

Advancing Entrepreneurship Competences in Higher Education: A Systematic Literature Review of Game-Based Learning Applications

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Abstract

The intersections of entrepreneurship education and game-based learning (GBL) have attracted substantial scholarly attention in recent years. This increased interest is triggered by the indispensable role of entrepreneurship in stimulating economic expansion, generating employment opportunities, and fostering innovation. Consequently, researchers have started exploring the possible applications of GBL in expanding entrepreneurial abilities among students and recent graduates. Entrepreneurship education, increasingly considered as an essential part of higher education, equips students with the requisite competencies to thrive in the dynamic business environment. While conventional teaching methods prevail in numerous entrepreneurship education programs, the effectiveness of GBL in teaching entrepreneurship competences is becoming increasingly recognized. Moreover, emerging research evidence indicates that the advantages of this pedagogical approach may extend beyond mere knowledge enhancement. Specifically, engagement with particular types of games could potentially cultivate problem-solving skills, aiding players in dissecting complex challenges into manageable sub-tasks, and fostering the development of superior communication skills—vital in successful collaborations and entrepreneurial projects. These discoveries underscore the necessity of comprehending the allure of various game formats to us, as educators, in our quest to deliver not only practical and successful entrepreneurial training, but also enjoyable learning experiences. Therefore, this systematic review endeavors to scrutinize the existing body of literature concerning the

use of GBL strategies in higher education for the advancement of entrepreneurship competences.

Keywords

Entrepreneurship, Game-Based Learning, Competences, Higher Education

1. Introduction

As underscored by Hessels & Naudé (2019) there is not yet consensus for the word entrepreneurship. However, they propose a synthesized definition—it is the “the resource, process and state of being through which individuals with ability and agency utilize positive opportunities in the market for generating individual and/or social value” (Hessels & Naudé, 2019: p. 397). Contrastingly, the definition by the Danish Foundation for Entrepreneurship & Young Enterprise, adopted by EntreComp, a European Commission’s initiative for entrepreneurship education and training is as follows: “Entrepreneurship is when you act upon opportunities and ideas and transform them into value for others. The value that is created can be financial, cultural, or social” (Bacigalupo et al., 2016: p. 10).

Regardless of the ambiguity surrounding the concept of entrepreneurship, it is indisputably a critical factor in today’s knowledge-driven global economy, with countries reliant on its power to maintain competitiveness. This is primarily due to its potential for enhancing economic growth, promoting creativity, and driving innovation. As a result, there has been a growing interest in creating educational programs that support and enhance entrepreneurial skills (Boldureanu et al., 2020). Hence, entrepreneurship is considered a quintessential skill of the 21st century, together with other competences necessary for success in a knowledge society, like learning and working (Antonaci et al., 2015).

Entrepreneurship Education (EE) has emerged as a crucial element of higher education, equipping students with the competency to succeed in the business landscape and equipping graduates with the necessary tools to navigate their careers innovatively and adaptively (Tony, 2016). It constitutes the teaching and learning of knowledge, skills, values, and attitudes required to initiate, manage, and grow a business. It comprises identifying opportunities, resource management under risk (or not), and building a business venture. It also entails cultivating entrepreneurial attitudes and skills, extending beyond merely training for business start-ups. Moreover, it aims to enhance enterprise capacity and prepare students for the workforce in an enterprising and innovative fashion, emphasizing skill and competency development (Hynes & Richardson, 2007).

The increasing interest in EE has led to various objectives for the field, as well as a variety of pedagogical approaches used to deliver it (van Ewijk et al., 2020). The approaches in entrepreneurship education vary considerably across pro-

grams, courses, and geographical regions (Neck & Corbett, 2018). Some of the methods that can be mentioned include:

1) Action-based entrepreneurship education, in which students actively participate in entrepreneurial activities, and the learning process is primarily driven by the students themselves, rather than being led by the teacher (Haneberg et al., 2022). This approach is characterized by a focus on hands-on experience, where students are encouraged to start their own businesses or work on real-world projects.

2) Collaborative learning is an instructional approach where students work together in small groups to achieve a shared goal and enhance their understanding. It involves the construction of knowledge through interaction and cooperation among individuals with common objectives (De Toni & Nonino, 2013). It is different than plain groupwork, as collaboration is crucial for meeting the common goals (Dillenbourg, 1999).

3) The simulation-based learning method uses interactive simulations to teach students in a controlled environment. Business simulation systems are a valuable tool for problem-based learning, as they offer experiences with uncertain outcomes, multiple solutions, and the ability to construct problem scenarios. Additionally, they can facilitate collaboration among learners and incorporate elements of competition and chance (Lin et al., 2018).

4) Game-based learning (GBL) aims to educate players by incorporating learning outcomes into game content, creating a “serious game” that engages users to achieve specific objectives and promotes learning and behavioral change, beyond mere entertainment (Manshoven & Gillabel, 2021).

It is important to highlight that while gamification and GBL are related, they are distinct concepts (Kapp, 2012). Gamification employs game design elements and mechanics in non-game contexts to engage and motivate people to achieve goals, whereas GBL uses games as a primary vehicle for delivering educational content.

GBL has emerged as an effective teaching method for entrepreneurship in higher education (Vandercruysse et al., 2012), since it is an interactive and engaging approach to teaching that provides hands-on experience in a simulated business environment (Nadolny & Halabi, 2016). This approach allows students to apply theoretical concepts in a realistic setting, which can make learning more meaningful and relevant. GBL also promotes active learning, which is beneficial for students as it increases their participation and engagement in the learning process (Pesare et al., 2016).

Research has shown that GBL is an effective approach to teach entrepreneurship. Studies have found that GBL improves students’ understanding of entrepreneurship concepts, increases their motivation to learn, and enhances their problem-solving skills. Additionally, GBL has been shown to improve students’ attitudes towards entrepreneurship, which is important as a positive attitude towards entrepreneurship is associated with a greater likelihood of becoming an

entrepreneur in the future (Carenys & Moya, 2016).

Despite the potential benefits of GBL, there are also limitations to this approach. One limitation is the cost of developing and implementing GBL programs (Whitton, 2012). Developing and maintaining GBL programs may be expensive, which may be a barrier for institutions with limited resources (Kaimara et al., 2021). Another limitation is that GBL may not be suitable for all students. Some students may not be comfortable with technology, if the games used are digital (Carenys & Moya, 2016), or may prefer traditional methods of learning (Greipl et al., 2020).

This paper aims to explore the synergistic potential of GBL (GBL) within entrepreneurship education, a domain critical to economic innovation and development. Specifically, the research objectives are twofold: first, to systematically review the existing literature on GBL applications in entrepreneurship education; and second, to identify and analyze the outcomes of such educational strategies on the entrepreneurial competencies of learners. By setting a clear trajectory for investigation, this study aims to outline the future direction for educators and policy-makers in cultivating the next generation of entrepreneurs through engaging and effective learning methodologies, but also set the ground for the design of a higher education, accredited course on the subject.

The paper is structured as follows: initially the methodology for carrying out the review is described. Then the results of the review are presented, structured in thematical categories. Followingly the results are discussed upon, before the conclusions section.

2. Methodology

The objective of this systematic review is to scrutinize the existing body of literature on the correlation between entrepreneurship education and GBL in higher education. The methodology was meticulously designed to ensure a comprehensive and unbiased aggregation of relevant literature. The search strategy began with an electronic search in two of the most comprehensive scientific databases, Scopus and Web of Science, employing keywords related to entrepreneurship education, GBL, and higher education, as shown in **Table 1**. These keywords were searched within the titles, abstracts, and documents' keywords. The inclusion criteria were peer-reviewed articles and reviews that explicitly discussed the application of GBL in entrepreneurship education, to ensure a higher level of rigor compared to other publication types (Kelly et al., 2014). The exclusion criteria ruled out non-empirical opinion pieces and articles not written in English.

Table 1 shows the number of documents for each keyword group, both before and after the restrictions were applied. The data was collected on February 14th, 2023. Post-duplicates removal within each database, we retrieved 74 and 45 documents from Scopus and Web of Science, respectively. Combining these into a single database and removing 33 duplicates left a total of 88 documents.

Table 1. Number of documents per group of keywords in the respective databases, before and after restrictions were applied. Scopus and Web of Science accessed on February 6, 2023. Source: own elaboration.

Keywords	Scopus		Web of Science	
	Before restrictions	After restrictions	Before restrictions	After restrictions
Game based learning AND entrepreneurship	124	51	87	28
Gamification AND entrepreneurship	76	28	53	20

Next, the titles and abstracts of the extracted articles were screened for relevance. Eligible articles had to focus on entrepreneurship education and GBL in higher education and have full-text availability for review. Subsequently, 28 documents were selected for comprehensive review. Although the search didn't confine to a specific period, among all the included articles and reviews, only one predated 2012, underscoring the topic's recent emergence in academic literature.

Data extraction from the selected articles utilized a standardized form, recording information about the authors, publication year, study design, sample size, and primary findings. This extracted data underwent a synthesis and analysis process to discern patterns and themes within the literature concerning entrepreneurship education and GBL in higher education. The results of this synthesis, presented in the subsequent section, served as the basis for drawing conclusions and making future research recommendations.

3. Results: Literature Review

3.1. Serious Games and Gamified Courses in Entrepreneurship Education

Serious games, which combine instruction and gameplay to create engaging learning contexts, have been recognized as potential effective tools for teaching entrepreneurship and company management to university students. In a study by Bellotti et al. (2014), the authors conducted a comprehensive overview of serious games (SGs) available on the market and identified key benefits and issues concerning their adoption in teaching entrepreneurship. SGs challenge and motivate players. This approach may support "learning by doing", where students may practice and apply what they have learned in a hands-on way. Antonaci et al. (2015) propose a theoretical model that considers usability, pedagogy, and entrepreneurship skills expressed by state-of-the-art models to identify the most appropriate mix of serious games for use in entrepreneurship courses. This suggests that serious games may be carefully selected and integrated into entrepreneurship curricula to create engaging learning experiences.

Almeida & Simões (2019) highlighted the advantages and limitations of using

serious games in entrepreneurship education, particularly for simulating challenges in start-up launch and management. Their study identified accessibility, interoperability, usability, and evaluation of student performance as global concerns in using serious games for entrepreneurship education.

Furthermore, gamified and collaborative courses for entrepreneurship education have been developed to help students become familiar with basic concepts of entrepreneurship and management and stimulate the emergence of their entrepreneurial attitudes. These courses incorporate game mechanics such as leaderboards and badges to enhance students' experience, engagement, and entrepreneurial self-efficacy. In a study conducted by [Isabelle \(2020\)](#), the course, with a 12-week format, involved the creation and operation of online ventures by 269 undergraduate students, who experienced the entire entrepreneurship process from ideation to launch of a real business and beyond. The use of gamification in entrepreneurship education may promote learning by doing, as students engage in hands-on experiences of ideation, creation, and operation of real businesses. This suggests that gamification may be an effective approach to promote active learning and enhance students' entrepreneurial skills and attitudes.

Another important finding in the literature is the experiential nature of GBL. [Fonseca et al. \(2012\)](#) describe a game that guides users to develop a business idea in the form of a business plan, and the authors conclude that this experiential learning approach positively impacted the participants and increased their propensity towards self-employment.

Similarly, [Musteen et al. \(2018\)](#) present "A Community of Practice approach to teaching international entrepreneurship". In this study, the authors evaluate the effectiveness of the Global Board Game Project (GBGP), which aims to promote interactions between students in different countries. They collaborate online in a semi-structured manner to generate ideas, develop, and market a board game product to another country. The qualitative analysis of student essays indicated that the project was effective in helping students achieve learning outcomes, including defining, recognizing, and evaluating international business opportunities; designing and validating a business model based on such opportunities, and creating a plan for pursuing these opportunities.

Another common theme across the studies is the importance of motivation and engagement in GBL. Several studies ([Kauppinen & Choudhary, 2021](#); [Mayer et al., 2014](#); [Patricio, 2017](#)) show that motivation, personality traits, and previous gaming experience can significantly influence the perceived effects of entrepreneurship training. [Mayer et al. \(2014\)](#) focuses on the use of serious games in a Master's level entrepreneurship course at Delft University of Technology (TU Delft) in the Netherlands (N = 27), finding that personality traits, motivation, and gaming experience can significantly influence the perceived effects on entrepreneurship after the training. The use of gamified tools, such as ideaChef® ([Patricio, 2017](#)) and Kahoot! ([Kauppinen & Choudhary, 2021](#)), is shown to enhance team engagement and participation in class activities. ideaChef®, devel-

oped in the University of Aveiro (Portugal), uses cooking metaphors in a board game format, designed to help teams transform high potential ideas into tangible concepts or prototypes. Findings highlight the positive impacts of gamification on idea quality and innovation capabilities. However, [Kauppinen & Choudhary \(2021\)](#), which examines the use of Kahoot!, an online game, in an entrepreneurship course on business planning at an Estonian technical university with 63 student participants, and in two courses on entrepreneurial process at an Australian technical university with 30 student participants, notes that offering gifts as rewards may not necessarily improve information recall, indicating that the design and implementation of gamification elements need to be carefully considered.

The use of video games in developing innovation skills in the context of entrepreneurship and innovation education was also investigated. [Tobar-Muñoz et al. \(2020\)](#) conducted a study using the Innovator's DNA framework of skills and observed participants interacting with a game specifically tailored for fostering these skills. The study found that participants enacted actions involving observing, associating, and experimenting, which are skills related to innovation. This highlights the potential of video games in fostering innovator's skills among students in entrepreneurship and innovation education.

[Kauppinen & Choudhary \(2021\)](#) provides insights into the use of an online game, Kahoot!, in entrepreneurship education, specifically in business planning courses. The study found that while offering gifts to the best players can motivate students to participate in class activities, it did not have a discernible effect on enhancing their ability to recall information.

[Memar et al. \(2021\)](#) investigates the effectiveness of gamification in large classroom settings for teaching causation and effectuation behaviors in entrepreneurship education, using an experiential learning exercise called the Strategic Business Game. The sample for this study comprised 126 participants, including 59 students enrolled in an industrial engineering master's program and 67 students enrolled in an international marketing master's program. The authors found that the Strategic Business Game prompts students' causation and effectuation behaviors, fosters better student interaction, and enhances the quality of learning.

Furthermore, the studies emphasize the positive impact of gamification on entrepreneurial intentions. [Aries et al. \(2020\)](#), conducted a study in Entrepreneurship or Business Plan courses in BINUS online learning, a higher education institution in Indonesia that provides e-learning degree programs. The results obtained from a sample of 400 students indicate that gamification can positively influence attitude, perceived behavior control, and subjective norms, with perceived behavior control being the dominant factor, leading to increased entrepreneurial intentions among students.

The study by [Beltrão & Barçante \(2016\)](#) investigated the use of the "Industrial Administration Game" (JOGAI), which simulates a supply chain of jewelry pro-

duction for export, covering the entire process from mining of raw materials to sale to the final exporter, to teach Business Excellence and Total Quality Management to undergraduate students. The findings indicated that the hands-on approach of the game was well-received by students and fostered entrepreneurship, increased class participation, teamwork awareness, and discussions on business ethics.

3.2. Simulation-Based Learning for Experiential Entrepreneurship Education

In addition, simulation-based approaches have been used in entrepreneurship education to provide students with experiential learning opportunities. For example, a study by [Arias-Aranda & Bustinza-Sánchez \(2009\)](#) investigated the impact of a simulation experience on entrepreneurial attitude through conflict management learning. The study was conducted on a sample of 427 advanced undergraduate students majoring in Business Management and Administration, Economics, Tourism, and Marketing at the University of Granada (Spain). The selected simulation program, Praxis MMT v.10, tasked the students with managing a manufacturing company in the automotive industry. The study found that students who participated in the simulation experience scored significantly higher in conflict management handling modes that reinforce internal relationships within the team, such as collaboration and compromise, compared to non-participants. The simulation experience also positively affected personal control and self-esteem, improving the perception of control and conflict management approaches. The study concludes that incorporating simulation tools into educational programs related to entrepreneurship can improve conflict management and foster motivation and cooperative attitudes.

[Costin et al. \(2019\)](#) and [Manshoven & Gillabel \(2021\)](#) highlight the benefits of using simulation games for enhancing entrepreneurial competencies and business model innovation. [Costin et al. \(2019\)](#) utilizes a simulation game called “SimVenture” to investigate the development of cognitive and non-cognitive entrepreneurial competencies in a master’s degree in international entrepreneurship at the University of Limerick, Ireland, emphasizing the transferability of these competencies to diverse business contexts. [Manshoven & Gillabel \(2021\)](#) presents the development and testing of a simulation board game called Risk&RACE aimed at bridging the gap between theory and business practice in implementing circular economy business models. The game was tested with 120 users, and results showed improved awareness, understanding, and insights in circular economy principles and business models. Players praised the engaging and realistic nature of the game, and debriefing discussions further deepened their learning experience.

Furthermore, a study on the long-term effects of gaming simulation to teach entrepreneurship to German university students, particularly related to the business processes of startups, found that participants showed an overall increase in their knowledge of business administration and business plan preparation skills,

as well as an increase in their desire to create a startup (Kriz & Auchter, 2016). The study also identified gender-based differences in entrepreneurial attitudes and motivation, suggesting that interventions such as cup seminars for women only with extended debriefing may reduce the decrease in motivation of women. This suggests that GBL approaches may have positive effects on students' entrepreneurial knowledge and attitudes, although further research is needed to explore potential gender-based differences in the effectiveness of these approaches.

Yang et al. (2022) further examined the influence mechanism of virtual simulation game learning experience on student engagement and entrepreneurial skill development. The study found that game design, teamwork, and self-efficacy had significant effects on entrepreneurial skill development and learning engagement. This suggests that the design of the game and the collaborative nature of game-play can influence student engagement and skill development in entrepreneurship education.

Williams (2015) focuses on SimVenture, a business simulation game, and demonstrates that it not only develops business and management skills but also entrepreneurial attitude and values in management students. SimVenture was used with second-year business and management undergraduate students (N = 32) and the assessment of how it affected students' entrepreneurial competences was conducted through formal assessment of students' reflective journals, as well as pre- and post-intervention student questionnaires. The author concluded that the game allowed students to face their limitations, overcome some of them, and make significant progress in their learning.

Other studies focused on the development of gamified software applications for business simulation and entrepreneurship learning. Tița et al. (2019) proposed the use of Unified Model Language (UML) and Business Process Model (BPM) tools to study business processes and develop a theoretical model for a gamified software application. The study aimed to provide a virtual simulation environment for understanding business principles in formal university education. Pratikto et al. (2021) explored the use of educational entrepreneurship game apps as a medium for online classes to improve students' analytical skills regarding business processes. The study found increased entrepreneurial analysis skills among students who engaged with the game-based mobile apps.

3.3. Flow Experience and Game-Based Learning

The concept of flow experience, defined as a mental state of complete absorption in an activity, emerges in the literature related to GBL, in the context of entrepreneurship education. This concept is found to be critical in enhancing learning performance and entrepreneurial self-efficacy (Yen & Lin, 2022). The challenge-skill balance and playability of the game are identified as key antecedents of flow experience, and designing GBL environments that promote flow experience can lead to improved learning outcomes in the context of entrepreneurship education. This finding is supported by Grivokostopoulou et al. (2019), which demon-

strates that gamified learning activities, particularly those implemented in 3D virtual reality environments, can significantly improve students' knowledge and skills in entrepreneurship, management, and finance, as well as increase their self-efficacy and intentions to engage in entrepreneurial activities. According to these authors, the 3D virtual reality environment offers theoretical knowledge of entrepreneurship, and the GBL activities provide students with real challenges that may be found in business environments.

3.4. Game-Based Learning in Teacher Training Programs

Moreover, the use of GBL approaches in teacher training programs has been explored as a way to enhance students' competences and teachers with innovative teaching methods that they can use in their future careers. [Canaleta et al. \(2014\)](#) argue that traditional lecture-based approaches often result in student passivity, and active learning methodologies, including serious games and project-based learning, can promote pro-activity and improve the effectiveness of learning. The authors evaluate the results obtained in the Master in Teacher Training (MTT) program, which is a professional Master program for teachers who teach in Secondary Education, Baccalaureate and Vocational Training in Spain, in its first three academic years of implementation (2009-2010, 2010-2011 and 2011-2012). The authors also emphasize the need for a more profound use of Information and Communications Technology (ICT) to create a learning system adapted to the digital world that the new generations of students are integrated into. This suggests that GBL can be beneficial not only for entrepreneurship education but also for other domains, such as teacher training, to enhance student learning outcomes.

[Vlachopoulos and Makri \(2017\)](#) used business simulation games in a post-graduate program for teachers in Greece, with the aim of developing the teachers' entrepreneurial skills. The authors found that the GBL approach was well received by the participants, and that it significantly improved the teachers' entrepreneurial skills and their attitudes towards entrepreneurship. The study suggests that the use of GBL approaches in teacher training programs may contribute to the enhancement of teachers' competences and their teaching methods.

3.5. Board Games and Innovative Teaching in Entrepreneurship

[Rosli et al. \(2019\)](#) investigated the use of a board game in teaching entrepreneurship and accounting to non-accounting students (N = 49). Pre- and post-game experiment surveys found that game-based accounting education aids in generating an interesting teaching and learning environment on a business accounting course that focuses on student-centered learning. Most respondents agreed that using games helped them to comprehend the business accounting knowledge better.

Several authors focused on the impact of teamwork and prior experience on student performance in business games ([Alas et al., 2018](#); [Almeida & Simões,](#)

2019). Alas et al. (2018) discusses a study conducted in Estonia that explored the relationship between teams' characteristics and their performance in the business game *Dynama*, as well as the effect of market research information on their performance. The authors concluded that success in the business game *Dynama* is influenced by factors such as acquiring adequate information (market research), quality of homework, and team discipline. High academic achievement and prior work experience positively impact the achievement of a favorable final result.

3.6. Student Perception and Preferences in Game-Based Entrepreneurship Learning

Furthermore, the perception of students towards game-based entrepreneurship learning has also been explored. Ahsan & Faletahan (2021) conducted a qualitative study in Indonesia using the "Start and Improve Your Business (SIYB)" game. Data was collected from 441 participants through a nine-year survey. The authors found that participants liked the game for its positive impact on entrepreneurial spirit, skills, insights, and mindsets. However, some participants expressed concerns about the characteristics of the game, personal issues, and teamwork. This suggests that while GBL can have positive impacts, it is important to consider the concerns and preferences of students in the design and implementation of such games.

3.7. Awareness of Cognitive Mechanisms in Decision-Making with Financial Risk

In addition to skill development, Zichella & Reichstein (2022) highlight the importance of entrepreneurship curricula that increase awareness of the cognitive mechanisms involved in biased decision-making with financial risk. Drawing on data from a money games experiment with undergraduate students ($N = 45$), the article highlights specific biases relevant to high-risk environments, such as the prior gain effect and the degree-of-risk effect.

4. Discussion

In the past, the traditional teaching model assumed learning as a process where students simply accumulated knowledge and skills, with the teacher being responsible for transferring this information. In this model, the teacher took a central role, while students played a passive role, mostly limited to listening and taking notes. However, contemporary cognitive science has introduced a paradigm shift in our understanding of how people learn, advocating for a model that differs greatly from the traditional approach.

This literature review on GBL for entrepreneurship education in Higher Education Institutions reveals several key findings and trends. Overall, the studies highlight the positive impact of gamification on various aspects of entrepreneurship education, including entrepreneurial competencies, intentions, engagement, and innovation capabilities. The studies included in this systematic literature review suggest that game-based approaches may be effective in enhancing

entrepreneurship education by improving students' innovation skills, changing perceptions of entrepreneurship and industry-related aspects, and increasing learning motivation and performance. These studies emphasize the importance of innovative and interactive approaches to entrepreneurship education, such as GBL and practice-based learning, also highlighting the significance of factors such as perceived behavioral control, social influence, perceived ease of use, and perceived enjoyment in promoting learners' satisfaction and intention to use game-based technologies.

The development of both cognitive (knowledge) and non-cognitive (skills and attitudes) competencies' elements associated with entrepreneurship along with the development of a greater predisposition towards undertaking entrepreneurial projects, highlight the potential benefits of incorporating GBL tools into educational programs for future graduates not only in Economics and Business, but also to as those interested in pursuing an entrepreneurial career.

Through business simulations, students are able to take ownership of their learning experience by engaging with a simulated "real" world, collaborating in interdisciplinary teams, iterating their approaches, and learning from failure—all of which are recognized as viable and respected methods for cultivating entrepreneurial competencies. This highlights the potential of business simulations as a valuable tool in entrepreneurship education, enabling students to acquire a diverse range of skills and attitudes essential for entrepreneurial success. The simulation's emphasis on conflict management within and between groups, particularly in complementary activities and negotiations with real agents, further enhances motivation and fosters cooperative attitudes.

According to the literature, students who are interested in the subject matter they are learning are more likely to exhibit higher motivation when engaging in experiential learning exercises. Furthermore, gamified educational exercises are often perceived as engaging and educational by students. It is argued that incorporating gamification into education has a positive impact on students' ability to think critically and creatively in self-reliant situations, as well as their communication and decision-making skills. This highlights the potential benefits of gamification as an effective pedagogical approach for promoting active and meaningful student engagement, while enhancing key cognitive and non-cognitive competencies.

Besides, although this literature review focused mainly on higher education and published papers in the two aforementioned scientific databases, the GBL approach has been applied also in younger ages, attempting to cultivate entrepreneurial predispositions and also teach fundamental terminology related to entrepreneurship. Such an example was implemented by developing the Kid-Venture online game (<https://kid-venture.weebly.com/>), addressed to children 6 - 10 years of age. Moreover, a theoretical framework was developed in order to provide foundation for the game and its connection to the national curricula which can be directly connected to the EntreComp Framework. In fact, some EU

member states have started to directly include entrepreneurship education in their curricula, starting from very young ages, which highlights the significance of this literature review (e.g. Greece proposes the implementation of Skills' Labs in Kindergarten and Primary Education, with Entrepreneurship being one of the main areas of work).

The literature reviewed suggests that games and simulations have potential in teaching entrepreneurial skills and attitudes, offering a social learning context, and developing students' analytical abilities and business acumen. However, it also reveals significant limitations: many existing games focus more on company management rather than on cultivating an entrepreneurial mindset or skills, such as innovation and responsiveness to emerging needs. Moreover, the lack of "real-world" simulations that factor in human elements limits the depth of entrepreneurial training is also revealed. Additionally, a considerable weakness in the reviewed studies is the frequent absence of a control group, undermining the research design's robustness. Despite recognizing entrepreneurship's value, the literature demonstrates a shortfall in detailing the systematic application of GBL to teach entrepreneurial skills, a gap this review addressed by evaluating GBL's role in entrepreneurial education and its capacity to build essential entrepreneurial competencies.

The contribution of this systematic review to the existing body of knowledge is multi-dimensional. It synthesizes the current empirical evidence on the efficacy of GBL in entrepreneurship education and states its pedagogical benefits. By mapping out the educational outcomes associated with GBL, this review provides a theoretical foundation for future research and practical guidance for the integration of GBL strategies into entrepreneurial curricula. This endeavor enriches the pedagogical discourse and offers a validated framework for educators to enhance entrepreneurial training.

5. Conclusion

In conclusion, this literature review indicates that GBL has positive effects on entrepreneurship education, including improved engagement, motivation, entrepreneurial competencies, and intentions. The studies also show that the use of gamification in entrepreneurship education can develop not only hard skills but also soft and interpersonal skills. The practical implications of integrating GBL into entrepreneurship education are profound. By actively engaging students in games that mirror real-world entrepreneurial challenges, educators can significantly enhance critical thinking, problem-solving, and decision-making skills. Such experiential learning not only reinforces theoretical knowledge but also boosts student motivation and retention. However, careful consideration needs to be given to the design and implementation of gamification elements, and the specific context of the educational setting.

It is important to note that entrepreneurship education should not be confused with general business and economic studies, as it encompasses a distinct

set of competencies and perspectives that go beyond traditional business education. There is a strong desire to develop efficient and effective entrepreneurship education frameworks that can effectively teach, promote, and instill entrepreneurship skills in young students. However, this domain is considered challenging due to its multifaceted nature. In this context, innovative educational methods such as GBL, gamification, and virtual reality hold significant potential to enhance and sustain entrepreneurship education. These approaches have the capacity to create immersive and engaging learning experiences, foster critical thinking and decision-making skills, and provide opportunities for hands-on experiential learning, ultimately contributing to the development of entrepreneurial mindsets and capabilities in students. This review is intended to serve as an exploratory guide for instructors who are interested in incorporating a gamified approach into their courses.

One important direction for future research in entrepreneurship education is the examination of gender-related aspects within the learning environment. This could involve analyzing the behaviors and attitudes of individuals from different genders towards entrepreneurship activities and frameworks, with the goal of understanding potential differences and identifying areas for improvement. Additionally, future research could explore the efficiency of collaborative learning activities, where students work in teams and engage in cooperative learning, communication, and soft skill development. Further research can also explore the long-term effects of GBL on entrepreneurship outcomes, including evaluating the sustained impact of gamified interventions on students' entrepreneurial skills and behaviors beyond the immediate learning context. Additionally, investigating the optimal design and implementation of gamified interventions for entrepreneurship education, including factors such as game mechanics, feedback mechanisms, and level of challenge, can provide valuable insights for effective instructional design in this domain. This may contribute to the continuous improvement and refinement of gamified approaches in entrepreneurship education.

In light of the findings presented and the current trend in educational certification, it is apparent that there is a need for a course that harnesses the strengths of GBL for entrepreneurship competencies. As emphasized in the literature, while traditional business studies have their merit, entrepreneurship stands distinct with its unique competencies and challenges. Current educational certifications are increasingly leaning towards specialized, skill-based, and experiential learning modules. The Erasmus + project "Game-it away!", proposes an Entrepreneurship training Course, that aims to bridge the gap observed in the literature by offering a program centered around game creation and implemented within a makerspace. By blending the foundational knowledge of entrepreneurship with the innovative and interactive elements of GBL, this course aims not only to address the challenges of the multifaceted domain of entrepreneurship education but also to align with contemporary certification trends. This initiative will be

important to equip the next generation of entrepreneurs with the competencies they need to navigate and thrive in an ever-evolving business landscape. The course is fully designed and will be tested in the foreseeable future and released in full in 2024. Finally, the course will be accredited with the micro-credentials approach.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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