

STAR WARS, JENGA AND SUSTAINABLE BUSINESS MODELS - EXPERIENCES AND FINDINGS FROM AN EU PROJECT ON USAGE OF GAME ELEMENTS IN ENTREPRENEURIAL EDUCATION

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Abstract

This article explores the implementation and effects of gamification in higher education through the G4C:NGE project. The curriculum, integrating 27 game elements and 49 game scenarios into three entrepreneurship modules, was piloted at seven European business schools, combining local and international formats and involving over 700 students. Evaluation results indicate that gamification enhances motivation, creativity, teamwork, and confidence. While gamification fosters essential skills for future entrepreneurs, challenges remain in aligning game elements with academic content and optimizing assessment. Recommendations include refining gamified methods and promoting intercultural exchange to further improve entrepreneurship education.

Keywords: *Playful learning, entrepreneurship, higher education, international project.*

1. Introduction

In recent years, gamification has become increasingly significant in higher education, as evidenced by steady growth in interest since 2010. Research indicates that game elements can enhance learning experiences and outcomes, with positive effects on student behaviour, performance, and satisfaction, especially when considering learner profiles (Khaldi et al., 2023). The impact of gamification depends on its implementation (Fischer & Rohr, 2014), supporting motivation, engagement, and performance in educational settings (Tolks & Sailer, 2021). Gamification also strengthens cognitive skills like problem-solving, creativity, and decision-making, which are essential *21st Century Skills* (Arnold et al. 2023; Csapó & Funke, 2017; Qian & Clark, 2016). This is where the project G4C:NGE comes in.

The overarching goal of the EU-Project *G4C:NGE* (Game4Change – Playful Learning in Next Generation Entrepreneurship) is to develop and provide content, training materials, strategies, guidelines, and best practices for gamification in business education. Additionally, a study program for Next Generation Entrepreneurship (NGE) is being developed to equip students at business schools across Europe – including Dresden University of Technology, Fachhochschule Dresden, DOBA Business School, WSB University, Rotterdam University of Applied Sciences, UC Leuven-Limburg University of Applied Sciences, and the international academic network BUSINET – with the necessary skills to tackle entrepreneurial challenges using playful methods (Fischer et al. 2024; Müller et al. 2024).

2. Curriculum design

The Next-Generation Entrepreneurship program consists of three modules, each worth 3 ECTS, which can be taken independently or combined into a comprehensive course. *Module 1, Ideation*, teaches students how to apply Design Thinking to develop innovative business ideas, with a focus on customer needs, creativity, and iterative improvement. *Module 2* focuses on designing *sustainable business models*

that prioritize ecological and social responsibility, while students learn to create, test, and develop a business model along with a Minimum Viable Product (MVP). *Module 3* is dedicated to *leadership* in an international context, where students develop leadership skills, take responsibility for their own career, make ethical decisions, and gain intercultural competence. All modules emphasize teamwork, critical thinking, and the ability to overcome challenges.

The development of the curriculum is based on the didactic theory of constructive alignment and wants to achieve the following learning outcomes:

Module 1: Creating Innovative Business Ideas

- Understand and apply the ideation process in entrepreneurship.
- Utilize critical thinking to tackle challenges in ideation.
- Craft and convey a strong business idea and its value.
- Collaborate effectively in teams to brainstorm and refine business concepts.

Module 2: Sustainable and Impactful Business Modelling

- Identify and tap into potential markets.
- Design an innovative and sustainable business model.
- Evaluate and refine the business model based on insights.
- Develop a minimal viable product (MVP) for real-life testing or simulations.

Module 3: Impactful Leadership

- Define a vision and strategies for futureproof and responsible leadership.
- Take responsibility for one's own sustainable career path.
- Seek, receive, and assimilate feedback on personal objectives.

2.1. Gamification of course content

The integration of game-based learning strategies posed a major challenge for the G4C:NGE project, as the newly developed concepts always had to align with the academic content of the courses. At the outset, a total of 27 game elements were identified and described as foundational components for the course's gamified scenarios.

Table 1.

1. Achievement Tracking	10. Interactive Quizzes	19. Rewards
2. Avatars	11. Interactive Simulations	20. Role-Playing
3. Badges	12. Leader boards	21. Scenario-Based Learning
4. Bonus Points	13. Levels	22. Social Sharing
5. Challenges	14. Mentorship Programs	23. Storytelling
6. Learning Paths	15. Peer Reviews	24. Team-Based Activities
7. Easter Eggs	16. Points System	25. Time-Based Challenges
8. Feedback	17. Progress Bars	26. Unlockable Content
9. Interactive Maps	18. Quests	27. Virtual Currency

Building on this foundation, approximately 49 game-based scenarios were developed and tailored to the three course modules: Ideation, Business Modelling, and Leadership. Each scenario incorporated multiple game elements to create diverse learning experiences—ranging from collaborative challenges and creative problem-solving to competitive simulations. Following Table demonstrates the game-based scenarios of module 1.

Table 2.

Module 1	Creating Innovative Business ideas	Gamified elements
Introduction	Who are you? Building a low-tech social network	2, 25, 26
	Build a get to know you Seppo tour	1,3,4,5,8,24, 25
Innovation	Exercise: the sniffing dog	8, 10, 16, 26
	Exercise: decision roadmap	3, 4, 17
	Exercise: re- engineering concepts	1,2, 3
Design Thinking I	Exercise: knowing without knowing	5, 16, 24
	Exercise: Debate	3, 4, 17,
	Exercise: Google gaggle	5, 16, 25,26
	Exercise: Assumption Busting	5, 16, 25
Design Thinking II	Exercise: Soul searching	5, 16, 25
	Exercise: Crazy quilt	5, 15, 18, 24, 26
	Exercise: Refurbishing the house	2, 11, 21, 24

2.2. Local and international implementation

The piloting phase of the G4C:NGE curriculum employed a dual approach, combining local implementation at participating universities and international collaboration through transnational bootcamps. This enabled thorough testing within institutions and cross-cultural learning. Locally, the “Next Generation Entrepreneurship” course was integrated into 14 regular programs. Formats varied from in-person teaching to distance learning. Over 700 students from more than 20 nations took part in the pilot phases, with the bootcamps alone involving 100 students in cross-institutional activities. Additionally, 22 lecturers contributed to the course’s design, delivery, and evaluation, enriching the teaching environment.

2.3. Development of an online platform

Within the scope of the project, a fully functional, integrated, and sustainable digital learning platform was developed, serving as the central ecosystem for all G4C:NGE activities. The conception and implementation were based on a pre-implementation report that defined the specific technical, functional, and quality requirements, incorporating input from partner organizations and target groups. The platform consists of two core components: the public G4C Gateway and the G4C Hub, which provides differentiated access areas for teachers and students, user management, access to case studies, tools and gamification scenarios, as well as all course materials of the NGE project.

Key outcomes of the platform development include the design and publication of two certified self-study courses: a gamified training course for teachers and an entrepreneurship course for students. Both courses utilize narrative elements, point systems, badges, and creative tasks to combine the development of digital competences with an introduction to gamified learning methodologies. In this way, the platform substantially supports the project’s objectives regarding methodological innovation, provision of toolkits, and promotion of digital skills.

The usability of the platform was practically demonstrated and tested in workshops with students and teachers at the partner institutions. These events confirmed high usability and contributed to the establishment of a cross-border community of educators and learners. In total, 11 student workshops with 212 participants were conducted, significantly exceeding the original expectations. In the area of teacher workshops, 5–7 events were held in accordance with project goals. The number of registrations and course enrolments on the platform reached the targeted range of 300–500 users.

The platform was evaluated using defined quantitative and qualitative indicators. Quantitative indicators included the timely completion and partner approval of key documentation (Pre-Implementation Report and Post-Implementation Quality Report), the scheduled implementation and launch of platform components, as well as the number of designed and certified self-study courses. The achievement and surpassing of workshop and participant targets, as well as user statistics, demonstrate the broad acceptance and effectiveness of the platform.

Qualitative indicators encompassed compliance with the defined requirements, usability, and the didactic quality of materials and courses. The final evaluation document confirms that all technical and functional specifications were fully met or exceeded. User feedback from workshops and online surveys

highlighted the high acceptance and practical value of the platform; iterative improvements were continuously implemented based on this feedback. The quality assurance of course content and gamification elements were ensured by peer review conducted by subject-matter experts, confirming alignment with the overarching pedagogical principles of the project.

3. Evaluation and findings

Various metrics or benchmarks were used to assess the implementation of the pilot projects at each higher education institution, e.g., in relation to the achievement of the project objectives, student learning outcomes and the need for future optimisation of content and curricula. These may include student performance metrics, feedback mechanisms and post-pilot assessments (e.g. Bin Mubayrik, 2020). A community-based participatory evaluation approach ensures the assessment of learning outcomes in the pilot courses and bootcamp activities and improves the overall quality of the process, implementation and results. The following instruments are planned and have already been implemented for evaluation and quality assurance:

- Pre-Semester survey to assess teachers' and learners' prior knowledge of the curriculum topic and previous experience with game-based learning.
- Formative assessment, for obtaining continuous feedback during the piloting phase of the NGE course to assess the course structure, progress, and teaching methods so that, as needed, adjustments can be made and learning outcomes improved.
- Summative assessment to evaluate the effectiveness of the curriculum after completion of the course, measuring teacher and student satisfaction with the curriculum, assessing knowledge acquired, surveys regarding the use of materials provided, such as the presentation, descriptions and Moodle platform, and the use of gamified elements.

Effectiveness and usability of the modules were assessed using a wide range of quantitative and qualitative indicators. In total, 14 pilot iterations at four universities were carried out far surpassing initial targets. Pre- and post-semester surveys yielded 233 and 105 responses, respectively, complemented by 14 lecturer questionnaires and instructor focus groups.

3.1. Quantitative findings

- 49% of students reported that gamification significantly increased their motivation.
- 63% gained confidence in presenting ideas, especially via creative methods such as Pecha-Kucha.
- 72% reported improvement in collaboration skills, particularly within international teams.
- Over half felt more creative, producing innovative solutions and projects.
- Two-thirds said their expectations were largely or fully met, with overall satisfaction ratings very high.
- Quantitative results also showed substantial competence gains in motivation, communication, teamwork, and creativity each increasing by approximately one scale point or more on the five-point metric.

Qualitative Findings: Students highlighted the value of engagement, teamwork, and international exchange. The most valued competences were teamwork, confidence, and creativity. Challenges included workload, fast pacing, and at times unclear assessment formats. Methods such as storytelling, peer review via Miro, and case-based gamification design were singled out as highly effective.

Practitioner Reflections: Teachers reported a sense of *professional renewal* through a shift from content delivery to facilitation. Participation in CPD workshops and peer exchange was regarded as an integral part of professional development. While workload was acknowledged as a challenge, institutional support and IT enablement offered meaningful compensation. Project partners especially stressed the need for curriculum embedding, development of playbooks, and adoption of micro-credentials.

In summary, the results demonstrate that the modules exceeded expectations, making a sustainable contribution to quality, impact, and adaptability in university teaching.

4. Conclusions

The implementation of the G4C:NGE project confirmed that gamification positively influences student engagement, motivation, and cognitive development. To enhance learning, the project should expand its gamified elements, particularly through digital and competitive formats. Playful learning fosters critical future skills, but effective implementation requires integrating game elements meaningfully with academic content. Encouraging students to design their own game-based experiences promotes deeper understanding and develops entrepreneurial mindsets, provided educators offer careful guidance. Student and lecturer feedback suggests refining instructions, increasing practice activities, reducing complexity,

and aligning assessments. Intercultural exchange and collaboration remain key strengths. By addressing these points, G4C:NGE can further improve its curriculum and strengthen playful learning in entrepreneurship education.

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