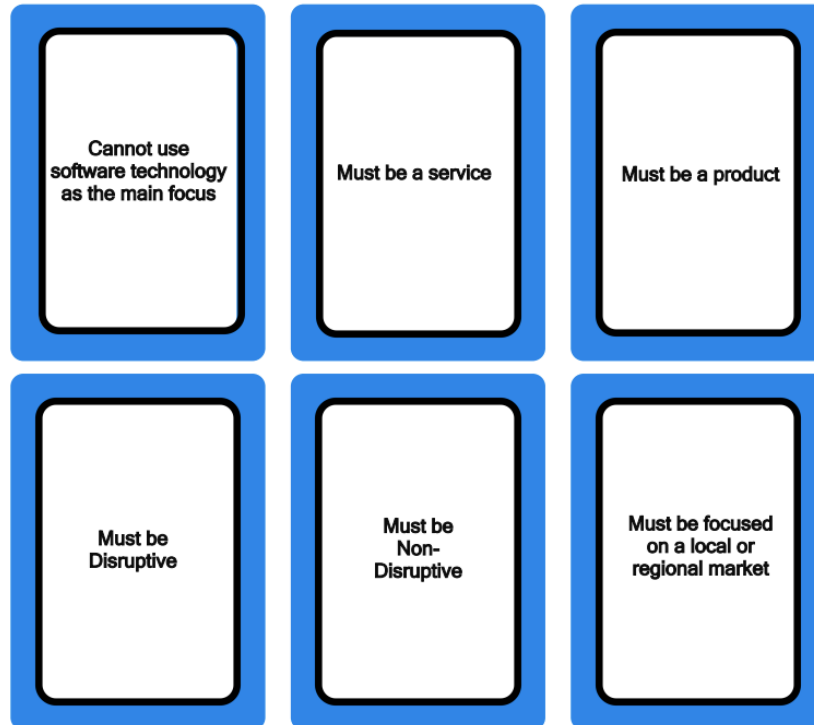


Figure 4: Challenge Modifier Cards

5. Business Planning

Teams develop a lightweight business model addressing customer value, revenue logic, feasibility, and differentiation. The CFO and CEO roles normally dominate here, though hidden traits often complicate this dynamic.

6. Chance Events

Teams draw *Chance Cards* (e.g., “Sudden investor interest - gain 1 point” or “Major setback- reset your plan”), and occasionally *Risky Chance Cards* (e.g., “Idea stolen,” “Pitch order reversed,” “Audience outrage event”). These random events enhance realism by simulating unpredictable shocks.

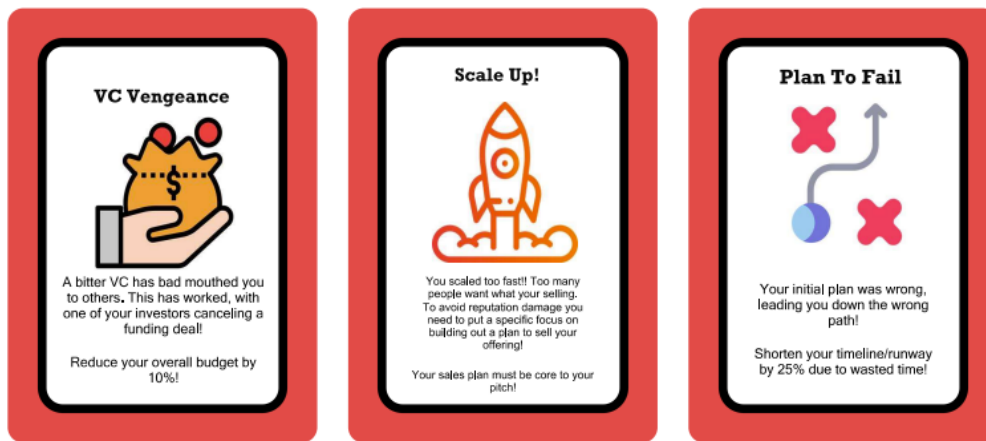


Figure 5: Regular Chance Cards

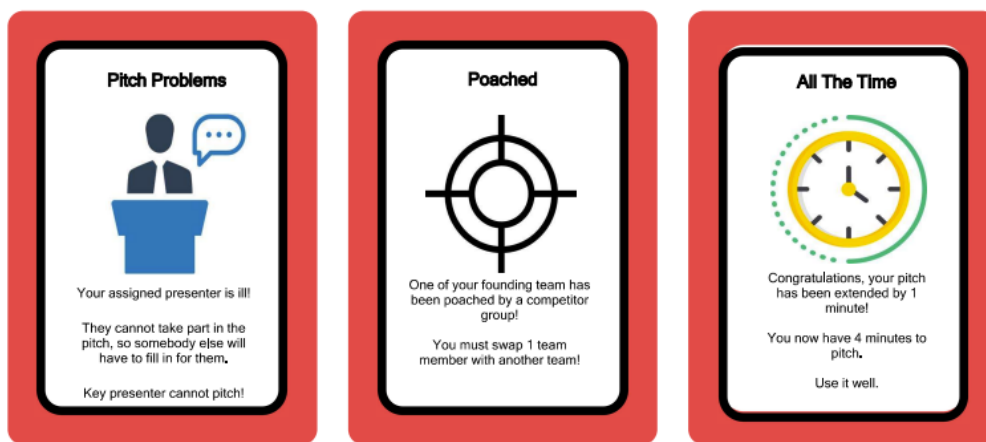


Figure 6: Risky Chance Cards

7. Investor Rounds

Teams meet rotating investors/customers whose open and hidden behaviours shape interactions. For example:

- *Professor* secretly holds €50 million in bee-related funding and awards points if students mention pollinators
- *Evil CEO* attempts to steal ideas but rewards teams who refuse to reveal IP
- *Charity CEO* values SDG alignment and emotional appeal

These mechanics foster improvisation, negotiation, opportunity recognition, and ethical reasoning.

8. Pitching

Each team delivers a short pitch to the facilitator and peers. Hidden skills may activate here (e.g. *Smooth Talker CFO* can block one difficult question, *Puppet Promoter* can only use words provided by teammates). Scoring considers creativity, feasibility, communication, and how effectively teams navigated hidden roles and chance events.

9. Reflection

Post-game reflections encourage learners to connect their experience to real entrepreneurial competencies, risk behaviour, communication strategies, and team dynamics.

METHODS

Study Context

The Entrepreneurial Journey Game was implemented in November 2025 at UCD as part of the master's level *Entrepreneurship for Engineers* module within the Master's Engineering programme. Students participated in the session as part of scheduled coursework. The class represented a multidisciplinary engineering cohort, most of whom had limited prior experience with entrepreneurship education or GBL. The game was delivered in a two-hour format, adapted from the full 3.5-hour version to fit the constraints of the teaching timetable while retaining all core mechanics, including hidden roles, investor interactions, chance events, and a final pitch.

Participants

A total of 37 engineering master's students participated in the game. Twenty-six completed both pre- and post-game surveys, which served as the data set for this study (response rate: 70%). Participants represented a mix of engineering disciplines. Only five respondents reported prior entrepreneurial training or experience with entrepreneurship-related games, though many had engineering teamwork backgrounds.

Teams formed organically, and the classroom was structured into "zones" for investors, ideation, and pitching, requiring physical movement and creating a lively, embodied learning environment. The game ran smoothly within the time constraints, following the structure outlined above but with shortened business-planning intervals and a single investor rotation. Approximately 37 students participated in a 2-hour session facilitated by two instructors, with three actors who were assigned 'investors' personas.

Data Collection

Data was collected using an online pre- and post-survey (Bateson and Martin 2013; Plano Clark and Ivankova 2016; Nabi et al. 2017) administered via EUSurvey. Participation was voluntary and anonymous. The survey consisted of both quantitative Likert-scale items and open-ended qualitative questions. No identifying information was collected, and responses were used solely for pedagogical evaluation and research purposes. Although the same 26 students completed both surveys, no unique identifier was collected, meaning individual pre- and post-game responses could not be linked. Analysis therefore proceeds at cohort level using group means rather than matched pairs.

Pre-Game Measures

The pre-survey assessed students' baseline attitudes and comfort levels regarding entrepreneurship:

- Entrepreneurial Intention: Interest in starting or joining entrepreneurial activities.

- Ability to Handle Uncertainty: Perceived preparedness for ambiguity, unpredictability, and risk.
- Comfort with Entrepreneurial Activities:
 - Idea generation
 - Idea validation
 - Business planning
 - Pitching
 - Fundraising
- Open-ended reflections:
 - Concerns about entrepreneurship
 - Anticipated aspects they looked forward to

All Likert items used a 5-point scale (1 = not at all; 5 = extremely/very).

Post-Game Measures

The post-survey mirrored the pre-survey questions, allowing for direct comparison. Additional items measured:

- Overall Change in Comfort: A single item assessing perceived improvement (1 = much less comfortable, 5 = much more comfortable).
- Creative Thinking: Extent to which the game supported divergent thinking and novel idea generation.
- Most Enjoyable Stage: Open response.
- Most Beneficial Stage for Learning: Open response.
- Shifts in Concerns and Anticipation: Re-asked from the pre-game survey.

Qualitative Data

Qualitative responses were collected across six open-response items. These included reflections on concerns before and after the game, enjoyable and beneficial stages, and perceived changes in creative thinking. Data were thematically analysed using an inductive approach to identify recurring patterns, shifts in perception, and insights into the pedagogical impact of the game.

Data Analysis

Quantitative Analysis

Descriptive statistics (means, distributions, and change scores) were calculated for all pre/post Likert-scale items. Because the study aimed to explore experiential impact rather than test hypotheses, inferential statistical tests were not applied. Instead, analysis focused on identifying meaningful trends and shifts in student-reported confidence, intention, and entrepreneurial competencies.

Qualitative Analysis

Qualitative responses were coded thematically using open coding followed by grouping into higher-level themes. Coding was performed manually, with attention to recurring concepts such as uncertainty, teamwork, creativity, realism, and confidence. Pre- and post-survey reflections were compared to identify shifts in mindset attributable to the game experience.

Ethical Considerations

This study was conducted in the context of curriculum enhancement and received low-risk approval from the UCD Human Research Ethics Committee: Humanities. Participation in the survey was voluntary and anonymous. No identifying information was collected, and responses were used only for pedagogical evaluation and research purposes. The study therefore reflects a low-risk classroom-based research design, while still acknowledging that students' experiences of role-play, performance, uncertainty, and peer interaction required careful facilitation and psychological safety.

RESULTS

This section presents the empirical findings from the pre- and post-game survey administered to 37 master's engineering students (26 complete responses). Results are reported in two parts: quantitative shifts in learners' self-reported competencies and qualitative insights regarding learner experience, perceived value, and game dynamics.

Quantitative Findings

Entrepreneurial Intention

Participants exhibited a modest but meaningful increase in interest in pursuing entrepreneurial activities following the game. Mean intention rose from 3.50 before the game to 4.00 after play (1-5 scale). Approximately 38% of respondents reported increased intention, while 54% remained stable. This pattern suggests that the game experience generated additional motivation and curiosity towards entrepreneurial engagement without creating negative reactions among those initially uninterested.

Ability to Handle Uncertainty

A central aim of the game is to simulate unpredictable decision-making environments. Participants' perceived ability to navigate uncertainty increased from 3.31 to 3.88. Half of all respondents (50%) reported improvements in their ability to manage ambiguity, while only a small minority (8%) indicated a reduction. This upward shift suggests that the game's mechanics; randomised chance events, hidden roles, investor challenges, and time-bounded tasks, may have helped students practise adaptive responses within a psychologically safe environment.

Comfort with Entrepreneurial Tasks

Learners assessed their comfort across five foundational entrepreneurial activities. Table 2 summarises the pre- and post-game means (n varies due to partial responses). All domains showed positive gains.

Competency domain	Pre-Game Mean	Post-Game Mean	Change
Idea generation	3.63	4.17	+0.54

Idea validation	3.13	4.37	+1.25
Business	3.17	3.83	+0.66
Pitching	3.89	4.17	+0.28
Fundraising	2.96	3.55	+0.59

Table 2: Pre- and Post- Survey means showing self-reported comfort

The most pronounced improvement occurred in idea validation, with no participants reporting a decrease. This reflects the intensive negotiation and improvisational elements involved in interacting with investor and customer personas during gameplay. Gains in idea generation, planning, and fundraising further indicate that students experienced the simulated entrepreneurial journey as supportive for confidence-building and skill rehearsal.

Overall Comfort and Creative Thinking

Two post-game items captured generalised effects across competencies. Overall comfort with entrepreneurial activities demonstrated a strong positive trend, with a mean of 4.31. Notably, 92% of students indicated they felt “slightly more” or “much more” comfortable after the game.

Similarly, creative thinking outcomes showed substantial perceived improvement (M = 4.00). A majority (65%) described their creative thinking as having improved significantly or transformatively. Students’ narrative responses highlighted new approaches to divergent thinking, problem framing, and rapid ideation in constrained environments.

Qualitative Findings

Qualitative responses provided additional insight into how the game influenced learners’ perceptions, confidence, and understanding of entrepreneurship. Thematic analysis of pre- and post-game open-ended items identified several recurring patterns.

Shifts in Entrepreneurial Concerns

Prior to gameplay, participants’ concerns centred around financial risk, fear of failure, uncertainty, and lack of experience in pitching. After the game, concerns became more concrete and operational, focusing on time commitment, sustaining momentum, and finding reliable partners. This transition suggests that learners moved from abstract apprehension to more realistic, practice-oriented considerations, indicating increased familiarity with entrepreneurial processes.

Perceived Learning Value of Game Stages

Participants consistently identified the pitching and investor interaction stages as the most educationally valuable. These stages were described as “confidence-building” “intense but realistic” and “helpful for understanding how to communicate an idea under pressure”. Students appreciated the immediate, embodied feedback provided by investor personas, particularly when faced with challenging questions or unexpected reactions.

The qualitative comments suggest that the value of the game lay not only in the content of the entrepreneurial tasks, but in the social pressure and performative framing through which those tasks were experienced. Students repeatedly identified pitching, investor interaction, and team-based ideation as moments where they had to translate uncertain ideas into persuasive narratives. These stages required participants to listen, improvise, adjust their assumptions, and defend decisions in front of others. In this sense, the game did not simply ask students to understand entrepreneurship; it asked them to temporarily perform entrepreneurial roles under constraint.

The ideation and validation phases were also cited as beneficial for learning, particularly when combined with hidden roles and chance-based modifiers that disrupted linear planning. Participants reported that these constraints forced them to revise assumptions and iterate quickly.

Engagement, Immersion, and Enjoyment

Students widely described the game as enjoyable, engaging, and distinct from traditional classroom instruction. Elements contributing to high engagement included:

- Role-play and character embodiment (e.g. hidden motives, exaggerated personas)
- Unpredictable chance events requiring rapid adaptation
- Team-based collaboration under time pressure
- Negotiation and improvisation with investors and customers

These features were repeatedly linked to enhanced immersion and a sense of “realistic entrepreneurial pressure,” which contributed to overall learning outcomes.

Creative and Divergent Thinking

Open-ended reflections indicated that the game stimulated creative exploration by combining structured prompts with disruptive events ((Paulus and Nijstad 2003). Students described the experience as prompting them to:

- Combine disparate ideas
- Generate unconventional solutions
- Reframe user needs
- Collaborate across disciplinary perspectives

In responses to the open-ended question “Which stage of the game did you find most enjoyable”, creative thinking was mentioned, e.g. “I found the idea development and brainstorming stage the most enjoyable” and “It’s wonderful to brainstorm our plans with others, because we can build our future together”.

Several noted that the game “forced creativity” due to environmental constraints, hidden agendas, and investor expectations, confirming the alignment between the game mechanics and EntreComp’s “Creativity” and “Working with Others” domains.

Summary of Findings

Overall, results demonstrate that the Entrepreneurial Journey Game supported increases in entrepreneurial intention, confidence, and creative thinking while offering an engaging, low-risk simulation of entrepreneurial practice. Both quantitative and qualitative data

indicate that the game effectively models uncertainty, fosters collaborative ideation, and provides meaningful experiential insight into key entrepreneurial competencies.

DISCUSSION

This study examined how an embodied, role-play-based entrepreneurial game could support entrepreneurial mindset development among master's engineering students. The findings suggest that even a short, two-hour intervention can influence learners' self-reported comfort with uncertainty, creative thinking, entrepreneurial intention, and confidence in core entrepreneurial tasks. More importantly for Game Studies, the results show how specific analogue role-play mechanics can make entrepreneurship playable: uncertainty becomes a rule structure, pitching becomes a performance, stakeholder engagement becomes social negotiation, and failure becomes a recoverable game event rather than a purely personal deficit.

Developing Comfort With Uncertainty Through Embodied Play

A central pedagogical aim of the game was to situate students in an unpredictable, improvisational environment that mirrors the volatile early stages of entrepreneurial activity. Quantitative results demonstrate that participants' perceived ability to deal with uncertainty increased substantially, with half of respondents reporting improved confidence in navigating ambiguous situations. This is notable given that uncertainty tolerance is widely regarded as a foundational entrepreneurial mindset competency (McMullen and Shepherd 2006; Mitchell et al. 2007) and is emphasised in the EntreComp framework. The qualitative data further suggests that the game's use of hidden role traits, chance cards, and evolving constraints contributed meaningfully to this outcome. Students described the experience as "realistic," "engaging," and reflective of the dynamic pressures of early-stage venture creation. Rather than avoiding uncertainty, students encountered it as a structural component of gameplay, supporting theories that embodied and dramaturgical learning environments can normalise risk-taking and iterative decision-making (Goffman, 1959; Lave & Wenger, 1991; Schell, 2014).

Enhancing Creative Thinking and Entrepreneurial Task Competency

The game also appeared to foster measurable gains in creative thinking, with 65% of participants reporting significant or transformative improvement. This aligns with research that positions improvisational and role-play learning as catalysts for divergent thinking and rapid ideation. The ideation and idea validation stages, supported by investor prompts, role constraints, and challenge modifiers, created structured opportunities for students to reframe problems, generate novel value propositions, and iterate rapidly. Post-survey scores revealed notable increases in comfort with idea generation, business planning, pitching, and especially idea validation. The latter represents the strongest change observed (+0.69), which is pedagogically meaningful because early-stage validation activities are frequently cited as difficult to teach through lectures alone.

The game's rapid cycles of interaction, negotiation, and adaptation may have contributed to these changes. Many students highlighted investor conversations and the final pitch as the most beneficial learning stages. These require articulation of assumptions, critical reflection, and public justification, skills central to entrepreneurial identity development.

Reframing Failure and Entrepreneurial Concern

An important shift emerged in the way students articulated their concerns about entrepreneurship. Prior to gameplay, worries centred on broad and affective fears: failing, generating poor ideas, handling uncertainty, or lacking confidence. After the game, concerns shifted toward more concrete and operational issues such as time commitment, sustaining momentum, validating assumptions, and finding reliable partners.

This shift suggests that the game may have helped students move from abstract apprehension toward a more grounded understanding of entrepreneurial work. The game did not remove uncertainty; instead, it reframed uncertainty as something that could be acted within. This is significant because fear of failure is often recognised as a barrier to entrepreneurial action, particularly among students and early-stage innovators. Games may be especially useful in this context because they can make failure temporary, interpretable, and even enjoyable. McGonigal (2011) argues that well-designed games make failure engaging rather than threatening, because the rules of the game make clear that setbacks are information rather than verdicts. Rather than treating a setback as a verdict on the learner, the game treats it as an event that prompts adaptation, humour, discussion, and strategic recovery.

This does not mean that the intervention reduced real-world fear of failure in a lasting way. The study did not track students longitudinally, nor did it measure subsequent entrepreneurial behaviour. However, the qualitative evidence suggests that students experienced setbacks within the game as part of a learning process rather than as personal failure. This offers a useful direction for future research into how entrepreneurial simulations can reshape learners' relationship with risk, experimentation, and uncertainty.

The Value of Role-Play and Social Dynamics

A key distinctive feature of the Entrepreneurial Journey Game is its explicit use of character roles, hidden agendas, and interpersonal negotiation as core mechanics. The qualitative findings show strong student engagement with these elements; they were frequently described as the most enjoyable and memorable aspects of the game. These mechanics appear to support several important learning functions: they require learners to engage in perspective-taking, adapt communication strategies, decipher others' intentions, and respond to dynamic interpersonal challenges. This resonates with research suggesting that embodied role-play and narrative framing can support socio-emotional learning, improvisation skills, and creative problem-solving.

The dynamic social environment also supports EntreComp competencies such as "mobilising others," "taking the initiative," and "working with others." Students' reports of increased confidence in pitching and interacting with investors indicate that the game successfully created a psychologically safe yet challenging space for practicing these interpersonal abilities.

Implications for Engineering Education

Engineering programs increasingly recognise the need for entrepreneurial mindsets, not solely for venture creation but for broader innovation-driven professional practice. This study demonstrates that a brief, structured game-based intervention can produce measurable changes in perceptions, confidence, and creative behaviours among engineering students, learners who may not otherwise self-identify as entrepreneurial. The game's emphasis on embodiment, improvisation, and real-time decision-making

offers an alternative to traditional pedagogy that often privileges linear planning, analytical tools, and predictable exercises. By simulating the messiness of early-stage venture formation, the Entrepreneurial Journey Game provides engineering students with an experiential entry point into entrepreneurial thinking that aligns more closely with real professional contexts.

Limitations

Several limitations should be acknowledged. Firstly, the study relies primarily on self-reported survey data, which may overestimate actual behavioural change. While the pre/post design captures shifts in perception and confidence, it does not directly measure observed entrepreneurial behaviour, quality of decision-making, or long-term skill transfer.

The analysed sample is relatively small, consisting of 26 complete responses from a cohort of 37 participating students. The study also lacks a control group, making it difficult to isolate the specific effects of the game from broader module influences, novelty effects, or students' prior educational experiences.

The game was facilitated by experienced facilitators who were comfortable managing role-play, humour, uncertainty, and psychological safety. This is important because the facilitator, or game master, is likely to play a significant role in shaping the safety culture and interactional quality of the experience. The present study did not isolate facilitator effects, and further research would be needed to determine whether the game is equally effective when delivered by less experienced educators. Veteran larp designer, Troels Ken Pederson stated "your larp's only as safe as its safety culture" while stating that "game masters are pretty much the priests and authorities of roleplaying culture"(Pedersen 2015).

The intervention lasted only two hours. The findings therefore provide evidence of short-term shifts in confidence and perception, but they do not demonstrate long-term retention, behavioural transfer, or later entrepreneurial activity.

Finally, the survey captured individual responses but did not analyse team-level dynamics in depth. Given that the game depends heavily on collaboration, improvisation, and group creativity, future research should examine interaction patterns, team decision-making, and the role of collective sense-making during play. Sawyer (2003) remarked that "creativity studies have tended to neglect group creativity, and particularly, to neglect improvisation."

These limitations preclude strong empirical claims but do not undermine the game studies insights regarding player experience and emergent frames of meaning.

Future Directions

Future research could address the limitations through several approaches.

- Behavioural outcomes could be examined, such as the quality of pitches, decision-making processes, or team communication dynamics through observational or video-coded data.
- Mechanic-specific post-game surveys or structured debriefs targeting individual elements (such as hidden roles, chance events or investor interactions) would help refine the design and enable direct attribution of outcomes to design features, strengthening the link between design intention and learning effect.

- Megagame scholarship is an emerging area (Thurston, 2020) that could offer useful frameworks here.
- A particularly generative direction concerns the role of the facilitator(s) in entrepreneurial role-play games. This study did not isolate facilitator effects, yet the game master's ability to establish psychological safety, manage pacing, and respond to emergent dynamics is likely consequential for learning outcomes. Future work could examine facilitator styles and training requirements, and whether the game is equally effective when run by less experienced practitioners - a key question for its viability as a scalable open educational resource.
- A further productive area concerns flow states in large-scale role-play formats. As the game scales toward megagame structures - involving larger cohorts, more complex role networks, and longer play sessions - questions of flow (Csikszentmihalyi 1990) become increasingly relevant: specifically, whether the layered uncertainty that drives learning also sustains the deep engagement characteristic of flow, and at what point cognitive load disrupts rather than stimulates.
- It could be investigated whether the fear of failure in entrepreneurship can be reframed by games.
- A comparative study design where the control group uses a traditional classroom technique (such as case-study or lecture) and the other through the proposed game would allow more robust inferences about the game's specific contribution relative to baseline entrepreneurship pedagogy.
- Longitudinal studies assessing whether such interventions influence later entrepreneurial activity, module performance, or career direction would provide deeper insights into the pedagogical value of embodied entrepreneurial play.
- Finally, and perhaps most directly relevant to entrepreneurship education, future research should investigate whether games can help students reframe their relationship with failure. Fear of failure is widely recognised as one of the primary barriers to entrepreneurial action (Gabriella Cacciotti et al. 2020; G. Cacciotti and Hayton 2015), yet it is rarely directly targeted in simulation-based learning. If this principle can be operationalised in entrepreneurial simulations by designing games where failure reliably produces insight rather than humiliation, it could represent a meaningful contribution to entrepreneurship pedagogy. The qualitative data from this study suggests early signs of this dynamic: students who described setbacks during gameplay tended to frame them as learning moments, not losses. Investigating whether this shift in failure orientation persists beyond the game, and whether it influences real-world entrepreneurial risk-taking, would be a valuable direction for future inquiry.

CONTRIBUTION TO DIGRA / GAME STUDIES

This paper offers four contributions to the DiGRA community: insights for game designers working on social simulation; new empirical evidence about performative play in educational contexts; exportable design principles for serious games practitioners; and a methodological contribution to the empirical study of analogue role-play in educational settings.

1. Insights for Game Designers working on Social Simulation

The most practically generalisable finding from this case is that hidden roles with partial information create productive ambiguity without overwhelming learners, provided that the social stakes of revelation are calibrated carefully. In our design, hidden traits were playful rather than adversarial, and the scoring system rewarded navigation rather than concealment alone. This balance appears critical: players need to feel the weight of not knowing what others know, but must also retain agency to act.

The chance card system offers a second insight: randomised disruptions are most effective when they require reframing rather than mere recovery. Cards that invalidated prior decisions (e.g., “Pitch order reversed”) generated richer reflective responses than cards that simply added or subtracted points. Game designers building social simulations for learning should therefore distinguish between “productive turbulence” (disruptions that force creative reorientation) and “arbitrary noise” that simply frustrates.

A third insight concerns investor personas: giving evaluator characters hidden agendas (e.g., the “bee-funding Professor”) transforms a simple pitch-judging mechanic into a social reading exercise, substantially increasing the interpersonal and communicative demands of the game.

2. Performative Play in Educational Contexts

The shift in students’ articulated concerns from abstract fears (failing, lacking ideas) to operational anxieties (sustaining momentum, finding reliable partners). This is a distinctive outcome of performative play that is difficult to achieve through lecture-based methods. Inhabiting a role, even a playful one, appears to accelerate the epistemic reframing that entrepreneurship educators work toward across entire modules. This aligns with performativity theory (Schechner, 2002; Goffman, 1974): the act of playing an entrepreneur, with full social stakes and an audience, produces identity-level effects beyond what reading or discussing entrepreneurship affords. This case therefore adds empirical weight to the theoretical claim that role-play enables identity exploration in educational contexts, and suggests that the mechanism is not simply “fun” but the combination of social accountability, embodied action, and narrative consequence. The implication for game studies is that the effectiveness of performative play may depend significantly on the quality of the social audience, specifically, the presence of investor-like evaluators whose reactions are unpredictable.

3. Exportable Design Principles for Serious Games Practitioners

The *Entrepreneurial Journey Game* is an open educational resource, and its structure is deliberately transferable. Three design principles appear most exportable to other serious game contexts. First, competency-mapped mechanics: each mechanic was explicitly designed to target one or more EntreComp competencies, which provided design constraints during development and evaluation hooks during research. Designers building games for professional skill development in other domains (healthcare communication, public administration, creative industries) could similarly benefit from mapping mechanics to established competency frameworks before building.

Second, layered uncertainty: rather than a single source of unpredictability, the game stacks three distinct uncertainty sources; hidden roles (social), chance cards (environmental), and investor agendas (interpersonal). Each role operated on a different timescale and requiring different adaptive responses. This layering appears to sustain engagement without fatigue.

Third, de-emphasised victory: framing scoring as a reflective scaffold rather than a competitive outcome enabled higher-stakes risk-taking and reduced the defensive behaviour that can accompany competitive evaluation. This principle may be particularly relevant in educational game design, where the social cost of visible failure can inhibit the experimentation the game is meant to provoke.

4. Broader contributions to Game Studies scholarship.

The game extends the study of hidden-role and asymmetry mechanics (Woods, 2012; Montola, 2005) beyond entertainment contexts by positioning them as tools for mindset transformation. Player roles with concealed motivations, investor personas with divergent agendas, and chance-based disruptions create what Montola describes as “layered realities” allow players to navigate social complexity while constructing meaning under uncertainty.

The paper also contributes to scholarship on embodied and social dimensions of analogue play: the game’s incorporation of movement between physical zones, real-time negotiation, and character-driven improvisation foregrounds the body as an active site of sense-making, aligning with DiGRA work on performative, situated, and material aspects of game engagement (FINE 1983; HARVIAINEN ET AL. 2013; LINDEROTH 2010). Methodologically, the paper provides mixed-methods empirical evidence WITH quantitative pre/post survey data alongside qualitative reflection. THIS IS grounded in an authentic educational deployment, addressing a gap in serious games research where design outcomes are more commonly theorised than measured.

Finally, as an open educational resource combining character-driven improvisation, scenario prompts, and dynamic constraints, the game offers a transferable model for designers and educators seeking to integrate social simulation into curricula across disciplines.

Collectively, these contributions position the Entrepreneurial Journey Game not merely as a pedagogical intervention but as an empirically grounded case study for understanding how analogue role-play systems can be deliberately designed to produce mindset-level outcomes. The paper expands DiGRA’s ongoing exploration of how games shape players’ behaviours and identities—and offers concrete, replicable mechanisms for designers who wish to achieve similar effects in other domains.

CONCLUSION

This paper presented the design, implementation, and evaluation of the *Entrepreneurial Journey Game*, an analogue, role-play-driven simulation intended to foster entrepreneurial mindsets among master’s engineering students. By integrating hidden roles, improvisational investor interactions, unexpected chance events, and embodied movement across workstations, the game aims to reproduce the unpredictability, ambiguity, and social complexity characteristic of early-stage entrepreneurial activity. Findings from a cohort of 26 engineering master’s students at University College Dublin

indicate that participation in the game was associated with increases in entrepreneurial intention, tolerance for uncertainty, creative confidence, and comfort with key entrepreneurial tasks such as idea generation, idea validation, planning, and pitching. Qualitative feedback further suggests that students valued the realism of time pressure, the dynamic social demands of investor conversations, and the need to adapt ideas in response to random or conflicting information.

More broadly, the evaluation demonstrates that embodied, role-play based game formats offer a promising pedagogical complement to traditional entrepreneurship education, especially for learners with limited prior experience. Rather than presenting entrepreneurship as a linear, rational planning process, the game creates a structured environment in which ambiguity, social negotiation, and nonlinear problem-solving become central features of gameplay and learning. This aligns strongly with contemporary calls for entrepreneurship education to represent the lived realities of entrepreneurial action, including risk, uncertainty, improvisation, and emotional labour (Sarasvathy, 2001; Baker & Nelson, 2005).

For the DiGRA and Game Studies communities, this work highlights the enduring value of analogue role-play games as design spaces for producing complex, socially situated learning experiences. It also underscores the importance of examining how specific mechanics, such as hidden roles, character-driven motivations, embodied interactions, and chance-based modifiers, shape player cognition, behaviour, and reflection in educational contexts. Future research will extend this work by examining the longitudinal impact of the game on entrepreneurial behaviour, exploring alternative design variants that emphasise ethical or sustainability-driven entrepreneurship, and analysing how hidden-role dynamics influence team decision-making and sense-making under pressure.

In summary, the *Entrepreneurial Journey Game* represents a novel, scalable, and research-informed approach to experiential entrepreneurship education. By foregrounding play, uncertainty, embodied interaction, and improvisation, it offers a useful case for understanding how analogue role-play systems can support entrepreneurial learning while also extending game studies discussions of performative, socially situated, and competency-oriented play.

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The authors contributed equally to this study.

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