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The use of active methodologies in entrepreneurial education: a systematic literature review

O uso de metodologias ativas na educação empreendedora: uma revisão sistemática da literatura

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Abstract
The labor market today is looking for professionals with, besides technical capacity, skills that are important in the 21st century, as an entrepreneurial competence. Universities and higher education institutions play an important role in shaping the professional profile demanded by the labor market. This requires adaptations in the teaching and learning process to help students build these skills. Thus, this article aims to analyze how national and international scientific literature has portrayed the use of active methodologies in the classroom in higher education institutions, for entrepreneurial education. To this end, a systematic literature review was conducted in the Scopus database. The results point to a growing interest in the theme and these methods have developed in students fundamental entrepreneurial skills in the contemporary context. The most active teaching-learning methods found were Design Thinking and Project-Based Learning.
Keywords: active methodologies, entrepreneurial education, systematic review, higher education.

Resumo
O mercado de trabalho hoje busca por profissionais portadores, além de capacidade técnica, de competências que são importantes no século XXI, como competência empreendedora. As universidades e instituições de ensino superior exercem importante papel na formação do perfil profissional demandado pelo mercado de trabalho. Para tanto, são necessárias adequações no processo de ensino e aprendizagem que auxiliem o educando a construir tais competências. Assim, este artigo tem como objetivo analisar como a literatura científica nacional e internacional têm retratado o uso das metodologias ativas em sala de aula nas instituições de ensino superior, para a educação empreendedora. Para isso foi realizada uma revisão sistemática da literatura na base de dados Scopus. Os resultados apontam um crescente interesse pela temática e esses métodos têm desenvolvido nos alunos competências empreendedoras fundamentais no contexto contemporâneo. Os métodos mais ativos de ensino-aprendizagem encontrados foram *Design Thinking* e Aprendizagem Baseada em Projeto.
Palavras-chave: metodologias ativas, educação empreendedora, revisão sistemática, ensino superior.

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1 Introduction

Contemporary society is marked by major and significant changes. In this context, Lacerda & Santos (2018) put that today the labor market is looking for professionals who have, in addition to technical capacity, ability to work in teams, produce under pressure, as well as critical, collective and interdisciplinary sense, ability to solve problems, among other skills that are characteristic of the professional in the 21st century.

Entrepreneurship involves the process of identifying new opportunities, creating new activities and innovation, which is a complex phenomenon requiring decision-making in situations of uncertainty. This phenomenon is recognized as one of the skills required in contemporary times, which are fundamental for lifelong learning (Sousa & Costa, 2022). Entrepreneurial skills can be understood as the entrepreneur's ability to successfully perform work (Pérez-Pérez et al., 2021), turning ideas and opportunities into results, through actions and the use of efficient resources (Ruiz-Rosa et al., 2021). Studies on entrepreneurial intent, personal level variables and entrepreneurial education have been intensified in recent years (Pérez-Pérez et al., 2021).

Antonaci et al. (2015) argue that the European Commission, in the report "Entrepreneurship in higher education, especially in non-entrepreneurial studies" (2008), states that entrepreneurial education should develop both general skills, such as self-confidence, adaptability and creativity, and specific entrepreneurial skills.

Secundo et al. (2021) put the University as a rich source of knowledge and skills, networking possibilities, opportunities, experiences and even financial capital needed for entrepreneurial success, which portrays an enabling environment for the Entrepreneurial Ecosystem. According to these authors, for such an environment to become possible, it is necessary for the university to reconfigure its traditional educational programs and approaches in order to create a favorable context for entrepreneurship, supporting students in an entrepreneurial process.

For Lacerda & Santos (2018), universities and institutions of higher education play an important role in the formation of the professional profile that the labor market demands, and, to this end, adaptations are needed in the teaching-learning process that help the student to build such competences. Pietrovski et al. (2019) corroborate by stating that the university, in addition to promoting academic development, should seek to transform social reality, signaling that students entering higher education have training gaps in their entrepreneurial potential and that it is up to universities to create teaching and learning processes that fill these spaces. The traditional teaching method, called by Freire (1996) banking education, still prevails in higher education in Brazil (Lacerda & Santos, 2018, Marin et al., 2010). According to Marques et al. (2021, p.734) in the "traditional method of teaching, students are prevented from seeing themselves as knowledge creators, being only consumers".

Entrepreneurial education, even today, is a major challenge in the field of Entrepreneurship. In Brazil, in particular, we need more studies of entrepreneurial education (Lopes & Lima 2019). Fayolle (2013) already pointed out that entrepreneurship education was growing worldwide, but the main educational and didactic issues remained unresolved. According to the author, there is commitment on the part of educators, but it is necessary to reflect on the practices and on what is taught.

Regarding entrepreneurial education Fayolle (2013) points out that content remains standardized and is represented by business planning, and serves as a producer of startups. But we need to go beyond that, and it must first of all be designed to produce entrepreneurs who are capable of thinking, acting and making decisions in various situations and contexts. The author

stresses that entrepreneurial education should focus on entrepreneurial skills and more specifically on soft skills, such as relational, conceptual, organizational and commitment skills. However, he stresses that several articles emphasize the importance of more active teaching pedagogies, but little evidence is provided on the adequacy between the methods used and the specificities of the public, methods and content.

With the aim of identifying ways to improve higher education in entrepreneurship, Lima et al. (2015) conducted a study with 12,604 Brazilian students, from various higher education courses, interested in having their own business. According to these authors, there is a need to improve entrepreneurial education in Brazil, highlighting the search for high quality, with emphasis on practice and contact with entrepreneurs and their real world. For them, this could generate direct contributions to the formation of a large contingent of students, and indirect contributions to the country, particularly through students who want to have their own business. They suggest that comparative studies be carried out between Brazilian higher education institutions and those with foreign institutions for the identification and dissemination of the use of best practices, as well as studies about the specific social, economic and cultural contexts of entrepreneurship in Brazil, and the necessary requirements in the country to undertake with less difficulty and more success.

Neck & Greene (2011) state that the approaches to entrepreneurial education are outdated, the academic field and the practical field of entrepreneurship disagree, so entrepreneurial education requires a new approach based on action and practice. The authors present a structure for the teaching of entrepreneurship in a new world, in this sense proposes a comprehensive approach, where teaching entrepreneurship requires a method, because the method can be taught, learned, but it is not predictable. Approaching entrepreneurship as a method means teaching a way of thinking and acting built on a set of assumptions, using a portfolio of techniques to stimulate creation. The authors suggest the following process: i) business: starting a business helps students to feel what it is like to take on the role of employer; ii) serious games and simulations: allow students to play in virtual worlds mirroring reality; iii) design-based learning: encourages students to observe the student through a different lens and create opportunities; iv) reflective practice: allows students to have time, think and absorb learning. Thus, according to the authors, the method allows to feel, play, observe, create and think.

Faced with this scenario, there is a need for new forms of learning that promote, in an efficient manner, the integral formation of the pupil. For Lacerda & Santos (2018, p.612), "non-traditional teaching methods and models, when well structured and grounded," may be the answer to this demand. The pedagogical strategies of active learning represent a paradigm shift, in which the teacher and the student take on new commitments (Lacerda & Santos, 2018). The role of students changes from passive to active, while the teacher becomes a facilitator who helps to relate theoretical knowledge to real-world situations and experiences. For the author several articles emphasize the importance of the most active pedagogies of teaching, but little evidence is provided on the adequacy between the methods used and the specificities of the public, methods and content.

In this context, the student is responsible for learning and should be involved in the teaching process so that the group is equally responsible for the schedule and goals to be met. He becomes the protagonist of the class in the construction of knowledge, creating the debate and enabling the critical formation of conclusions about the theme addressed (Lacerda & Santos, 2018). The choice of a teaching method must take into account, in addition to the objectives of the course, the educator's knowledge, the content, the target audience and the

expected results, as well as a learning environment that enables students' autonomy, self-confidence, independent thinking and self-management ability (Fayolle, 2013; Daniel, 2016)

The use of active methodologies has positive effects on the development of entrepreneurial skills, such as interpersonal relationship, leadership, initiative (Pérez-Pérez et al., 2021); teamwork, decision-making, confidence, self-esteem, self-efficacy (Grivokostopoulou et al., 2019); entrepreneurial attitude, motivation, management knowledge and business planning skills (Kriz & Auchter, 2016), knowledge, competitiveness, teamwork, motivation.

Experiential learning is considered to be the most effective way to develop entrepreneurial skills, as experience drives observation and reflection of students, leading to new action implications, leading to new experiences (Pérez-Pérez et al., 2021). Entrepreneurship is an important element in economic evolution, arouse academic interest in entrepreneurial education. In this sense, the question that guided this study is: How have studies on entrepreneurial education discussed the use of active methodologies for entrepreneurial education in higher education?

Since entrepreneurial skills are needed for vocational training and active methodologies can be a response to entrepreneurial education, this study aims to analyze how national and international scientific literature has portrayed the use of active methodologies in the classroom in higher education institutions, for entrepreneurial education. To do so, a systematic review of the literature was carried out in the database of the Scopus platform, seeking to identify which ative methodologies have been applied in the classroom, their objetives, the courses in which they are being applied, and, finally, the effectiveness of the method.

According to Pérez-Pérez et al. (2021) an authentic learning experience is needed for entrepreneurial education, due to its complex content permeated with uncertainty, and because there is little study in the area, leading to inconclusive views. It is therefore justified to carry out such a systematic review, as it aims to contribute to the state of the art by promoting discussions on the use and efficiency of active teaching-learning methodologies in entrepreneurial education.

In addition to the Introduction, this article is divided into four sections. The methodological procedures defined for the study are presented below. The result is presented in the fourth section. And finally, they follow the conclusion and the references used in the construction of the study.

2 Methodological Procedures

A systematic literature review was conducted to explore scientific production related to the research problem. For Botelho et al. (2011), the systematic review is a type of systematic bibliographic review designed to answer a research question using explicit and systematic methods that are reproducible. The procedure used for the construction of this revision is described below.

The search was carried out on the Scopus platform, the Elsevier B.V. database started in 2004, which has a large and multidisciplinary bibliographic database (Gusenbauer, 2019; Gusenbauer & Haddaway, 2020), of great relevance, as it offers peer-reviewed documents and a national and international panorama of scientific literature. Its diverse research field contributes to the accurate selection of documents. According to Gusenbauer (2019) bibliographic databases are standard locations for accessing up-to-date scientific publications.

A survey carried out on 12 different databases to check query variations, points out that these are not different, all being successful. For a single database (Scopus) a word combination

proved successful in retrieving a maximum QHC, meaning that for that database alone, a longer search sequence actually meant more records retrieved (Gusenbauer, 2019).

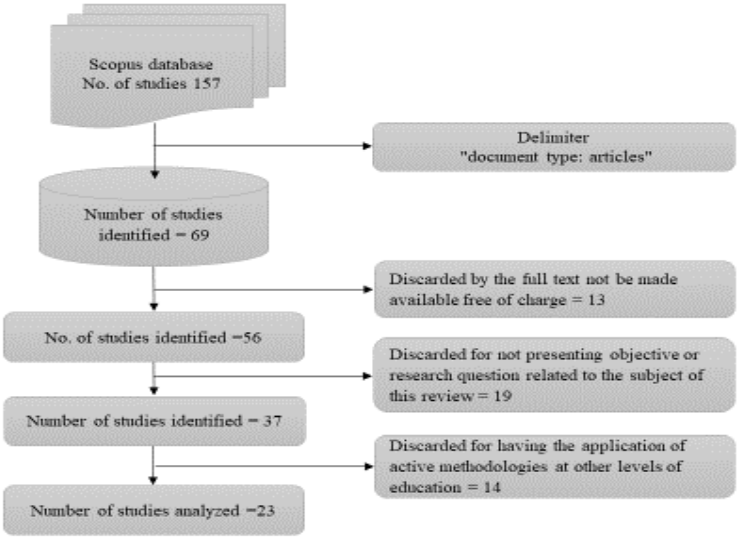
The study by Gusenbauer & Haddaway (2020) to examine which databases are suitable for synthesis of evidence in the form of systematic review indicates that the Scopus platform meets the necessary requirements.

The words Entrepreneur, Higher Education, Education and Active Methodologies were used, and the search string was as follows: TITLE(entrep*) AND TITLE-ABS-KEY(university OR higher education OR graduation) TITLE-ABS-KEY(educ*) AND TITLE-ABS-KEY(active_methodolog* OR design_thinking OR flipped_classroom OR gamification OR project_based_learning OR problem_based_learning OR peer_instruction OR maker_movement OR business_games).

After the application of the search in the base, 157 documents were found. To complement the analysis, the delimiter "type of document: articles" was applied, leaving 69 documents. Another criterion used was the full and free availability of the text in the databases used, in English or Portuguese (Figure 1). For the selection of the works, the abstracts found were read and, as eligibility criteria, the works that presented objective or question of research related to the subject of this investigation were used. We analyzed the articles that had as their objetive/problem the use of active methodologies in the classroom, for didactic purposes, in the teaching of entrepreneurial education for undergraduate students. Next, articles that made use of the active methodologies in another context or level of education were excluded. It is important to note that the period of publication was not delimited, being accepted all articles and so the oldest article that returned in the search was published in 2004.

Figure 1

Steps in the selection of studies.



In order to better classify the data and grouping the information, the articles were divided into categories defined by the type of active methodology used by the authors. Each category refers in a simplified way to the common characteristics of the group elements (Bardin, 2004). Some authors used more than one active methodology simultaneously, and in this case, the article was categorized by the methodology considered to be the main one. The categories defined were: a) Problem-based learning (PBL), b) *Serious games* and/or Gamification, c) *Service Learning* (SL), d) Design Thinking (DT), e) Flipped Classroom, f) Project-based learning (PBL). Next, the objective of the application of the active learning method was analyzed, considering, in this analysis, the objective defined by the authors. In addition, the efficiency of the active method in the classroom was analyzed, in the perception of the authors. Such information was found in the results and/or in the conclusion of the articles. Finally, a content analysis was performed, using the Bardin analysis technique, 2011, mapping the most recurrent words and/or information.

3 Result

3.1 General analysis of documents

On the Scopus platform, 23 articles were published, aligning themselves with the proposed research problem, which is to analyze national and international scientific literature as far as the use of active methodologies in higher education for entrepreneurial education is concerned. The articles were published between 2004 and 2022, with the majority (82.6%) published in the last 9 years. The oldest article was published in 2004 and only 4 articles (17.4%) were published between 2004 and 2011. In the years 2019 and 2021, there was the majority of publications, which shows a growth in interest for the theme.

The categories DT (7 articles - 30.43%) and PBL (6 articles - 26.09%) were the methodologies with the highest number of studies. In all categories, articles have appeared in the last three years (2022, 2021 and 2020), which reinforces a growing interest in entrepreneurship issues and teaching methodologies.

The articles were published in *journals* from the areas of Education (8), Technology (2), Psychology (2), Engineering (2), Administration (2), Interdisciplinary (2), Pharmacy (1), Public Health (1), Innovation and Entrepreneurship (1) and Games (1). The major part of the publications are in magazines in the area of Education (34.8%), and, among the teaching methods, the most used was DT. With regard to the origin of the work, the majority are from Europe (60%), followed by Asia (12%), North America (12%), South America (12%) and Africa (4%). The countries that most published were Spain, with 5 papers, and Brazil, with 3 papers. The others presented 1 or 2 published works.

When analyzed the courses in which the researchers applied the active methodologies, 13 different areas can be found (some works cover more than one area). Eight (8) papers do not specify which undergraduate students participated in the research, and in these cases, the courses were opened at the university, allowing all enrollees to participate as an optional module. Participation in optional subjects shows that the student is interested in the subject. The areas that most utilized the methodologies were entrepreneurship, technology and finance, followed by Administration, Marketing and Engineering.

3.2 Problem-based Learning - PBL

The PBL is a method that helps the student to search for innovative solutions to problems encountered in the work environment (Sousa & Costa, 2022; Wee, 2004). It seeks to facilitate cognitive learning processes by allowing a student-centered pedagogy and requiring that students learn through experience (Hogue et al., 2011). Students work in teams and are assessed at both group and individual level. The teacher acts as a facilitator guiding students in problem analysis, thus learning is built collaboratively (Hogue et al., 2011; Sousa & Costa, 2022; Wee, 2004). For Hogue et al. (2011) the PBL has an interdisciplinary nature.

For Sousa & Costa (2022), in the application of the PBL, the following procedures should be used in order to guide the students: i) identification of an organizational problem in a public entity or body; ii) diagnosis of the situation-problem to be analyzed; iii) proposal for an action plan to solve the diagnosed problem; and iv) possible effects of the solution found for the problem under study.

Sousa & Costa (2022) used the PBL methodology in a study conducted with 76 students from the Bachelor's courses in Administration, Human Resources Management and Information Technology, in the city of Lisbon. Through a literature review, the authors list 22 entrepreneurial skills that reflect relevant skills. The results show that all related competencies were developed by the students, and the competencies innovation, time management, responsibility, digital skills, trust, initiative capacity and organizational change presented a significant level of development. They also point out that the method is effective, especially when evaluated in knowledge retention and long-term application, and they indicate that its use has significant potential in the development of entrepreneurial skills that should be further developed (Sousa & Costa, 2022).

Hogue et al. (2011) applied the PBL in the Games Development and Entrepreneurship Program of Information Technology at the "University of Ontario" Institute of Technology to facilitate cognitive learning processes by allowing students to learn through experience. Evaluations indicate that the approach was successful, particularly with regard to students' grades, attitudes and perceptions. Students show greater motivation, determination and enthusiasm since the introduction of the method.

Wee (2004) implemented PBL in the 'Entrepreneurship Practice' module with 65 Marketing students. Students worked in small groups to develop real work situations. With the development of the methodology, students have felt effective and acquired knowledge that can be applied to real work situations, as well as developed process skills for their professional practice. They pointed out that, in the future, improvements are needed in communication on assessment and learning outcomes. According to the authors, the PBL adapts well to teaching and learning education for entrepreneurship because it aims to equip students to be able to 'do' rather than 'know'.

In the three studies, it is noted that the PBL was used to allow the student to experience concrete entrepreneurial situations, making it possible to experience real problems found in the organizational environment. For Wee (2004), boosting entrepreneurial education provides authentic learning, in which students learn by managing situations they are likely to face in their professional practice, preparing them to act effectively. Sousa & Costa (2022) link the PBL methodology with the potential for developing skills needed by organizations and in the context of real life. While Hogue et al. (2011) seek in the PBL an opportunity to maintain a balance between the skills desired by the sector, theoretical knowledge and critical analysis, thus ensuring that the concepts learned were linked to a sector-specific scenario.

The studies also point out that the PBL contributes to the development of entrepreneurial skills, such as innovation, time management, responsibility, digital skills, trust, initiative capacity, organizational change (Sousa & Costa, 2022), motivation, determination, enthusiasm

(Hogue et al., 2011), problem solving, autonomous learning, analysis and synthesis of information(Wee, 2004). Finally, we see that the PBL has significant potential in the development of entrepreneurial skills (Sousa & Costa, 2022; Hogue et al., 2011), and adapts well to entrepreneurial education, providing students with opportunities to experience theory and practice (Wee, 2004).

3.3 *Serious games*/ Gamification

Despite being similar, *Serious games and Gamification* are different concepts. As the analyzed studies involved the two methodologies in the same study, in this study they will be considered in a single category. While gamification defines the use of game design and principles in non-game contexts, *serious games* enable students to experience real-world situations that would be impossible in the real world due to considerations of security, cost, time, and other factors. Serious *games* also have the ability to demonstrate the association and application of concepts and skills that can be difficult and impossible to explain in words and gamification techniques can involve students in activities and training scenarios that can stimulate their motivation, increase their engagement and, above all, increase their interest in learning, experience and knowledge building (Grivokostopoulou et al., 2019; Pérez-Pérez et al., 2021)

Antonaci et al. (2015) consider that the concept "*serious games*" is within "gamification":

> "Innovative educational strategies such as gamification (Deterding, Sicart, Nacke, O'Hara and Dixon, 2011) and collaboration (Pozzi & Persico, 2011) can effectively contribute to improving and sustaining education for entrepreneurship and that, in particular, *serious games* can be considered powerful tools for this purpose."

The business simulation game developed by Tata Interactive Systems (2007) is an example. In it the teams go through seven phases, being: 1) Team formation and game briefing; 2) Getting information: the idea of the business is checked for practicality; 3) Business plan; 4) Start-up: decisions on the constitution; 5) Market entry/competition: the competition takes place in the period of 2 years; 6) Conclusion/evaluation of success: winner is the team that achieves the best performance by one or a combination of criteria; 7) Debriefing: held individually and in team (Kriz & Auchter, 2016).

For Pérez-Pérez et al. (2021) *serious games* can become a powerful tool for determining what entrepreneurial and managerial skills students lack, providing a fuller education and stimulating entrepreneurial intent. It also allows the student to understand the difficulties faced by entrepreneurs.

The study by Pérez-Pérez et al. (2021) was conducted with students of the Bachelor's degree course in Business and Management at a University in Spain, in the optional discipline "Business games", which aims to provide students with a practical environment to apply and develop professional skills. In groups, students participate in a *serious game* simulation, to develop and implement knowledge previously acquired during their studies and develop entrepreneurial skills such as interaction, leadership and initiative. As results, the authors indicate that *serious games* are not the appropriate tool to boost entrepreneurial intent, but is indicated to develop entrepreneurial and management skills.

Grivokostopoulou et al. (2019) developed the study with 86 university students distributed in 2 groups (A and B) of 43 students. Conventional learning method (textual

presentations) was used with group A and gamified learning method was used with group B. Thus, an innovative 3D virtual reality educational environment was formulated, providing immersive and efficient learning in real environment, through simulation. The results indicate that gamified learning activities are efficient, increase student motivation and help in the formulation of entrepreneurial mindset, skills and competences.

Kriz & Auchter (2016) provided students with a simulation of real-world environments through games. Over 10 years, more than 1200 German university students participated in the study. The entrepreneurship simulation game focuses on startups and realistically simulates the various stages of opening up these businesses, the main objective has been the simulation of startups and the support to the acquisition of professional skills and knowledge for entrepreneurial and management activities, as well as the motivation of students to launch startups. The results show an increase in knowledge and business planning skills that are needed for management and entrepreneurship, as well as an increase in the ownership rate of startups and self-employment.

Antonaci et al. (2015) created a gamified learning experience for the entrepreneurship course at universities in Italy, Spain and the Netherlands. The group activities enabled the student to run their own business and make decisions to support their growth. Competition and collaboration among students were among the pillars of learning interventions and proved to be good sources of internal and external motivation and significantly increase engagement in learning tasks. The educational approach adopted in the project proved to be effective. Its results were positive in terms of acquiring knowledge and accepting students, due to the novelty, interactivity and possibility of collaborating and competing with each other. Competition and teamwork were the main motivators.

As can be seen, the method is used to simulate real environments for students. Pérez-Pérez et al. (2021) point out that their study sheds light on the effects of learning by experience, in this case through a business game, while Grivokostopoulou et al. (2019) point out that gamified activities involve students in real situations requiring them to put theoretical knowledge into practice and Kriz & Auchter (2016) complete that business simulation teaches the skills believed to be necessary for successful task management in a new company.

Regarding *serious games* and gamification, the authors agree that they are effective educational tools that impact student learning, increase knowledge, confidence and entrepreneurial skills (Antonaci et al., 2015; Grivokostopoulou et al., 2019; Kriz & Auchter, 2016). Pérez-Pérez et al. (2021) point out that *serious games* develop entrepreneurial skills, but they are not the best tool to drive entrepreneurial intent. The competencies presented in the study results were interpersonal relationship, leadership, initiative (Pérez-Pérez et al., 2021); teamwork, decision-making, confidence, self-esteem, self-efficacy (Grivokostopoulou et al., 2019); entrepreneurial attitude, motivation, management knowledge and business planning skills (Kriz & Auchter, 2016); knowledge, competitiveness, teamwork, motivation (Antonaci et al., 2015).

3.4 *Service Learning* (SL)

SL is a methodology based on John Dewey's theory of experiential learning, which seeks to develop academic skills and increase reflection while providing community service to meet social needs. SL allows the student to develop activities together with the community, favoring the development of personal, professional and social skills and fosters innovative and entrepreneurial learning experiences (Maravé-Vivas et al., 2021). The authors do not describe in the article how the SL methodology is developed.

Maravé-Vivas et al. (2021) developed a study with students of the discipline "Fundamentals of body language: motorized games in children's education", which aims to develop content in the area of physical education, essential to promote the integral development of children. Students worked in groups developing a project aimed at children with functional diversity and/or in situations of social exclusion. The project proposed in the study brings the participating students closer to the professional environment. Through the results obtained, they show that the applied SL program is a useful tool for the development of social entrepreneurship skills. Among the most prominent skills is the ability to take risks and the ability to learn and evolve. (Maravé-Vivas et al., 2021).

3.5 *Design Thinking* (DT)

DT is an initiative of Stanford University, started in the 1980s, that provides a human-centric and problem-based approach, usually grounded in the designer's tacit knowledge. In the context of contemporary entrepreneurship, DT becomes valuable because it allows the new venture to originate from the identification of relevant needs of a given public of interest to the entrepreneur (Daniel, 2016).

Pietrovski et al. (2019) describes the DT in three stages: (i) immersion: which seeks the identification of the problem to be solved, information about customers, products, markets and competitors; (ii) ideation: which consists in the use of methods and techniques of generating ideas; (iii) prototyping: for the prototyping of the business idea in several stages of the process, allowing circular flows of analysis and synthesis of the business idea.

The study by Pietrovski et al. (2019) was conducted with 31 students enrolled in the higher courses of Marketing, Financial Management, Commercial Management and Foreign Trade in the distance mode at a University Center in the city of Curitiba (Brazil). The authors integrated DT and Canvas techniques with Kolb's experiential learning model (1984). The results indicate that the combination of the methods helps students develop their entrepreneurial potential. The development of entrepreneurial potential implies the potentialization of business creation, the development of the capacity not to invest in businesses that do not present clear opportunities for economic, social and environmental success and return.

In the Linton & Klinton course (2019), students are encouraged to develop new solutions to a problem and practice identifying entrepreneurial opportunities. The authors use DT in conjunction with Neck & Greene's approach to methods, which, according to them, is a way to focus more on creating opportunities, rather than assuming that ideas exist and the entrepreneur just needs to act on them. The results indicate that the students learn in an improved way by reflecting, throughout the course, about their development and presenting an improvement in the quality of the ideas. This discovery may indicate that when students care less about the outcome and focus on the process, the outcome may be more positive. The reflections also help students connect practical knowledge with understanding the theoretical perspectives of entrepreneurship.

Dos Reis et al. (2019) present the entrepreneurship course, "7600001 - Innovation and Entrepreneurship", developed at the University of São Paulo (USP) by the Innovation Agency of the University of São Paulo (AUSPIN, 2017), together with other institutions promoting entrepreneurship, in which students fully experience the initial cycle of creating a new business. The course is composed of a combination of DT, Lean Startup, and Business Model Canvas. The results point out that entrepreneurial education through active methodologies enables the student to experience and appropriate knowledge, since it must be placed in a context for the development of new products and services from the opportunities identified together with the

clients, connecting different responses in order to establish the general logic of the business model. It also requires students to work in multidisciplinary teams and ultimately face the high complexity involved in structuring a new business. This new form of entrepreneurship education, with project-oriented learning and the assumptions developed, has been found to lead students to experience a new set of educational experiences.

Bosman (2019) uses four *frameworks* that are systemic thinking, DT, value proposition canvas and business model canvas, to build a teaching approach that demonstrates the integration of doing (artifact development) and thinking (reflection). Bachelor's students in transdisciplinary studies in technology from a University in the Midwest participated in the study. Overall, the results suggest that students were able to recognize that design-focused tools and learning activity were important outside the classroom, particularly in relation to preparing the workforce and securing future jobs. In addition, students were able to reflect on how they could do things differently in the future. The study and reflections suggest that this immersive process encourages deeper transdisciplinary thinking within the design and innovation workspace.

Aranha et al. (2018) developed an Entrepreneurial Dynamic Learning (EDLE) tool that integrates active learning, DT, and Bloom's Taxonomy, with the aim of developing entrepreneurial skills in undergraduate engineering students at a Brazilian public university. The results indicate that the operationalization of the EDLE tool favored and fostered the development of students' entrepreneurial skills. The authors suggest that the entrepreneurial skills that must integrate into engineering education are vision, leadership, energy, recognition and evaluation of opportunities, hearing and argumentation, networking, problem-solving and innovation ability, self-efficacy, knowing how to work as a team and teach others.

Daniel (2016) developed his study with 66 undergraduate students from five different courses: engineering and industrial management (13), economics (43), languages and business relations (1), biology (1) and management (8) from the University of Aveiro, Portugal. The main objective was to promote the development of an entrepreneurial mindset among students. The choice of the DT method was due to its socio-constructivist approach from education to entrepreneurship. This program comprised three main phases: entrepreneurial awareness, development of entrepreneurial skills and practical projects. The results point out that the DT method was valuable in promoting an entrepreneurial learning environment in which students could mainly govern their own learning process.

According to Nielsen & Stovang (2015), the proposed teaching model, DesUni, offers a significant paradigm shift in entrepreneurial education for University students. It proposes that the processes involved in design can be used to develop students' creative ability and analytical skills. The results show that the proposed model offers a unique way to integrate creativity, future processes as an integral part of entrepreneurial education. It involves teaching that creates new connections among knowledge, problems and solutions, students and stakeholders, in a collaborative, emphatic and creative way. The DesUni model is interdisciplinary, reflecting educational principles of autonomy, which can be easily associated with the act of undertaking.

The studies grouped in this category, on the one hand, use DT as a teaching method (Daniel, 2016; Linton & Klinton, 2019; Nielsen & Stovang, 2015), and, on the other hand, address it in conjunction with another methodology or technique (Pietrovski et al., 2019; dos Reis et al., 2019; dos Reis et al., 2018). Studies by Aranha et al. (2018), Daniel (2016), dos Reis et al. (2019), Linton & Klinton (2019) and Nielsen & Stovang (2015) sought to describe the methods created and how they were applied; while studies by Bosman (2019), Pietrovski et al. (2019), in addition to the method, analyzed participants' perception of the method used.

The studies analyzed use DT as a teaching method, seeking the interaction of the student with real situations of entrepreneurship. For Pietrovski et al. (2019), experiential learning and DT techniques tend to empower people who are involved with the business and generate a positive effect on the business itself. Linton & Klinton (2019), for their part, argue that the entrepreneurship process is not linear, so this experimentation and real-world interaction of users and customers with feedback, is important in combination with reflection exercises. Dos Reis et al. (2019) focuses on the detailed understanding of the reality experienced by the end customer to generate innovative ideas, capable of resulting in differentiated projects. Bosman (2019) seeks to make students think about learning holistically, allowing the connection between classroom learning and the specific context of work. For Daniel (2016) the role of experimentation cannot be underestimated in education for entrepreneurship.

The authors are unanimous in reporting the effectiveness of the proposed methods: dos Reis et al., (2019) state that based on student evaluation and the quality of the projects delivered, the method has proven to be suitable for promoting entrepreneurship education; Bosman (2019) notes that, overall, the results suggest that students were able to recognize why design-focused structures and learning activity were important outside the classroom, particularly in relation to workforce preparation and securing future jobs.

Another issue addressed in the articles is entrepreneurial skills. Linton & Klinton (2019) find it difficult to assess whether students acquire more or less entrepreneurial skills with the new course; however, they note that students come out with a different set of entrepreneurial skills that are more focused on creativity, collaboration and problem solving. Pietrovski et al. (2019) report that the method allows students to reflect, plan and control, risk analysis, teamwork, continuous learning process. The studies by dos Reis et al. (2019) and Nielsen & Stovang (2015) do not address this issue.

3.6 Flipped classroom

For Qin et al. (2020) the Flipped Classroom is designed to provide the student with resources to build knowledge, initially with personal skills and, at a second moment, in a more targeted manner, thus being a deep learning. It is a process in which the student critically learns new ideas, based on the understanding of learning, and transfers existing knowledge to new situations, in search of solving more complex problems. This innovative learning is supported by stakeholder involvement (Secundo et al., 2021). Flipped Classroom is integrated into the process of entrepreneurial education, promoting autonomous learning and dealing creatively with problems.

The method includes three steps where the student and teacher have tasks to fulfill. Qin et al. (2020) describes the process as follows: 1) before the class: the teacher determines the resources and designs activities according to the teaching objectives, making available on the platform. The student, in turn, uses the resources made available and carries out the activities, participating in discussions; 2) during the class: the teacher evaluates the knowledge acquired by the student, organizes lectures and discussions, answers questions and summarizes the content, the student participates, taking advantage to take questions and make notes; 3) after the class: the teacher organizes the doubts and tests and assigns extended activities, completes the task and expands the knowledge. All stages should be evaluated by the teacher separately.

The study by Secundo et al. (2021) demonstrates how an active entrepreneurship program within the University of Salento Laboratory (Lecce, Italy) can represent a favorable context for generating intentional and unintentional knowledge flows. For the authors, the interaction among students, academia, companies and institutions, created by the lab, supports

the identification of opportunities and the generation of ideas through a deep dissemination of unintended information flows, knowledge, skills and experiences. The lab's mission is to develop the entrepreneurial mindset, creativity and innovation in students. The results demonstrated the crucial role of CLab@Salento for knowledge dissemination, in which processes such as business ideas presentation, open innovation challenge, workshop, business projects, business game are important vehicles for effective knowledge transfer in an entrepreneurial ecosystem.

Qin et al. (2020) study with 348 entrepreneurial education students from a Shanghai college. They were divided into a research group (Flipped Classroom) and a control group (traditional education). The results indicate that the two groups had the same performance. Therefore, the application of Flipped Classroom can achieve the goal of deep learning, which is very significant for improving the effectiveness of entrepreneurial education (Qin et al., 2020). Thus, this work believes that the method offers students autonomous learning possibilities and internalization of knowledge.

Secundo et al. (2021) present the importance of the student's approach to the entrepreneurial ecosystem and Qin et al. (2020) are concerned with presenting the importance of student autonomy for the generation of knowledge. For the first, it is clear that CLab@Salento has contributed to the local ecosystem in terms of *spillovers* of knowledge. The close interaction between students, academia, companies and institutions has created a favorable environment that has enabled the identification of opportunities and the generation of ideas through a deep dissemination of knowledge, skills and experiences among all students. The second shows that, through the process of inverted teaching, the goal of deep learning can be achieved ideally, in the process of entrepreneurial education for university students.

Regarding entrepreneurial skills, Secundo et al. (2021) present that their initiative aims to create entrepreneurial skills and behaviors in students through *knowledge spillover* mechanisms, as well as providing inspiration, self-knowledge, development of creativity and critical thinking. For Qin et al. (2020), entrepreneurial education should not only teach students the skills needed to start a business, but also convey how to strengthen their entrepreneurial awareness. Entrepreneurial motivation is the product of the interaction of individuals and external factors.

3.7 Project-based learning (PBL)

PBL is a student-centered teaching-learning methodology. Organized into work teams, students approach a real problem to try to provide a solution by combining theoretical knowledge with developing skills, attitudes, and competencies essential to good professional performance. Participating students identify opportunities and develop innovative solutions (Ruiz-Rosa et al., 2021). For Pal'Ová et al. (2020), the method should involve i) authenticity, ii) challenging problem or question, iii) ongoing research, iv) student voice and choice, v) student opinion and choice , vi) reflection, vii) critical review, viii) public product.

The research of Ruiz-Rosa et al. (2021) involved a total of 90 students enrolled in the discipline of Planning and Financial Control of the Bachelor in Accounting and Finance course. The results indicate that, after participating in the project, the degree of acquisition of skills included in the discipline has increased considerably, being the most developed in the perception of students, initiative and development of the entrepreneurial spirit. This demonstrates that associating teaching content with practical real-world business experiences promotes not only better knowledge assimilation and increased motivation of students in their

learning process, but also a greater entrepreneurial attitude. There was also a greater engagement of students in the activities, directly impacting the approvals of the discipline.

Pal'Ová et al. (2020) conducted a study with 117 students, providing participants with the opportunity to implement their knowledge, skills and experiences to solve practical problems. The results show that PBL and the virtual laboratory supporting entrepreneurship education through electronic tools are useful ways of developing entrepreneurial skills.

Shahiwala (2017) sought to design, implement and evaluate a project-based activity in the pharmacy administration course. 72 students took part, divided into groups, defined by the participants themselves, to develop the project for opening a pharmacy. Based on the results, the methodology met the goal of developing entrepreneurial attitudes and skills. This activity develops in students the awareness of the need to develop business project proposals and subsequent presentation to financial sources while working in a team.

Álvarez García, (2013) focuses on creating a professional working environment that meets the real needs of the institution in which education is provided. By setting up a professional environment that poses real and specific problems and objectives for each discipline and group of students, the teacher adapts the demands of a real client to the strategies included in the didactic guide, in terms of activities. Information and Communication Technologies are essential tools. The results indicate that learning happens in such a way that the student can adapt to the demands of the labor market and the required skills, favoring entrepreneurial attitudes and skills.

Botha, (2010) presents a practical teaching method applied to a large group of students and students' perception of the entrepreneurial knowledge and skills acquired, as well as other critical thinking skills and teamwork arising from the project. The research was conducted with 1500 students enrolled in the Entrepreneurship course. Based on empirical results, PBL is an effective method of teaching entrepreneurship to a large group of students. It also highlights the fact that certain entrepreneurial skills can be taught and this can be done using more creative pedagogies than traditional classroom teaching. It also illustrated how entrepreneurial skills can be acquired by a large group of students if a practical approach is used.

Okudan & Rzasa, (2006) discuss the evolution of the Entrepreneurial Leadership course (ENGR 310), which is one of four core courses at Pennsylvania State University (Penn State). The course, developed with the PBL method, has two focuses: (1) leadership skills development, which uses concrete experience, reflective observation, abstract conceptualization and active experimentation; and (2) business plan development and implementation, which mainly uses active experimentation. 22 students took part in the focus group. The results attest to the success of the course: (1) All teams that completed the construction and sale project made profits. (2) Most of the students in the class, who were not graduating, decided to enroll in the Entrepreneurship course.

The articles highlight the applicability in real context, simulated or not. Ruiz-Rosa et al. (2021) show that associating the teaching of content with practical and real experiences in the business world, in addition to a better assimilation of knowledge and an increase of motivation in the student's learning process, potentiates a greater entrepreneurial attitude. For Pal'Ová et al. (2020), the participants' practical experience with the projects is among the most important results of both courses. Botha (2010) adds that entrepreneurship is seen as a course that cannot be taught without a practical approach. PBL is dynamic and active, involving students in exploring real-world problems and challenges while developing cross-curricular skills, working in small collaborative groups (Shahiwala, 2017).

The authors attest to the effectiveness of the applied method as well as the increase in the approval percentage (Ruiz-Rosa et al., 2021). Pal'Ová et al. (2020) claim that students

assessed the benefits of the courses and the practical experience gained during participation very well. For Álvarez García (2013), Botha (2010) and Okudan & Rzasa (2006), PBL is an effective method of teaching entrepreneurship, favoring entrepreneurial attitudes and skills.

In relation to the entrepreneurial skills developed there are competences related to financial management and entrepreneurial spirit (Ruiz-Rosa et al., 2021); vision, creativity, assessment of ideas and sustainable thinking, financial and economic management, mobilization of resources, learning through experience, working in a team, planning and managing, dealing with ambiguity, uncertainty and risk (Pal'Ováet al., 2020); entrepreneurial competence, knowledge in management, interest, trust (Álvarez García, 2013; Shahiwala, 27); presentation skills and communication, entrepreneurial application, teamwork; creativity and innovation, preparation for testing and exam, knowledge of entrepreneurial skills (Botha, 2010); leadership, motivation, innovation, communication skills, teamwork and business plan development, and developing knowledge and skills to stimulate entrepreneurial behavior (Okudan & Rzasa, 2006).

4 Discussion

This article aimed to analyze how national and international scientific literature has portrayed the use of active methodologies in the classroom in higher education institutions for entrepreneurial education. To do so, 23 articles on the theme were analyzed, selected through systematic procedures in the Scopus database, the majority (82.6%) of which have been published in the last 9 years. It is perceived that there has been a growing interest in the theme over the last three years. The majority of the articles were published in *journals* from the areas of Education (8) and published in Europe (60%). The areas that most utilized the methodologies were Entrepreneurship, Technology and Finance, followed by Administration, Marketing and Engineering.

The articles analyzed, were categorized by the active methodology applied in the study, being the categories identified, PBL - 3 articles, *Serious games* and/or Gamification - 4 articles, SL - 1 article, DT - 7 articles, Flipped Classroom - 2 articles, PBL - 6 articles. The categories DT (7 articles - 30.43%) and PBL (6 articles - 26.09%) were the methodologies with the most studies. DT, is a new tool in relation to the others, mainly in the area of entrepreneurship, which can justify the more recurrent use in relation to the others. **In each one of these categories, one presents, in an integrated manner, the objetive application of the active method, the analysis of the method efficiency in the perception of the authors, as well as the results in common found in the articles.**

The main objectives of the application of the active methodologies in the classroom for teaching entrepreneurship, found in the studies, are divided into: identifying the effectiveness of the method for developing entrepreneurial skills (9 articles); presenting the effectiveness of the method in teaching entrepreneurial education (8 articles); proposing a teaching-learning tool based on active methodologies described in the literature (5 articles) and identifying the influence of the active methodology on entrepreneurial intent (1 article). In all the articles, the authors highlight the application of active methodologies to allow the student to experience real entrepreneurial situations, making it possible to experience problems encountered in the organizational environment. Among the main results found in the articles is that the application of active methodologies favors the development of entrepreneurial skills, the most cited being teamwork, motivation, knowledge in management, trust and creativity.

Finally, the words most present in the documents, title, abstract, objective, conclusion were focused. As a result, the following terms are highlighted: entrepreneurial mentality, entrepreneurial potential, skills and competences.

5 Concluding Considerations

It is observed that teaching-learning of entrepreneurial education through active methodologies has arisen the interest of teachers in recent years, corroborating with (Fayolle, 2013) as regards the commitment of teachers by new teaching methods in the area. Although there is interest, there are still research gaps. The articles analyzed in this review point out that the use of these active methodologies has developed in students entrepreneurial skills, which are competencies considered fundamental in the contemporary context. However, it is noted that the variables for measuring the effectiveness of the methods can be considered inconsistent. What happens are isolated attempts to teach entrepreneurship differently. There is no consensus on which method to use or even prior study by teachers when teaching the subject (course, program), are choices made based on the practical knowledge. It is important to build a conceptual basis for these changes to be solid, bringing entrepreneurship closer to education.

Robust empirical studies, with methodological rigor, described in detail so that they can be replicated, would be a step towards an effective analysis of these methodologies in entrepreneurial education. In this sense it is relevant to broaden the discussion about pedagogical innovations in entrepreneurial education, through the active methodologies thus favoring the academic, institutional and social context. We stress that this should be a joint action between teacher and institution, since it demands multidisciplinary efforts.

Suggestions for future research include empirical articles aimed at verifying the efficiency of active methodologies in entrepreneurial education, as well as their ability to develop entrepreneurial skills, as pointed out in this research, or replicating the studies cited for further study. The expansion of the study to other databases suitable for literature review purposes as pointed out by Gusenbauer & Haddaway, 2020). Comparative studies of the application of the method between countries can also be carried out. Apply the method proposed by Neck & Greene (2011) exclusively. And finally, to carry out studies that take into account the Brazilian context and its specificities.

It should be noted that this research was limited to a database, Scopus, carried out on the basis of published articles, defined with methodological rigor, but not portraying everything that exists on the theme. This limitation should be considered when reading the article.

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