



AI and Marketing: Bridging the Gap Through a Game-based Tool Among Higher Education Students

IA y Marketing: acortando la brecha entre estudiantes de educación superior mediante una herramienta basada en juegos

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ABSTRACT

Artificial Intelligence has a very important impact on a company's marketing strategy. From personalization, decision-making or content development, there are several value-creation instruments that can increase the notoriety of a brand. However, literature shows that Higher Education students do not fully understand the opportunities and threats that AI applied to Marketing has on their future jobs. This paper describes the conceptualization and validation of a game-based tool to promote knowledge about AI applied to marketing. Aimed at Higher Education Students who are about to enter the job market, this solution was designed to increase users' critical sense of the opportunities and dangers of using automatic technologies. Four co-creation sessions were organized using a Design Thinking approach to increase participation and creativity of all participants. *Trailblazer AI*, a prototype of a boardgame with 300 questions, was produced in the following categories: AI Marketing Fundamentals; Tools and Platforms; Ethics and Privacy; Metrics and Analysis; Case Studies and Success Stories; and AI Powered Content Creation. The prototype was validated with a different group of 25 students. The results suggest that game-based tools developed with students in co-creation environments can promote motivation and knowledge in AI applied to Marketing. About 92,00% of the respondents consider it as a good tool to promote knowledge about AI, and 72,00% of the students are revealed to be motivated to play the game in recreative contexts.

RESUMEN

La Inteligencia Artificial tiene un impacto muy importante en la estrategia de marketing de una empresa. Desde la personalización, la toma de decisiones o el desarrollo de contenido, existen varios instrumentos de creación de valor que pueden aumentar la notoriedad de una marca. Sin embargo, la literatura muestra que los estudiantes de Educación Superior no comprenden completamente las oportunidades y amenazas que la IA aplicada al Marketing tiene en sus futuros trabajos. Este documento describe la conceptualización y validación de una herramienta basada en juegos para promover el conocimiento sobre la IA aplicada al Marketing. Dirigida a estudiantes de Educación Superior que están a punto de ingresar al mercado laboral, esta solución fue diseñada para aumentar el sentido crítico de los usuarios sobre las oportunidades y los peligros del uso de tecnologías automatizadas. Se organizaron cuatro sesiones de co-creación utilizando un enfoque de Design Thinking para aumentar la participación y la creatividad de todos los participantes. *Trailblazer AI*, un prototipo de un juego de mesa con 300 preguntas, se produjo en las siguientes categorías: Fundamentos de Marketing de IA; Herramientas y Plataformas; Ética y Privacidad; Métricas y Análisis; Estudios de Caso e Historias de Éxito; y Creación de Contenido Potenciado por IA. El prototipo fue validado con un grupo diferente de 25 estudiantes. Los resultados sugieren que las herramientas basadas en juegos desarrolladas con estudiantes en entornos de co-creación pueden promover la motivación y el conocimiento en IA aplicada al Marketing. El 92 % de los encuestados las considera una buena herramienta para fomentar el conocimiento sobre IA, y el 72 % de los estudiantes se muestra motivado para jugar en contextos recreativos.

KEYWORDS | PALABRAS CLAVE

Artificial Intelligence, Marketing, Higher Education, Business, Co-creation, Game-based.
Inteligencia artificial, marketing, educación superior, negocios, co-creación, basado en juegos.

1. Introduction

Artificial Intelligence (AI) has brought about significant changes in the way we live our daily lives (Jamil, 2024; Ng et al., 2021). These changes were a paradigm-shift for 21st century companies and their marketing (Labib, 2024; Sheth, 2023). In fact, brands are now able to serve their target audiences like never before (Anayat & Rasool, 2022), substantially increasing the effectiveness of processes (Franki, Majnarić & Višković, 2023; Ransbotham et al., 2019). This perceived “ease” has prompted inquiries regarding the utilization of AI and the extent to which business managers possess sufficient understanding of what AI entails, its capabilities, and its limitations (Enholm et al., 2022). AI offers a wide range of opportunities for designing and implementing the marketing strategy of companies, enhancing, among others, personalization, decision-making, content creation and cost reduction (Mikalef et al., 2023).

1.1. Personalization

New technologies allow companies to offer products or services aligned with the priorities of a large pool of customers, ensuring that everyone’s preferences, behaviors and purchase history are considered and studied (Rafieian & Yoganarasimhan, 2022). The so-called “Personalization at Scale” can be achieved using AI-driven algorithms and the delivery of tailored messages (Ramnarayan, 2021). Machine learning, natural language processing or predictive analytics are also significantly improving customer engagement (Iyelolu et al., 2024a). Round-the-clock customer support through chatbots and virtual assistants is enhancing customer satisfaction (Gayam, 2020). In this scope, the literature review of Wankhade, Rao and Kulkarni (2022) highlights the importance of “Sentiment Analysis” - the application of natural language processing, text analysis, computational linguistics, and biometrics to systematically evaluate whether the emotional tone of a message is positive, negative, or neutral (Zhang, Wang, & Liu, 2018) - as a crucial AI performance area that enables organizations to interpret customer emotions and feedback in real-time, allowing them to enhance communication strategies and address issues proactively. Taherdoost and Madanchian (2023) explore this as a business strategy for companies to surpass their rivals and cultivate customer loyalty.

1.2. Decision-making

In 2007, Hair (2007) explored the principles of Predictive Analytics to generate knowledge through information. The author argued that higher education students and university researchers should be trained to be able to use predictive models as everyday work tools. Almost 20 years after the publication of this article, the possibilities of predictive models have been enhanced by AI tools, which accelerate the ability to obtain data patterns and convert them into predictors of a customer’s behavior (Raji, Ijomah, & Eyieyien, 2024). Indeed, Predictive Analysis can anticipate future behaviors and future market trends, improving companies’ strategic planning and operational efficiency (Ilori, Nwosu, & Naiho, 2024). In their review article, Okeleke et al. (2024) stated that sales forecasting is a fundamental pillar of decision-making in both public and private sectors. Similarly, with the creation of Relationship Marketing in the 80s (Gupta, Lehmann, & Stuart, 2004), the identification of Customer Lifetime Value (CLV), i.e., the total worth of a customer to a company over time (Firmansyah, Machado, & Moreira, 2024), is helping companies determine who high-value customers are and allows them to allocate resources to enhance these critical relationships. Ultimately, this contributes to customer retention (Bashir et al., 2024). AI is reshaping the decision-making processes and enabling organizations to track, test and evaluate campaign metric with less effort. This is creating actionable insights that drive the refinement of marketing strategies (Kaggwa et al., 2024).

1.3. Content Creation

AI tools for content creation, which include automated writing mechanisms, are now capable of generating compelling cross-platform marketing copy (Cao et al., 2023). Generative AI includes not only the production of emails, social networks and websites but also their intelligent scheduling (Leng et al., 2024). All of this accelerates and optimizes content publishing and can promote loyalty among different target audiences and greater engagement (Bashang & Puttanna, 2023).

Visual and voice searches are also important ways for companies to interact with customers and depend on the evolution of such technologies. These features have allowed companies to remain competitive

(Iyelolu et al., 2024b). Adapting voice search, for example, ensures businesses remain competitive as voice-activated devices become increasingly popular, while image recognition allows users to discover products using visual input, significantly improving the client's experience (Fedorko, Král, & Bačík, 2022).

Another example is Influencer Marketing. AI has proven invaluable in identifying influencers who are aligned with a brand's target market, ensuring more effective campaigns (Fowler & Thomas, 2023). Additionally, AI tools make it easier to measure campaign Return on Investment (ROI), providing companies with detailed information on whether the investment of working with a particular influencer will have the desired impact (Laszkiewicz & Kalinska-Kula, 2023).

1.4. Cost reduction

By automating repetitive marketing tasks such as data entry, campaign scheduling, and reporting, AI also contributes to cost reduction and freeing up resources for more strategic activities (Peyravi, Nekrošienė & Lobanova, 2020). This is also true because AI minimizes the risk of human error, leading to more accurate outcomes and further cost savings (Hildebrand & Bergner, 2019).

This study delves into the main concepts and processes that support the design of a game-based learning tool (Kenwright, 2016) to promote Intelligence learning about AI applied to Marketing. Three main goals were envisioned: to encourage students to critically assess the ethical implications, risks, and biases associated with AI in marketing; to assess how co-creation methods and gamification improve motivation and engagement in AI learning; and to determine how different profiles of students respond to innovative co-creation practices.

2. Literature Review

2.1. From opportunities to dangers

Despite its many benefits, AI poses significant risks to the integrity of brands, their intellectual property and their authenticity. According to Cheatham, Javanmardian and Samandari (2019), identifying these risks can avoid harmful mistakes and prevent the company from failing. Large data sets are a common presence in AI models, and result in repetitive and uniform results. This homogenization of content limits brand differentiation and authenticity (De Bruyn et al., 2022). For example, the use of the same or similar AI tools by different brands can bring the way they communicate with their audiences closer together, making them indistinguishable (Huang & Rust, 2022). AI Generator tools should aim to enhance the development of complementary ideas and never be the primary source of strategies (Przegalinska & Triantoro, 2024). Adequate human oversight is also crucial to prevent perpetuation of inaccuracies or biases in the data being analyzed. In fact, generative AI models are only as good as the data they are trained on (Daneshjou et al., 2021). For example, AI-generated content that reflects outdated stereotypes can harm a brand's reputation (Ahn, Kim, & Sung, 2022). Human intervention is essential to validate the accuracy and relevance of AI results, the context in which they are inserted and the purposes for which they are intended (Selbst, 2020). Intellectual Property (IP) violations are also a pressing question when addressing AI-generated content. With several cases that have been covered by the media and have been studied in scientific literature, Lucchi (2024) stressed out the importance of more robust mechanisms to protect property rights, taking in consideration the advancement of AI technology. These and other risks should be considered when facing a business commitment (Zhan et al., 2024).

2.2. Higher Education Students and AI

The public understanding of AI is not homogeneous, and this is influenced by media (Nader et al., 2024; Selwyn & Gallo Cordoba, 2022; Sun et al., 2020). Despite being a topic often addressed by Higher Education students, very little literature has been produced on these students' perceptions of AI. Sit et al. (2020) observed in the UK that medical students are interested in having AI as part of their curriculum because they recognize the importance of it to their future work. In a study with eighteen universities from Canada, Teng et al. (2022) analyzed that 75% of the students had positive perceptions related to AI in general, but these attitudes depend on specific disciplines. Co-creation was the starting point of this work aimed to identify and design solutions that directly involve the users they aim to serve, designing for people with people (Sanders & Stappers, 2014). Co-design and co-creation are

gaining momentum in diverse settings as initiatives that involve multiple stakeholders and add value to the processes (Avila-Garzon & Bacca-Acosta, 2024). Principles involved in co-design are fundamental pillars to avoid common failures, such as the development of interventions/products rejected by end users (Villatoro Moral & de Benito, 2021).

2.3. Game-based tools to enhance knowledge on AI

Games have long served as learning tools, with gamification gaining prominence in education due to their ability to enhance focus and immersion. Gamification, a constructivist learning approach (Roodt & Ryklief, 2022), has been widely applied in fields such as commerce, employment, health, the environment, and education (Manzano-León et al., 2021). It involves problem-solving in game-based settings to achieve learning outcomes (Wang & Zheng, 2021; Zhan et al., 2022a) and can take the form of badges, points, leaderboards (Bodnar et al., 2016), or complex virtual simulations (Zhan et al., 2022b). This approach is also known as game-based learning (Tsai, Lin, & Liu, 2020). Research has shown that gamification enhances motivation, learning performance, and competence by providing timely feedback and rewarding progress (Bodnar et al., 2016). However, its effects remain debated; while some studies highlight its benefits (Kaya & Elgün, 2015), others argue its success depends on student characteristics and the learning environment (Hamari, Koivisto, & Sarsa, 2014). Moreover, while rewards boost positive emotions, they can also induce anxiety upon failure (Domínguez et al., 2013).

In AI education, researchers have explored various teaching strategies. Ali, Warraich and Butt (2024) addressed AI ethics through unplugged activities for children, while platforms encapsulating AI technologies have facilitated hands-on learning (Vartiainen et al., 2020). Gamified tools have also been developed for programming education, such as CENGO (Gulec et al., 2019) and “Robot ON!” for novice programmers (Miljanovic & Bradbury, 2016). Kazimoglu et al. (2012) is the example of another team that has introduced gamification in their work to support computational thinking and coding instruction.

3. Methodology

A co-creation program (Arnab, Clarke, & Morini, 2019; Zarandi, Soares, & Alves, 2024) was designed with the main objective of creating a game-based learning tool (Kenwright, 2016) to promote Intelligence learning about AI applied to the Marketing area. Aimed at Higher Education Students who are about to enter the job market, this tool was designed to increase users’ critical sense of the opportunities and dangers of using AI. A class of 34 Higher Education students from Management Degree and Data Analysis and Artificial Intelligence Degree were recruited. The sessions were organized with Design Thinking tools (Davis, 2011) to increase participation and creativity of all participants.

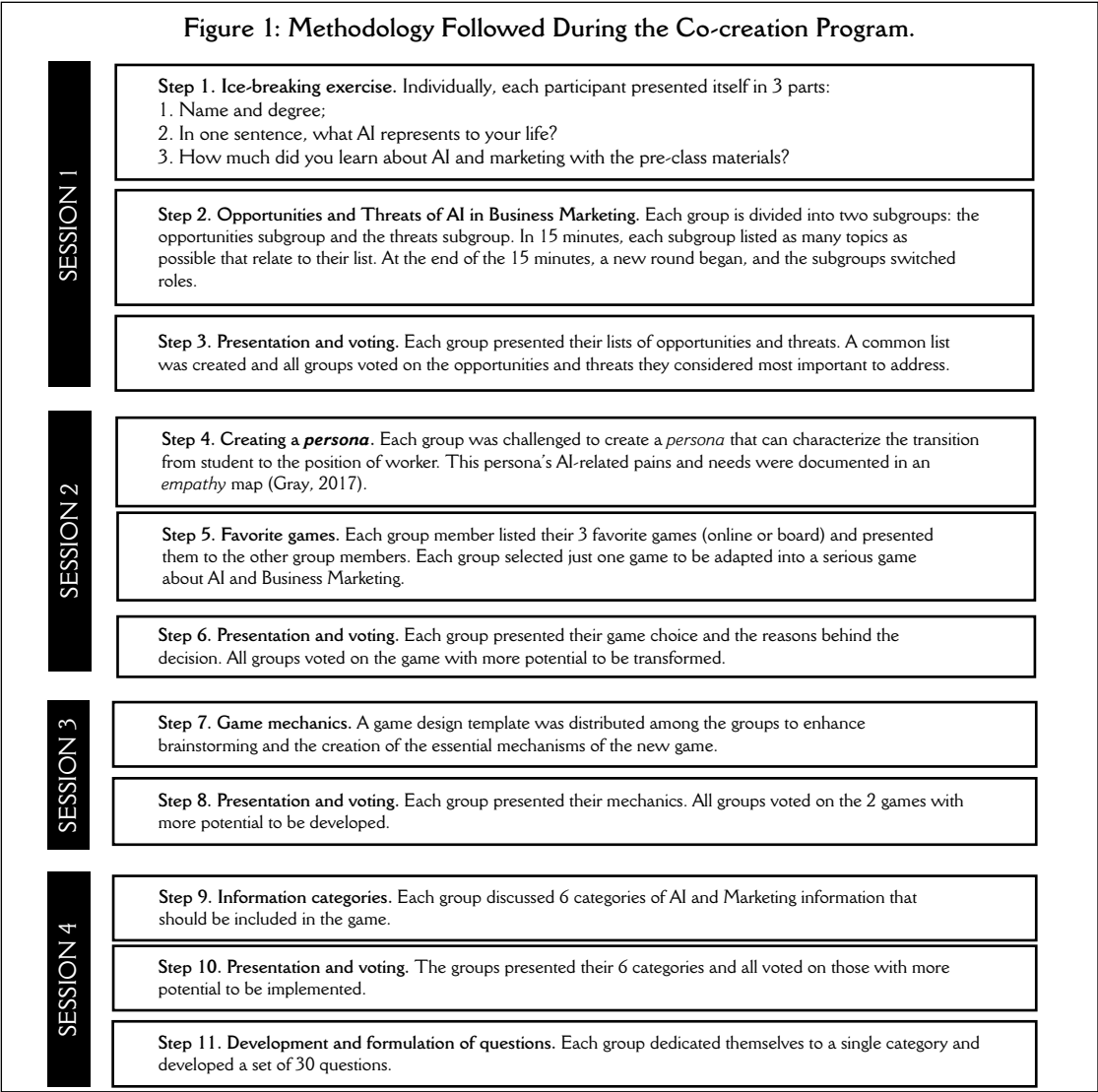
Using the Flipped Classroom method (Baker, 2000; Bergmann & Sams, 2012), students were invited to study the following articles before the face-to-face sessions:

1. European Commission (2020a) On artificial intelligence – A European approach to excellence and trust. White Paper. COM(2020) 65 final. Brussels, 19.2.2020.
2. Ivanov, S. (2023). Using Artificial Intelligence to Create Marketing Content—Opportunities and Limitations. *Journal*.
3. De Bruyn, A., Viswanathan, V., Beh, Y. S., Brock, J. K. U., & Von Wangenheim, F. (2020). Artificial intelligence and marketing: Pitfalls and opportunities. *Journal of Interactive Marketing*, 51(1), 91-105.

Four sessions of 2 hours each were organized, and students formed 2 groups of 8 members and 2 groups of 9 members during the sessions to answer the following questions:

1. What perceived knowledge do these students have about Artificial Intelligence applied to Marketing?
2. What opportunities and threats of using AI in Business Marketing are most pressing for students?
3. What difficulties might these students have in a business context?
4. How could knowledge about Artificial Intelligence be applied to a game-based platform?
5. What information can be associated with this platform and how can it be organized?

An 11-step methodology was followed throughout the 4 sessions (Figure 1).



After the 4 sessions, a prototype of the game designed by the participants was developed. This prototype was tested with another class of 25 students enrolled in the same bachelor's degrees. Five groups of 5 students each were created to test the game. One of the group members acted as a rapporteur and did not participate in the dynamic directly. A validated questionnaire based on the MEEGA+ systematic model to evaluate educational games (Petri, Gresse von Wangenheim, & Borgatto, 2024) was administered to this second class to obtain feedback on: Game mechanics; Informational content; Interaction with other players; Motivation to play; and knowledge acquisition about AI applied to Marketing.

4. Results
Session 1

The participants were made up of 19 Management students (male = 42.1%; female = 57.9%) and 15 Data Science and Artificial Intelligence students (male = 53.3%; female = 46.7%). During the ice-breaking exercise, most of the students revealed that they learned something from the preparation papers on AI applied to Marketing (47.06%). Female students of the Management Degree are those who reveal having learned the most from the preparatory articles (54.55%). On the other hand, 37.5% of male students from the Data Science and Artificial Intelligence Degree report having learned nothing or very little (Table 1.)

Table 1: Distribution of Students by New Information Acquired with the Materials from the Preparation of the Co-creation Sessions (%).

Students' profile	Learned nothing or little	Learned something	Learned a lot
Male students from Management Degree	12,50%	62,50%	25,00%
Male students from Data Science and Artificial Intelligence Degree	37,50%	50,00%	12,50%
Female students from Management Degree	9,09%	36,36%	54,55%
Female students Data Science and Artificial Intelligence Degree	14,28%	42,86%	42,86%
Totals	17,65%	47,06%	35,29%

Table 2. Ranking of AI opportunities applied to Marketing raised and voted on during co-creation sessions (%)

AI opportunities applied to Marketing	Distribution (%)
Automated Content Generation	15,69%
AI-Assisted Ideation and Design	10,78%
AI-driven customer support	10,78%
Customer interactions to optimize website layouts, navigation, and content	6,86%
Hyper-Personalized Marketing to tailor content, product recommendations, and offers to individual customer preferences	6,86%
Forecasting to predict future market trends	5,88%
A/B Testing to determine the most effective ad copy, visuals, or call-to-actions.	5,88%
Sentiment Analysis of social media, reviews, and feedback to understand customer sentiment and brand perception	3,92%
SEO Optimization	3,92%
Fraud Detection	3,92%
Influencer Marketing	3,92%
Price adjustment in real time based on demand, customer segments, and competitive analysis	3,92%
Improved ROI Measurement	3,92%
Behavior-Based Targeting for tailored campaigns.	3,92%
Lookalike Modeling to find new customers by identifying patterns in existing customer data	2,94%
Ad placement, bidding, and performance optimization across platforms.	0,98%
Global Market Expansion by localizing content and automating translations	0,98%
Email Marketing Automation	0,98%
Real-Time Ad Adjustments	0,98%
Customer Lifetime Value to identify high-value customers	0,98%
Risk Mitigation	0,98%
Voice and Visual Search Optimization	0,98%
Cross-Cultural Insights for marketing adaptation	0,98%

Table 3: Ranking of AI threats applied to Marketing raised and voted on during co-creation sessions (%).

Threats that the application of AI to Marketing can bring	Distribution (%)
Fake Content Creation can damage brand reputation and trust	25,49%
Reduction of Human Roles	19,61%
AI models may unintentionally perpetuate or amplify biases in data, leading to unfair treatment of certain groups	14,71%
Extensive use of customer data for personalization can lead to privacy violations	7,84%
Loss of Human Touch affects customer experience	5,88%
AI-driven systems can generate fake clicks or manipulate campaign metrics	5,88%
Data is attractive to cyberattacks	2,94%
Excessive personalization can come across as invasive	1,96%
Overuse of personal data can erode trust	1,96%
Competitors or malicious actors could use AI to misrepresent brands in a negative light	1,96%
Dependence on Data Quality	1,96%
Disconnected or poorly integrated datasets can hinder AI's effectiveness	0,98%
Creation of overly persuasive marketing or deceptive ads	0,98%
Over-automation of marketing processes may stifle creative thinking and innovation.	0,98%
AI-generated strategies can become repetitive or uninspired	0,98%
Dependency on AI Vendors may leave businesses vulnerable	0,98%
Rapid Technological Evolution can make existing systems obsolete, requiring constant learning and investment	0,98%
Competitors with better AI capabilities may gain significant advantages	0,98%
Overemphasis on Metrics: A focus on AI-driven KPIs might overshadow qualitative aspects like customer satisfaction or brand loyalty	0,98%
The complexity of some solutions can increase the difficulty about the interpretation of results	0,98%
Customers and stakeholders may distrust AI-driven decisions if the rationale behind them is unclear	0,98%

From the brainstorming activity of the first session, 23 different AI opportunities applied to Marketing were identified by the students. After the presentation of these opportunities, all the students used an online voting system to vote on the opportunities that, in their opinion, are the major achievements of AI so far in Marketing. A clear top3 was formed by Automated Content Generation (15,69%), AI-Assisted Ideation (10,78%) and Design AI-driven customer support (10,78%). The same process was made for the threats that were listed and presented. Fake Content Creation (25,49%), Reduction of Human Roles (19,61%) and the Unfair Treatment of Certain Groups (14,71%) are the top 3 reasons that are raising more concerns to the participants. Table 2. and Table 3. summarize these findings.

Session 2

In the second session, participants began by creating personas that could characterize recent graduates who are starting to work in Business Marketing. The four groups presented four different realities. Special attention was paid to ensure that no profile was repeated.

Empathy map of group 1 | Persona: Maria is 22 years old. She has a master's degree in Communication Sciences and she is currently working in a communication agency company.

- What does she hear? "AI is the future of marketing."; "If you don't learn AI, you will be left behind." "AI can replace your job."
- What does she think and feel? Anxiety about the complexity of AI; Hope that AI can simplify repetitive tasks.
- What does she see? She sees that her colleagues have more experience than her with AI. She sees her boss excited with the impact of AI in Business Industry.
- What does she say and do? She uses ChatGPT® daily. She has participated in introductory workshops on AI. She is looking for another affordable AI tools to get started to simplify her tasks at the company. "I want to learn more about AI, but I don't know where to start and I think I don't have the time to it properly."; "It's amazing what AI can do, but it seems so technical."
- Main pains | There is a lack of practical resources for learning AI. She is afraid of being replaced by technology. She feels insecure about how to apply AI to Marketing.
- Main wishes | She needs an affordable way to learn how to use diversified AI tools.

Empathy map of group 2 | Persona: Manuel, 27 years old. He had his master's degree 5 years ago in Business Management. He works for a multinational company.

- What does he hear? "With AI, your working data can be analysed in seconds."; "Careful with AI. It can fail if misconfigured."
- What does he think and feel? He is sceptic about the benefits of AI. He doesn't want to rely too much on machines. He is curious to learn more, but there is some initial resistance.
- What does he see? He sees a lot of infringement and copyright problems surrounding AI. He sees a lot of vulnerability in Industry regarding job retention.
- What does he say and do? "Does AI really do all this?"; "I prefer traditional methods to ensure accuracy". He is postponing AI learning because of other priorities; He tests AI tools only when instructed.
- Main pains | Difficulty in fully trusting the results generated by AI. Resistance to abandoning traditional methods.
- Main wishes | He wants to understand the Limits of AI in Marketing. He wants to ensure that AI is a support and not a replacement. He wants to improve processes without compromising quality.

Empathy map of Group 3 | Persona: Jéssica, 28 years old. She has a Master's Degree in Business Management for Creative Industries. With her colleague on maternity leave, she is now overwhelmed with her new tasks on a brand management and consulting company.

- What does she hear? "Everyone is using AI. You should do it as well."; "This will automate repetitive tasks and you can focus on your urgent assignments and creative tasks."
- What does she think and feel? She is feeling frustrated with the workload. She hopes that AI can alleviate administrative tasks. She fears that AI will reduce the originality of content.
- What does she see? She sees that nowadays everyone is using some tool to create creative content. She sees a lot of people questioning the work of creatives.
- What does she say and do? "If AI can help me with reporting, that would be great."; "I don't want

my creative work to lose its human touch.”; She is experimenting AI tools for specific tasks; She seeks to integrate AI into creative workflows without compromising quality.

- Main pains | She has some difficulties balancing creativity with operational tasks. She fears that AI will standardize content.
- Main wishes | She wants to use AI to free up more time for creative pursuits. She wants to find tools that complement her artistic work.

Empathy map of Group 4 | Persona: Andreia, 25 years old. She has a degree in Business Management. She is starting her own company.

- What does she hear? “AI improves strategic decision making.”; “Competitors are already adopting AI for campaigns.”
- What does she think and feel? She is concerned about falling behind in the market. She is not sure about how to measure the impact of AI. She has a cautious optimism about potential gains. “How do I integrate AI into strategic planning?”; “What metrics can I use to evaluate the ROI of AI?”
- What does she see? She sees a lot of competitors using AI tools. She sees different clients complaining about high costs of services.
- What does she say and do? She participates in discussions and webinars on AI applied to strategy. She searches for successful cases in marketing with AI. She implements pilot projects to evaluate AI but she was not able to scale up yet.
- Main pains | She has no technical knowledge to evaluate AI solutions. She has some concerns to do investments on AI because her business is a start-up.
- Main wishes | She wants to learn how to use AI to improve campaigns and get measurable results. She wants to be recognized as an innovative leader and to increase the survival odds of her company in the future.

To start thinking about the best game-based tool to promote knowledge about AI, some games that motivate and entertain participants were also discussed in session 2. Digital games and board games were mentioned as references. During this discussion, one of the participants mentioned the high digitalization of daily activities, and that it would be interesting to contrast this reality with an offer that promoted the acquisition of information in a non-digital way. For him, “the development of this type of game could increase the number of dynamics that do not depend on tools other than a physical board game.” The proposal was well received by the rest of the group, with the exception of another student who mentioned that this board game proposal would be more inclusive and could easily be transformed into a digital proposal if necessary. Two games were mentioned most often and served as a starting point for discussion: Monopoly® and Trivial Pursuit®. For participants, these are games known to a large majority of people, which can make it easier to adopt other themes. For participants, these are easy games and can be played by a few or many people, increasing the chances of creating different dynamics between students. After this discussion, when comparing the two games, Trivial was the most voted game to be used as a model game-based platform about AI and Marketing (76,5% vs 23,5%).

Session 3

Session 3 was dedicated to developing game mechanics. Each group proposed an approach so that the themes about Artificial Intelligence could be implemented in a dynamic that did not stray too far from the simple dynamic played in Trivial Pursuit®. After a discussion between all groups, the main elements of a new game proposal were chosen, which was called *Trailblazer AI*. Game dynamics: the game maintains the same main purpose - filling the circle with the 6 colored pieces that represent correct questions from different categories of the hexagon’s vertices. The knowledge categories created for *Trailblazer AI* were as follows: AI Marketing Fundamentals; Tools and Platforms; Ethics and Privacy; Metrics and Analytics; Case Studies and Success Stories; AI Powered Content Creation

Twist on the original game: In addition to the knowledge questions, “houses” were added to the board that relate to questions about the dangers of AI applied to Marketing. If the player doesn’t answer these questions correctly, he will collect black pieces. Each black piece eliminates a colored piece already conquered. Teams that fill all 6 spaces with black pieces are automatically eliminated.

In the case of *Trailblazer AI*, there are two ways to win the game: by collecting all the colored pieces faster or by not being eliminated.

Participants used the last session of the co-creation program to outline the development strategy for 300 questions that make up the functional prototype of this game (Figure 2). Cards with question on the 6 mentioned categories plus the danger category were created (Figure 3).

Figure 2: Trailblazer AI mock-up.



Figure 3: Trailblazer AI mock-up.



The validation of this prototype took place in a 2-hour session with a different class. There were 16 students from the Management Degree and 9 students from the Data Science and Artificial Intelligence Degree. Students were asked to prepare the class with the same pre-documents as students in the co-creation sessions. The great majority of the students have indicated that they understand the purpose of the game (92.00%) and all understood the rules and had no doubts about the game mechanisms. The table reporters identified that the players began to interact shyly, especially when they did not know the answers to the questions, but that as the game progressed the participants became more participative. Of the participants, 76,00% would play this game outside of the classroom context. While 92,00% consider this to be a good tool for promoting knowledge about AI among higher education students.

After testing the prototype, participants were generally more likely to indicate that they learned a lot from the *Trailblazer AI* game (60% of students in the class). Of these, the female students of Data Science and Artificial Intelligence (75.00%) and the female students of Management Degree (66.66%) stand out. Male Data Science and Artificial Intelligence students were the only ones to indicate that they learned nothing or little from the game (20.00%), as shown in Table 4.

Table 4: Distribution of students by new information acquired with Trailblazer AI (%).

Students' profile	Learned nothing or little	Learned something	Learned a lot
Male students from Management Degree	0,00%	42,85%	57,15%
Male students from Data Science and Artificial Intelligence Degree	20,00%	40,00%	40,00%
Female students from Management Degree	0,00%	33,33%	66,66%
Female students Data Science and Artificial Intelligence Degree	0,00%	25,00%	75,00%
Totals	4,00%	36,00%	60,00%

All validation questions were asked via anonymous questionnaire except for the new information acquisition question shown in Table 4, which was asked at the end of the session and answered orally by the students.

5. Conclusions

In a general approach, this study matches the previous conclusions in applying game-based tools in Higher Education, namely, a very broad acceptance on its potential as learning method. The use of Flipped Classroom and Design Thinking methodologies were essential for the development of a new learning tool in AI. The Flipped Classroom gave students the autonomy to prepare in advance and ask critical questions, and Design Thinking mechanisms allowed us to guide the brainstorming and student voice and made the co-creation sessions richer, resulting in a platform made by and for students.

The first co-creation session revealed varying levels of prior knowledge about AI in Marketing, suggesting that existing exposure to AI concepts among students in technology-focused programs may shape their perception of introductory material as too basic or redundant. Management students, particularly female students, reported higher levels of learning from the preparatory materials. In contrast, a significant proportion of male students from Data Science and Artificial Intelligence programs indicated they had learned little or nothing from the readings. These different perceptions indicate that care must be taken when preparing material that can introduce new content to students. Striving for a balance between basic learning content and innovative materials is important to promote the motivation of students.

The brainstorming exercise identified 23 AI opportunities and 21 threats, with Automated Content Generation, AI-Assisted Ideation, and AI-driven Customer Support emerging as the top-ranked opportunities. On the other hand, Fake Content Creation, Reduction of Human Roles, and Unfair Treatment of Certain Groups were identified as the most pressing threats. These concerns are aligned with current academic discourse on AI ethics and automation, underscoring the need for critical discussions on responsible AI implementation in Marketing. This was also in line with the development of the personas in the second co-creation session.

These personas reflected real-world anxieties, including fear of job displacement, uncertainty about AI capabilities, and the challenge of balancing creativity with AI-driven efficiency. It is by addressing these issues, anxieties and uncertainties that we consider that new AI learning programs must be designed, so that these future workers can be more critical and efficient in the management of AI tools when they enter the

market. This may also be relevant for their companies, especially those with little experience in this domain.

The discussions further highlighted a preference for a board game format as an educational tool. This suggests that students can value interactive, social, and accessible learning formats over purely digital solutions. In fact, Board Game-Based Learning (bGBL) represents a dynamic pedagogical approach that harnesses the immersive nature of games to enhance the learning experience (Abdul Jabbar & Felicia, 2015; Noda, Shiotsuki, & Nakao, 2019). As noted by Tinterri et al. (2024), bGBL is characterized by its tactile and social elements, promoting interactive exploration, collaboration, and strategic thinking. However, its widespread adoption remains limited due to insufficient teacher preparation and the scarcity of pedagogical and instructional frameworks in scientific literature.

In the third session, the game development process led to the creation of *Trailblazer AI*, incorporating both knowledge acquisition and AI risk awareness. The introduction of a penalty mechanism for incorrect answers on AI threats reinforces the importance of ethical considerations in AI education. As mentioned, the group of participants in the co-creation sessions had different levels of knowledge about AI and Marketing. This allows *Trailblazer AI* to reach a wider audience without making the gamified tool too simple and irrelevant. In this sense, the use of AI for content generation assumes a very important role for participants, with emphasis also on ideation and creativity as fundamental AI opportunities in the Marketing area. The issue of valuing customer support can also be seen as valuing the student's own experience. The greater focus on a prototype in these domains can bias the game-based platform and make it less attractive for other Business Marketing opportunities. On the other hand, this approach can captivate students who have the same profile.

Nevertheless, the prototype validation session showed strong acceptance, with 92% of participants understanding the game mechanics and 76% willing to play it outside the classroom. Notably, students demonstrated increased engagement as the game progressed, supporting the effectiveness of game-based learning in fostering active participation. Interestingly, the proportion of students who reported learning a lot from the game increased significantly compared to the initial preparatory readings. Female students, particularly in Data Science and Artificial Intelligence, reported the highest learning gains, while male Data Science and Artificial Intelligence students were the only group to indicate minimal learning. This might suggest that game-based learning is particularly beneficial for students who may not initially engage deeply with traditional study materials.

Although we believe in the success of the tool that was produced, this study has limitations related to impact measurement. To measure the AI knowledge applied to Marketing before and after the sessions through a questionnaire would be very important. In terms of methodology, co-creation sessions could have shorter dynamics and groups could have fewer students, so that there would be more sharing from each member.

Still, we can infer that the development of *Trailblazer AI* led to greater motivation in students than reading articles to prepare for a class. Testing the prototype did not raise any problems regarding understanding the rules and acquiring knowledge, although it was self-reported. However, during the testing phase some did not understand the purpose of having a board game to explain concepts that are promoted by digital tools. Future studies in this direction and in the development of this project should involve the expansion of a more robust prototype of the physical board game, a digital version of this game developed in parallel, and the collection of longitudinal data to assess the retention of knowledge and its application in professional contexts.

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