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Integrating Generative AI into a Gamified Business Learning Model

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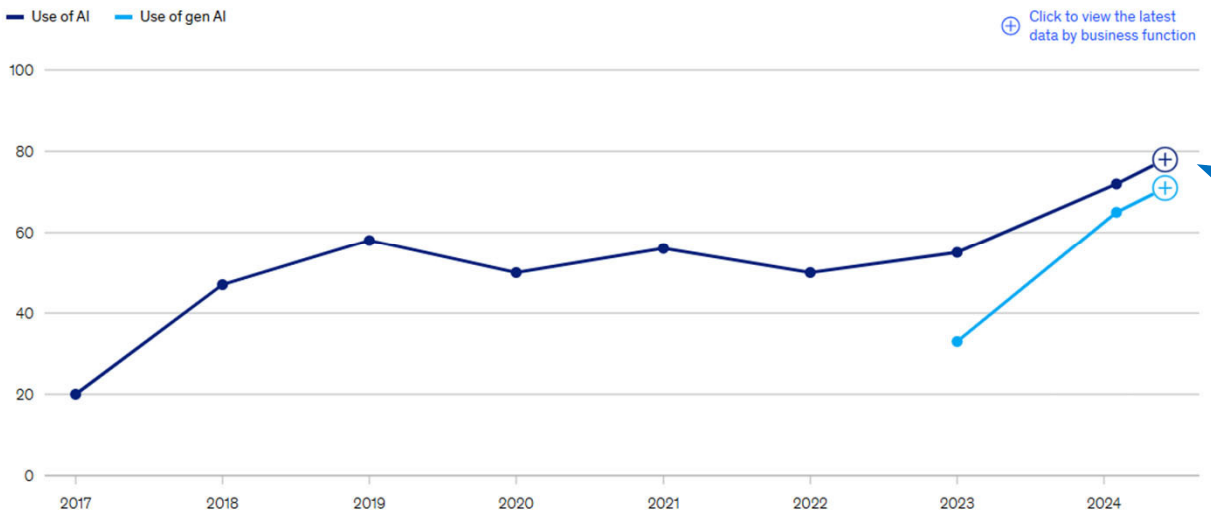
Mercedes Grijalvo Martín,
Professor,

AI use continues to climb

Organizations' use of AI has accelerated markedly in the past year, after years of little meaningful change.

Organizations that use AI in at least 1 business function,[1] % of respondents



[1]In 2017, the definition for AI use was using AI in a core part of the organization's business or at scale. In 2018–2019, the definition was embedding at least 1 AI capability in business processes or products. Since 2020, the definition has been that the organization has adopted AI in at least 1 function.

Source: McKinsey Global Surveys on the state of AI

Use of AI spans from early experimentation by a few employees to AI being embedded across multiple business units that have entirely redesigned their business processes.

https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai/

Are our students ready to make business decisions with AI—and still master the core analytical and strategic thinking skills?

Integrating Generative AI into a Gamified Business Learning Model

Mercedes Grijalvo Martín

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Gamification

It is a way to increase **motivation, engagement, and performance** in people carrying out a task unrelated to games or leisure, **by using certain typical game elements and tools**—such as rules, challenges, badges, rewards, prizes, etc.

Project Background

This study is being carried out at **ETSII- UPM since 2014.**

Three types of students have been involved:

- from the **Master in Industrial Engineer**, who had graduate degrees focus in disciplines such as mechanics, electronics, materials, energy, among others,
- from the **Master in Chemical Engineering**, and
- from the **Organizational Engineering Degree**.

Master's students are about **22 years** old and undergraduate students are about **19 years old**.

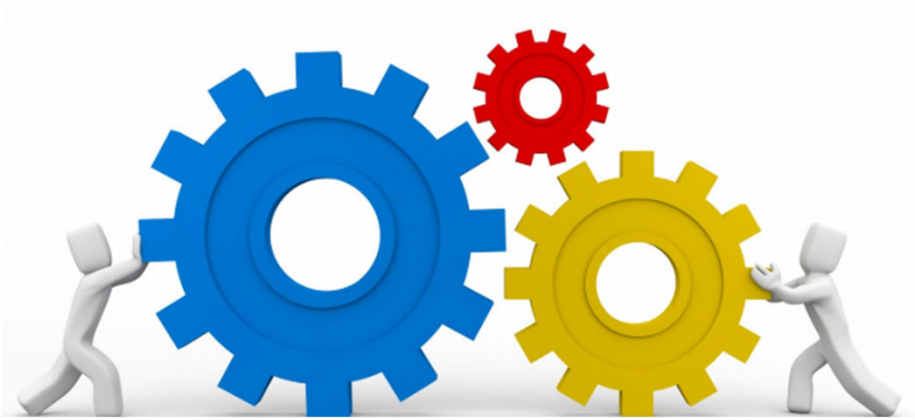
Most had **no career experience**.

Objective

Implement innovative teaching approaches

- adapt teaching methods to the digital age and
- improve the curricula,

while **creating personalized learning environments** tailored to the needs and knowledge of the students



Methodology

Action research

First, **professors focus on** identifying the **context and conditions** that support the integration of business simulators within formal learning environments,

Then, **researchers evaluate** if its use is **beneficial** and is aligned with the needs, requirements, and objectives of **all agents of the educational ecosystem**

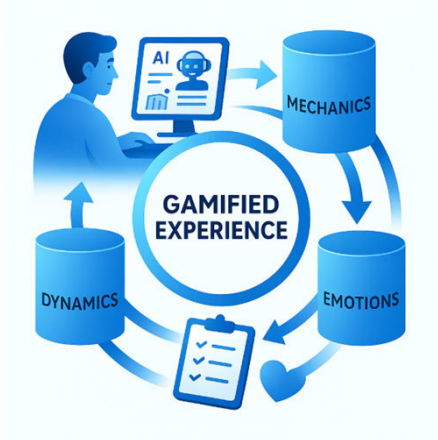
The MDE gamification framework

Mechanics are the agents, objects, elements, and their relationships within the game.

Dynamics are the behaviors that arise from players while playing the game.

Emotions are the players' emotional response to the game.

The MDE gamification framework



AI is used as a chatbot to simulate conversational situations for students

Setup mechanics	Gestionet	GMC
Virtual with access from outside the classroom	x	x
Shift-based participation	x	x
Team building among students	x	x
Randomly defined competitive markets	x	x
Rivalry against teams from other universities		x
Existence of elimination rounds		x

Rule Mechanics	Gestionet	GMC
Management of initially identical companies	x	x
Input of decisions on web page	x	x
Cumulative decisions	x	x
Generation of results dependent on own decisions, competition and general market evolution	x	x
Need for consensus in the teams	x	x
Weekly decisions during several weeks	x	x

Progression Mechanics	Gestionet	GMC
Classifications (Investment performance)	x	x
2nd Level classifications (assets, share price)		x
Top rounds at regional, national and international level)		x
International travel award to represent Spain.		x
Certificate of attendance	x	x
Networking opportunities for successful players	x	x

Part 1: Case analysis without gen AI

In the **first decision**, students are asked to analyze the case without the use of generative AI. This stage challenges them to rely entirely on their own critical thinking and analytical skills to evaluate the situation and develop an initial course of action.

Part 2: Case analysis with gen AI

In the **following decisions**, students **can use generative AI** to support result interpretation, conduct financial or strategic analysis, develop scenarios, or generate departmental recommendations, among other applications.

Part 1: Case analysis without gen AI

Decision Report and Economic-Financial Analysis

1. **Justification of the Decision Taken**
   - •Brief description of the strategy adopted in the simulation.
   - •Connection with macroeconomic and target market data
   - •Consistency with previous decisions and expected evolution.
2. **Provisional Financial Statements**
3. **Market and Competitor Assessment**
   - •Evolution of the number of competitors per product and market.
   - •Competitive positioning: market shares, pricing, innovation.
4. **Economic-Financial Analysis**
   - •Horizontal analysis: trends in key items (sales, operating income, etc.).
   - •Vertical analysis: percentage representation of items relative to total assets and sales.
   - •Ratios
5. **Strategic Conclusion**
   - •Overall assessment of the company's performance.
   - •Lessons learned and recommendations.

Part 1: Case analysis without gen AI

Key Outcomes of the Experience

1.Enhanced Student Engagement
The use of simulators (GMC and Gestionet) increased students' motivation and involvement by offering them a meaningful and dynamic learning environment.

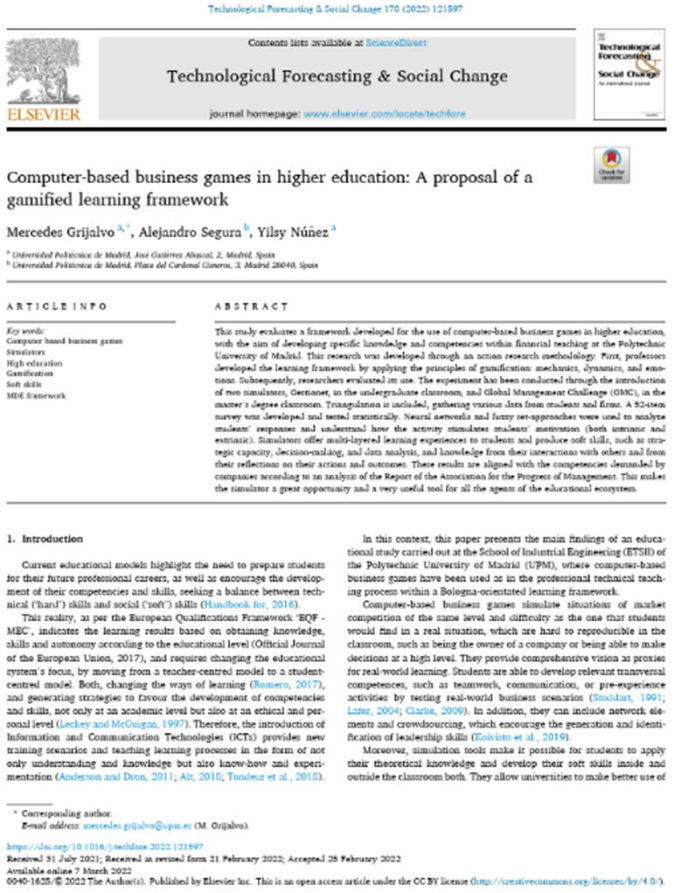
2.Development of Critical Thinking and Problem-Solving Skills
By navigating complex, evolving scenarios within the simulators, students were challenged to make decisions, interpret data, and manage uncertainty—fostering analytical and strategic thinking.

3.Improved Communication and Teamwork
Simulations required collaboration, negotiation, and consensus-building, helping students develop essential communication and interpersonal skills.

4.Effective Application of Theoretical Knowledge
Students applied financial and strategic concepts in realistic business contexts, reinforcing their academic learning through practice and feedback.

5.Personalized Competency Development
Depending on the role and focus within the simulator, students strengthened different skill sets. Their learning was shaped by prior knowledge and their perception of self-competence.

6.Bridging Academia and the Workplace
Students felt that the experience prepared them for professional challenges, helping them acquire both academic and career-ready competencies.



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Computer-based business games in higher education: A proposal of a gamified learning framework

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ABSTRACT

This study evaluates a framework developed for the use of computer-based business games in higher education, with the aim of developing specific knowledge and competencies within financial teaching at the Polytechnic University of Madrid. This research was developed through an action research methodology. First, professors developed the learning framework by applying the principles of gamification: mechanics, dynamics, and emotions. Subsequently, researchers evaluated its use. The experiment has been conducted through the introduction of two simulators, Gestionet, in the undergraduate classroom, and Global Management Challenge (GMC), in the master's degree classroom. Triangulation is included, gathering various data from students and firms. A 52-item survey was developed and tested statistically. Neural networks and fuzzy set-approaches were used to analyze students' responses and understand how the activity stimulates students' motivation (both intrinsic and extrinsic). Simulators offer multi-layered learning experiences to students and produce soft skills, such as strategic capacity, decision-making, and data analysis, and knowledge from their interactions with others and from their reflections on their actions and outcomes. These results are aligned with the competencies demanded by companies according to an analysis of the Report of the Association for the Progress of Management. This makes the simulator a great opportunity and a very useful tool for all the agents of the educational ecosystem.

1. Introduction

Current educational models highlight the need to prepare students for their future professional careers, as well as encourage the development of their competencies and skills, seeking a balance between technical ("hard") skills and social ("soft") skills (Handbook for, 2016).

This reality, as per the European Qualifications Framework 'EQF - MEC', indicates the learning results based on obtaining knowledge, skills and autonomy according to the educational level (Official Journal of the European Union, 2017), and requires changing the educational system's focus, by moving from a teacher-centred model to a student-centred model. Both, changing the ways of learning (Romero, 2017), and generating strategies to favour the development of competencies and skills, not only at an academic level but also at an ethical and personal level (Leckey and McGuigan, 1997). Therefore, the introduction of Information and Communication Technologies (ICTs) provides new training scenarios and teaching learning processes in the form of not only understanding and knowledge but also know-how and experimentation (Anderson and Dron, 2011; Alt, 2018; Tondeur et al., 2018).

In this context, this paper presents the main findings of an educational study carried out at the School of Industrial Engineering (ETSII) of the Polytechnic University of Madrid (UPM), where computer-based business games have been used as in the professional technical teaching process within a Bologna-orientated learning framework.

Computer-based business games simulate situations of market competition of the same level and difficulty as the one that students would find in a real situation, which are hard to reproducible in the classroom, such as being the owner of a company or being able to make decisions at a high level. They provide comprehensive vision as proxies for real-world learning. Students are able to develop relevant transversal competences, such as teamwork, communication, or pre-experience activities by testing real-world business scenarios (Stoddart, 1991; Lafer, 2004; Clarke, 2009). In addition, they can include network elements and crowdsourcing, which encourage the generation and identification of leadership skills (Koivisto et al., 2019).

Moreover, simulation tools make it possible for students to apply their theoretical knowledge and develop their soft skills inside and outside the classroom both. They allow universities to make better use of

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Part 2: Case analysis with gen AI

The voluntary use of generative artificial intelligence tools (such as ChatGPT, Gemini, or similar) will be allowed as support in different stages of the project. Students who properly integrate AI into their analysis will receive additional credit in the final grade of the project. AI can be used in the following ways:

- **Interpretation of results**: AI may act as an expert to analyze data, recommend decisions, and assess impacts on KPIs.
- **Financial or strategic analysis**: AI can be used as an external firm supporting market research or financial advisory tasks.
- **Scenario proposal**: AI may take on the role of an advisory committee the company consults for sensitive decisions regarding labor policies, supplier selection, or market entry.
- **Departmental recommendations**: AI can act as an expert in specific areas such as Production, Finance, Human Resources, etc.

AI usage should address several of these modes, and **market analysis is mandatory**.

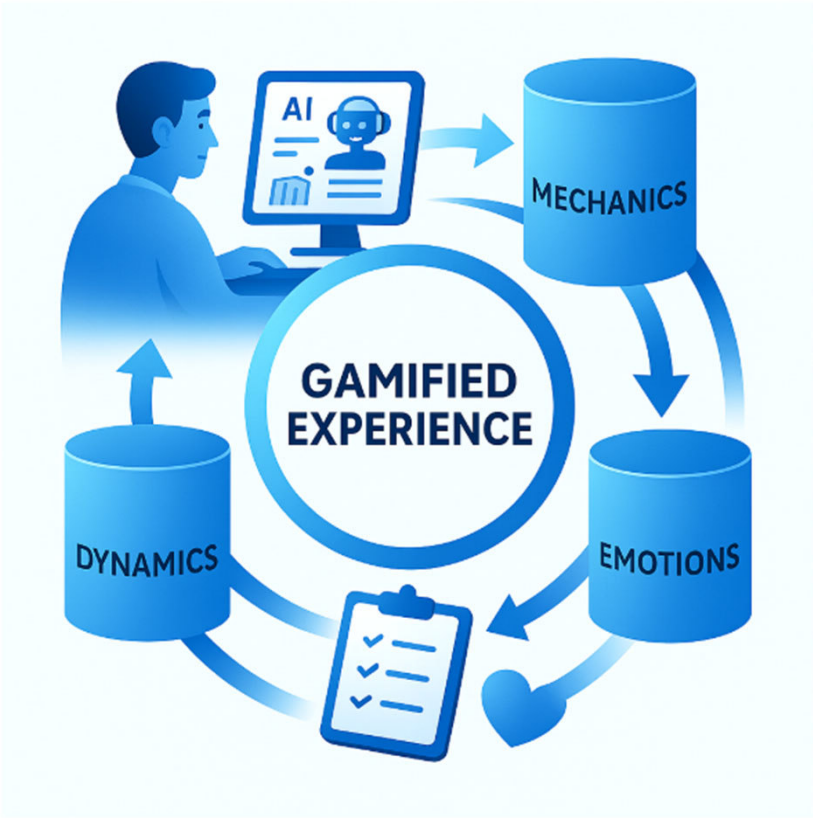
Part 2: Case analysis with gen AI

12 teams in 2 markets

Second decision: 20% reported they had used AI

Third decision: 50% reported they had used AI

Fourth decision: ???



Part 2: Case analysis with gen AI

The results of our study are aligned with previous research, such as the work by Stampfl et al. (2024), confirming that the use of simulation games supported by AI

1. **Development of Critical Thinking and Problem-Solving Skills**
2. **Improved Communication and Teamwork**
3. **Effective Application of Theoretical Knowledge**
4. **Personalized Competency Development**

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Revolutionising Role-Playing Games with ChatGPT

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Abstract

Digitalisation in education and its influence on teaching methods is the focus of this study, which examines the use of ChatGPT in a role-playing game used in the Cloud Computing Engineering Master's programme at the University of Applied Sciences Burgenland. The aim of the study was to analyse the impact of AI-based simulations on students' learning experience. Based on Vygotsky's sociocultural theory, ChatGPT was used to give students a deeper understanding of strategic decision-making processes in simulated business scenarios. The methodological approach included role-playing and qualitative content analysis of 20 student reflections. The findings suggest that ChatGPT enhances students' engagement, critical thinking, and communication skills, in addition to contributing to the effective application of theoretical knowledge. Furthermore, simulations can contribute to the effective application of theoretical knowledge. The results underscore the significance of adaptive teaching approaches in promoting digital literacy and equipping learners for the digital workplace. The integration of AI into curricula and the need for ongoing innovation in higher education are also emphasised as a means of guaranteeing excellent, future-focused instruction. The findings highlight the potential of AI and ChatGPT in particular, as an innovative cutting-edge educational tool that can both enhance the learning experience and help achieve the Sustainable Development Goals (SDGs) through education.

Citation: Rita Stampfl, et.al. Revolutionising Role-Playing Games with ChatGPT. Advances in Artificial Intelligence and Machine Learning. 2024;4(2):129.

AI acted as an external support that helped us interpret sales, demand, and pricing data. It provided strategic ideas that complemented our own analysis, such as adjusting production, improving pricing, and better planning stock.

However, as you will see in our analysis, we did not follow all the AI's exact recommendations, as we sometimes felt they were not entirely accurate.

During the development of the strategic and market analysis, artificial intelligence (ChatGPT) was used as support in different phases of the work, acting as an external expert or financial advisor.

AI helped us to clearly structure the market analysis, provide professional comparative approaches for price justification, and improve the design of the action plan.

We also tried several times to use it for forecasting the balance sheet, but it consistently produced incorrect calculations and was unable to understand our instructions—even when we provided detailed explanations and uploaded sample Excel files. In the end, we had no choice but to do the calculations manually.

Instead of using AI as a mere text generator, we integrated it throughout the entire process of analysis and decision-making, as if it were a consultancy firm with multisectoral experience.

In addition, another key purpose was to contrast our internal hypotheses with a more neutral and systematic perspective. AI helped us to question our initial decisions.

The use of AI has significantly improved the quality and coherence of the analysis. It also brought speed to the interpretation of data, helping to make more well-founded decisions by product and market. In addition, it facilitated clear and professional report writing, saving time and ensuring more effective communication.

Preliminary Conclusions

While it’s still too early to draw definitive conclusions, **the experience so far has been very positive**.

The integration of AI into a gamified learning environment seems to:

- enhance student engagement,
- support deeper analysis, and
- promote more confident decision-making.

We look forward to analyzing the results once the last decisions and feedback are submitted.

Looking Ahead

This project aligns closely with the growing focus on micro credentials in digital skills.

- By integrating generative AI into a gamified business simulation, students not only apply financial and strategic knowledge, but also develop key digital competencies—such as data interpretation, AI-assisted decision-making, and critical digital communication.

- In this sense, the experience could serve as a basis for recognizing students' progress in specific digital competencies and eventually contribute to formal micro credential pathways in higher education.

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