

# Mapping of scientific production on design thinking as a tool for entrepreneurship education: a bibliometric study of a decade

Scientific  
production on  
design  
thinking

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## Abstract

**Purpose** – Design thinking (DT) is still a relatively new methodology in the context of entrepreneurial education, which presents itself as an important tool for the development of entrepreneurial skills when inserted into the educational system. This research aimed to analyze studies about DT related to the entrepreneurial mindset in international journals over a period of ten years (2009–2019). Entrepreneurial education has been a constant in academic debates as well as practices and methodologies to apply this education, and such context has moved educational institutions to adopt practices and initiatives focused on the theme.

**Design/methodology/approach** – The tool used in the present study was the bibliometric database of the Web of Science through the words “Design Thinking” (DT) and “Entrepreneurial Education”. The research is characterized as descriptive and quantitative, and 146 publications were investigated in the period from 2009 to 2019, in the respective database.

**Findings** – The study also highlighted the new generation of young students forcing a change in education with an approach centered on the individual. Speech does not prevail in the teachers but in the students, and the teacher educator starts to collaborate for this new educational demand with didactics relevant to the world in this way preparing these young people and delivering society to critical, proactive and participatory individuals.

**Originality/value** – In the course of the study, we observed practices and examples of schools and universities that have adapted ways to allow new interactions in the school environment by promoting and encouraging innovative education.

**Keywords** Design thinking, Entrepreneurial education, Bibliometric study

**Paper type** Literature review



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## 1. Introduction

In the dynamic of the competitive market to which we are inserted an entrepreneurial education to our young people becomes relevant. In this way, continuous learning presents itself as an instrument of transformation with integration practices with an emphasis on interdisciplinarity under a systemic perspective. According to the studies presented in this research the methodology design thinking (DT) is shown as an effective tool in the teaching of entrepreneurship through an entrepreneurial education.

For [Schaefer and Minello \(2017\)](#), individual entrepreneurial is the act of innovating in the evolutionary process of the contemporary world, capable of solving problems and absorbing opportunities, attributing this subject as agent of change. Entrepreneurship understanding through several researches has been characterizing it not only as a way of knowing, but also as a way of being ([Schaefer and Minello, 2017](#)).

In this perspective, in several studies there is a consensus that the most effective way to teach entrepreneurship is to live through practices and dynamics based on the real world facts of organizations. In this way, entrepreneurial education has been the lever of many economies. Schools have fundamental information and intellectual capital for research that allow the search for understanding and formulation of a better relationship between teaching, work and science ([Silva et al., 2018](#)). Therefore, it is impossible to study educational institutions as entities displaced from the entire social context in which we individuals are inserted.

As an alternative, entrepreneurial education appears to promote creativity to overcome the changes and competitiveness imposed by globalization, capable of placing the university in front of society, reinforcing its teaching function but also promoting development through knowledge, innovation and entrepreneurship ([Hägg and Schölin, 2018](#)).

In this same perspective, recent studies corroborate the efficiency of DT, facing employability skills, learning and development of professionals, in strategic growth and also in entrepreneurial education ([Nielsen and Stovang, 2015](#); [Lewis et al., 2017](#); [Phusavat et al., 2018](#); [Liedtka and Kaplan, 2019](#); [Ornellas et al., 2019](#)).

In the most disruptive business in the world, the method is present integrating organization, technology and innovation, having human as the process center and the concern to understand its needs. In this context, the ability to innovate has been a tool in all segments because society expects universities to deliver proactive and creative individuals to work for the community.

From this point of view, the DT theme comes against this new complex, dynamic and innovative scenario where entrepreneurial education has the capacity to promote the student's entrepreneurial behavior in order not only to face the challenges presented by the job market, but also as a way of awakening and encouraging the capacities to meet the most diverse demands or adapt an existing service ([de Castro Krakauer et al. 2015](#)).

The methodology starts with skills that designers have learned over the course of several decades to match human needs with technical resources available considering the practical constraints of the business. By integrating what is desirable from the human point of view to the technologically and economically viable, designers have managed to create products that we enjoy today ([Brown, 2010](#), p. 3).

Opening possibilities, collaboration and thinking outside the box, facing the role of education and discussing approaching pedagogical practices, by aiming innovative schools in the USA, in the Silicon Valley, the School Design Tech in the Silicon Valley, California and developing in its students the skills of the 21st century uses DT.

Under this approach [Glen et al. \(2014\)](#) argued that the paradox of design rationality lies in the fact that the problem is not defined before solutions. For them the problem must be well defined. Design learns about the problem by trying solutions, and not in a *priori* way as usually happens, designers have this facility, since the projects are changed through prototypes along the same and built in the practice of the way ([Glen et al., 2014](#)).

The authors also pointed out that DT can easily redefine its objectives, among many thoughts and plans not all generate action, so the problem is studied and known in all respects. Designers do not only use traditional rational techniques, they use tools and methods that cannot always be translated into words, which are expressed through sketches, models and prototypes (Glen *et al.*, 2014).

DT has been propagated in the academic world because they have a competence to work in an interdisciplinary way helping students to see in practice a method of problem solving for their future professional problems. Also, evaluating the approach of DT that brings the conception with a differentiated way of perceiving reality brings light to the discussion as a systematic perspective.

In the same vein, the importance of sustainable development in the global context is highlighted, which, in addition to the complex challenges inherent to the path of sustainability, there is still a need for companies to adopt management models that bring effective results with creativity and the ability to relate where the individual is at the center of that dynamic. For this, it is necessary to train entrepreneurs focused on sustainability and support experiences with design standards in the business models (Kurucz *et al.*, 2017; Schaltegger *et al.*, 2016; Upward and Jones, 2016).

In this context, considering the relevance of both themes, this study aimed to verify intellectual productivity in the area of DT applied to entrepreneurial education through a bibliometric analysis, seeking to evaluate the productivity of researchers as well as the level of concentration of this production.

This article is divided into five sections, started by this introductory approach. Next, section 2 presents a review of the literature, in which entrepreneurship and entrepreneurship education are studied. Section 3, methodology, addresses the means of research employed during the current study. Results obtained are presented if discussed in the section. 4. Subsequently, in section 5, the final considerations of the study are reported, and finally in the section are presented bibliographical references used in the research.

## 2. Theoretical foundation

### 2.1 *Thinking design and scientific production indicators*

DT, according to Mello (2014), can be defined as a methodology that aggregates a set of tools capable of awakening at the school level a culture of collaboration, where the alternatives are constructed together. For the author, this process allows a change in the attitude of educators, because the construction of pedagogical practices occurs through group experiences. The discipline DT applied in education offers a platform with several strategic practices that allowed encouraging innovative initiatives, enabling teachers and students with the development of significant solutions (Mello, 2014). According to Nitzsche (2012), the thought and methodology design tangence a thought, an intention, being able to transform problems into solutions in the school environment through the construction and deconstruction, using the prototype.

According to Oliveira (2017), real knowledge about entrepreneurship takes place through practical experiences with the market reality and the actors involved in the context, all the paths of entrepreneurial learning lead to a practical approach. From this point of view, DT offers the great differential to entrepreneurial education since raising questions, proposing dynamics and promoting challenges are methodologies adopted by DT, going to the greatest meeting of the teaching of entrepreneurship that is to ascertain look and perception in a context of behavioral characteristics entrepreneurs. The simplified model of the DT methodology can be visualized in Figure 1.

Given this context of exigencies Rocha *et al.* (2013), characterized the process of teaching learning should occur integrated with social experiences experienced by students, which will

**Figure 1.**  
Thinking design model  
for education



**Source(s):** Instituto Educadigital (2014)

lead them to participate actively in this process, expanding both their creative abilities and their look at differences, which should be seen as positive, since they enrich the creative processes.

Still in this perspective [Glen \*et al.\* \(2014\)](#) corroborated that today's organizations embedded in highly competitive, complex and turbulent environments need managers who combine analytical reasoning with skills linked to creativity and innovation. The author links DT to cognitive skills through recent studies of human cognition, a cognitive process that facilitates adaptive reasoning and showed how design methods align with adaptive reasoning in the real world context. The design methodology includes in its approach, not only material objects, but also symbolic objects, working with the visual through cognitive strategies demonstrating the theory in practice for problem solving ([Glen \*et al.\*, 2014](#)).

Also, according to [Oliveira \(2017\)](#), the DT methodology as an experiential learning method thus offer positive contributions to the teaching of entrepreneurship, through the practical exercises of DT where entrepreneurship is built in practice through innovative ideas. Behavior and posture of the entrepreneur demands to overcome challenges with innovative solutions, create opportunities through obstacles and overcome challenges is one of the main virtues of an entrepreneurial individual and this is achieved through experimentation and team building exercises that DT provides ([Oliveira, 2017](#)).

### *2.2 Entrepreneurial education and indicators of scientific production*

In the last decade, there has been an increase in studies related to entrepreneurial education. Soon this education has been the subject of several studies that emphasize the entrepreneurial culture as a tool for the economic and social development of a nation.

For [Lima \*et al.\* \(2015\)](#) entrepreneurial education goes beyond the development of skills and knowledge, generates innovation and possibilities not previously seen by students presenting different ways of undertaking. The importance of entrepreneurial education is evidenced not only in front of business initiatives, but also in their jobs, where they are inserted, either in the university or in the work, finally, generating innovation or exploring needs that the market presents, promoting development of the entrepreneurship ([Zampier and Takahashi, 2014](#)).

[Schaefer and Minello \(2017\)](#) corroborated that teaching of entrepreneurship must focus on the knowledge centered on the individual and acquisition of know-how and expertise developing this entrepreneurial education with the intention of manifesting the entrepreneurial being through a new form of education. According to [Dolabela \(2003\)](#) the

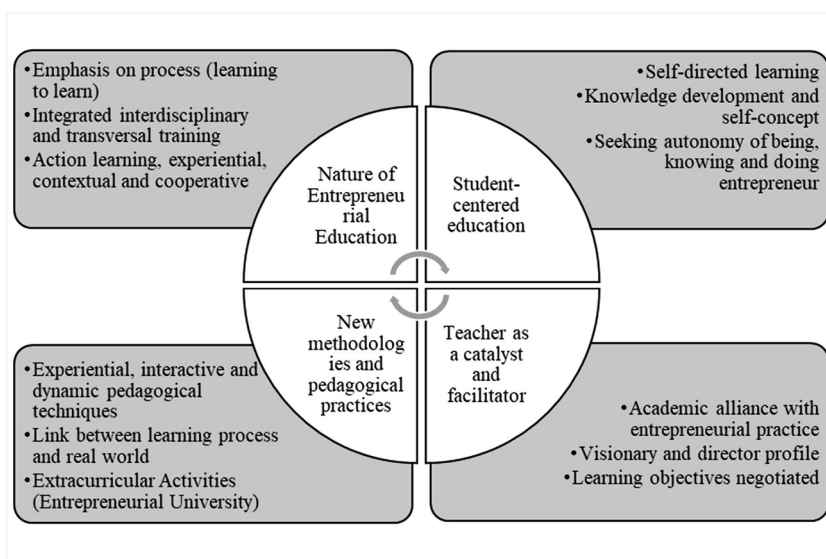
action of an individual's undertaking comes from learning and being proactive in a continuous process of self-creation, and the knowledge to undertake for the author goes far beyond contents and theories.

Entrepreneurial education builds an individual's relationship with himself and the world, thus strengthening entrepreneurial values in society, generating value for society through the ability to innovate, autonomy and ease adaptation to changes that are strong traits of entrepreneurs (Dolabela, 2003). The author in The Dream Entrepreneurial Theory, in his study "The Secret of Luisa", attributes the entrepreneurial spirit in several activities as a public service, in the third sector and also in personal activities. Entrepreneurship has been discussed in the field of education increasingly from year to year. Therefore, there is an imminent need to review innovation ideas in the educational sector in the face of a new reality in which students are increasingly required by labor market with proactive abilities developed. In Figure 2 it is possible to visualize a model of characteristics of the entrepreneurial education:

According to the figure the authors emphasized the entrepreneurial education as experiential and experiential through extracurricular activities that allow the experience and the contact with real situations, where the center is the student and the teacher assumes the role of facilitator. In this model of education, the individual ally with theory aligns theory with practice, developing perceptions of him and the world in which he lives through attitudes and behaviors instigated by the pedagogical practice of entrepreneurial education (Schaefer and Minello, 2016).

### 2.3 Recent studies on design thinking in the context of entrepreneurial education

Through a bibliographic review it was possible to find studies that have already approached the theme of DT in the context of entrepreneurial education. Daniel (2016) in his study "Promoting an entrepreneurial mindset using a design thinking approach in entrepreneurship education" Bringing design thinking to the teaching approach in entrepreneurship education During the 2012/13 school year, a new curricular unit of one



Source(s): Schaefer e Minello (2016)

Figure 2.  
Entrepreneurial  
education  
characteristics model

semester was offered to 66 undergraduates in five courses, using a teaching methodology adapted from the DT process. The assessments of the students of the unit were elicited through a questionnaire at the end of the semester. The findings suggested that DT has positively influenced the promotion of an entrepreneurial mindset, its motivation and its satisfaction with overall performance. The author's research was a case study.

Val *et al.* (2017), in his research "A design thinking approach to introducing entrepreneurship education in European school curricula" examined the basic principles of DT as a promoter of entrepreneurial skills and abilities in schools. The authors reported the promotion of entrepreneurship in Europe since childhood in schools. The article discussed how entrepreneurial skills can be promoted through DT tools. Results of the study revealed new ideas related to integrating sustainability into project management practices for developing countries. However, the study results should be considered with caution due to several limitations. That is, the findings must be applied to other developing countries in the light of socio-economic discrepancies between Iran and other developing countries.

Similarly, Linton and Klinton (2019) recently conducted a study "Education in university entrepreneurship: a design thinking approach to learning," the authors argued the use of thinking. Design focused on the entrepreneurial process stresses entrepreneurial skills and entrepreneurial mindsets individual through a non-linear process, where creativity is central within an unstructured process. In this way, DT emphasized a practical approach with students outside the classroom, interacting with the real world allied to reflection exercises.

It is worth mentioning the authors' conclusion that DT can be a valuable tool for teaching entrepreneurship today, that the future is already present, where companies need to be able to foster and receive these new technologies to stay in the market and for this it required visionary managers and collaborators with developed entrepreneurial aptitudes.

### 3. Methodological procedures

The present study was developed from a bibliometric research, classified as descriptive of empirical nature and quantitative (Hair, 2005). Bibliometric research presents the same structure of an empirical article, consisting of the sections: introduction, literature review, methodology, results and conclusions (Soares *et al.*, 2018).

The present research was carried out from resources available in the Web of Science database, from 2009 to 2019 (10 years), aiming to broaden the knowledge related to the publications related to DT and entrepreneurial education.

To do so, from the search engine of the Web of Science, using as keywords Design Thinking And Entrepreneurial Education, where were located 146 researches in the period from 2009 to 2019 (10 years). The following are the general characteristics of these publications, according to the following categories: thematic areas, type of documents, year of publications, authors, title of sources, institutions, funding agencies, countries and languages.

### 4. Bibliometric indicators on thinking design and entrepreneurial education available in the web of science database

#### 4.1 Thematic areas of publications

Table 1 presents the five main thematic areas related to the theme, according to the number of publications. The selected areas present evidence of the heterogeneity of the theme.

The main thematic areas related to the publications on DT and entrepreneurial education are related to Education in Educational Research followed by studies in Business Economics.

#### 4.2 Types of documents

Table 2 presents the types of documents related to the publications reported.

Most of the publications reported are articles, followed by papers published in congresses or similar.

#### 4.3 Publications per year

In the period between 2009 and 2019, it was reported that the number of publications increased gradually over the ten years analyzed, except for the years of 2013, 2016 and 2017, when there were falls, especially during the last year. Figure 3 showed the number of publications per year.

It is possible to observe an increase in the year 2016 the entry of this theme in the academic environment, having its peak of publications in the year 2019.

#### 4.4 Main authors

Table 3 lists the five authors that published the most in the analyzed period.

The main authors are from numerous educational institutions and stand out in the various areas of management. Alfredo Biffi is part of the Department of Economics, University Insubria Varese in Italy, and his areas of interest are innovation and DT. Rita Bissola is an associate professor of Business Organization at the Catholic University of the Sacred Heart

| Thematic área                      | Number of publications |
|------------------------------------|------------------------|
| 1 Education educational research   | 69                     |
| 2 Management (Gestão)              | 35                     |
| 3 Business (Negócio)               | 25                     |
| 4 Education scientific disciplines | 19                     |
| 5 Engineering multidisciplinary    | 14                     |

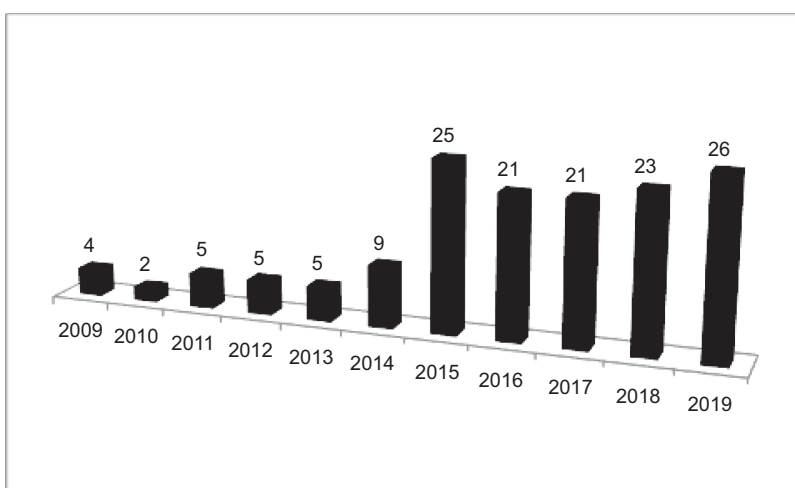
**Source(s):** Web of Science (2019)

**Table 1.**  
Thematic areas in the  
study on  
entrepreneurship

| Types of publication | Frequency |
|----------------------|-----------|
| Proceedings paper    | 75        |
| Article              | 71        |
| Review               | 3         |

**Source(s):** Web of Science (2019)

**Table 2.**  
Classification of  
publications by type



**Source(s):** Web of science (2019)

**Figure 3.**  
Publications per year



Department of Economics and Business Management in Milan. Donald Carpenter is an associate professor of Civil Engineering and the director of Lawrence Technological University, where he teaches ethics / professionalism and water resources. Dr. Carpenter serves as an Evaluation Director of Lawrence Tech after serving as Founding Director of the Center for Teaching and Learning, where he conducts funded research and educational development projects and has published numerous engineering education papers and conducts effective teaching development workshops for teachers.

*4.5 Main institutions and financing agencies*

As for the Institutions and funding agencies, it has been identified that more than half of the studies are funded by the National Natural Science Foundation of China, which appears as the dominant Institution and/or Funding Agency (Table 4).

The funding agencies that most supported the research are located in China, the United States and the European Union. The National Natural Foundation of China, the European Commission, the National Science Foundation which funds 20 percent of all federally subsidized basic research in US institutes and universities. Next was the European Union and fifth in the EU, the European Foundation for the Improvement of Living and Working Conditions.

The countries that publish the most on entrepreneurship education are presented in Table 5.

**Table 3.**  
Number of articles  
published by author

| Authors         | Published articles | Parents        |
|-----------------|--------------------|----------------|
| 1 Biffi A.      | 2                  | Itália         |
| 2 Bissola R.    | 2                  | Italia         |
| 3 Carpenter DD. | 2                  | Estados Unidos |
| 4 Daniel AD.    | 2                  | Portugal       |
| 5 Eisenberg M.  | 2                  | Alemanha       |

**Source(s):** Web of Science (2019)

**Table 4.**  
Larger funding  
agencies

| Financing agencies  | Records |
|---|---------|
| 1 2016 Counselors quality project at Wuhan textile university             | 3       |
| 2 Dalian Neusoft university of information                                | 1       |
| 3 Educational support unit at universidad Jayme I                         | 1       |
| 4 Erasmus program   | 1       |
| 5 European institute for innovation and technology through kic innoenergy | 1       |

**Source(s):** Web of Science (2019)

**Table 5.**  
Main countries

| Countries                   | Number of articles |
|-----------------------------|--------------------|
| 1 Estados Unidos da América | 30                 |
| 2 Inglaterra                | 14                 |
| 3 Espanha                   | 13                 |
| 4 China                     | 9                  |
| 5 Finlândia                 | 7                  |

**Source(s):** Web of Science (2019)



As for the number of publications by country (Table 5), the United States of America leads the ranking of publications, followed by England, Spain, China and Finland (Table 6).

The main language is English, which is more representative, followed by Spanish and Chinese.

#### 4.6 Citation report

The citation reported provided statistical information based on results retrieved and reported the index  $h$  (the index that uses the number of articles published by a scientist and the frequency of these articles being cited by other scientists). Figure 4 shows the number of citations per year.

The calculated period totaled 302 quotes, of these, 297 are quotes without self-citations. The average citation per item is 2.97 and the  $h$ -index is 10. An index of  $h$  means that there are  $H$  publications that have been quoted at least  $h$  times.

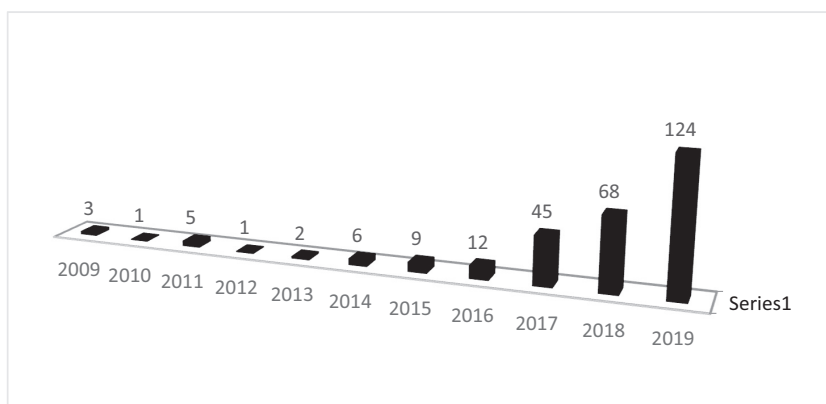
Through the analysis of citations, the most cited works on entrepreneurship education were identified. These works are detailed in Table 7.

Figure 5 shows the co-citations map of the authors. From the co-citation analysis it is possible to analyze the intellectual structure among the authors, that is, in the co-citation analysis of the authors, the more two authors are quoted together, the closer the intellectual relation between them. In this way, the co-citation analysis allowed to analyze the existing clusters and the authors that belong to them. The authors mentioned were selected at least five times totaling 5,068 links with 47 items in four different colors, that configure the four clusters mentioned above (see Figure 5) The cluster of red color appears with the largest number of items and it contains references in entrepreneurial education studies such as Krueger and Linan. Next, the

| Language   | No of publications |
|------------|--------------------|
| 1 Inglés   | 141                |
| 2 Espanhol | 4                  |
| 3 Chinés   | 1                  |

**Source(s):** Web of Science (2019)

**Table 6.**  
Main languages



**Source(s):** Web of Science (2019)

**Figure 4.**  
Total citations per year

| Description  | Year of publication | Quotes |
|--|---------------------|--------|
| <i>Core entrepreneurial competencies and their interdependencies: insights from a study of Irish and Iranian entrepreneurs, university students and academics</i><br>Por: Rezaei Zadeh, Morteza; Hogan, Michael; O'Reilly, John; et al. International Entrepreneurship and Management Journal, Volume: 13 Edição: 1, Páginas: 35-73            | 2017                | 19     |
| <i>Using problem-based learning to stimulate entrepreneurial awareness among senior African undergraduate students</i><br>Por: Swart, Arthur James Eurasia Journal of Mathematics Science and Technology Education, Volume: 10, Edição: 2, Páginas: 125-134  | 2014                | 18     |
| <i>Entrepreneurial self-efficacy: a systematic review of the literature on its theoretical foundations, measurement, antecedents, and outcomes, and an agenda for future research</i><br>Por: Newman, Alexander; Obschonka, Martin; Schwarz, Susan; et al., Journal of Vocational Behavior, Volume: 110, Edição especial: SI, Páginas: 403-419 | 2019                | 17     |
| <i>Entrepreneurship education in Sub-Saharan African universities</i><br>Por: Kabongo, Jean D., Okpara, John O., International Journal of Entrepreneurial Behaviour and Research, Volume: 16, Edição: 4, Páginas: 296  | 2010                | 12     |
| <i>Sustainability: what the entrepreneurship educators think</i><br>Por: Wyness, Lynne; Jones, Paul; Klapper, Rita, Education and Training, Volume 57, Edição: 8-9, Edição especial: SI, Páginas: 834-852  | 2015                | 14     |
| <i>Determinants of entrepreneurial intentions technical-vocational education and training students in Ethiopia</i><br>Por: Buli, Bereket Mamoo; Yesuf, Wasihun Mohammed, Education and Training, Volume: 57, Edição: 8-9, Edição especial: SI, Páginas: 891-907  | 2015                | 14     |
| <i>Tourism Education: What about entrepreneurial skills?</i><br>Por: Daniel, Ana Dias; Costa, Rui Augusto; Pita, Mariana; et al., Journal of Hospitality and Tourism Management, Volume: 30, Páginas: 65-72  | 2017                | 13     |
| <i>Predicting entrepreneurial motivation among university students The role of entrepreneurship education</i><br>Por: Farhangmehr, Minoo; Goncalves, Paulo; Sarmento, Maria, Education and Training, Volume: 58, Edição: 7-8, Páginas: 861-881   | 2016                | 12     |
| <i>Preparing professional degree students to tackle grand challenges: a framework for aligning social work curricula</i><br>Por: Nurius, Paula S.; Coffey, Darla Spence; Fong, Rowena; et al., Journal of the Society for Social Work and Research, Volume: 8, Edição: 1, Páginas: 99-118  | 2017                | 10     |
| <i>Critical curriculum theory and slow ecopedagogical activism</i><br>Por: Payne, Phillip G., Australian Journal of Environmental Education, Volume: 31, Edição: 2, Páginas: 165-193   | 2015                | 10     |

**Table 7.**

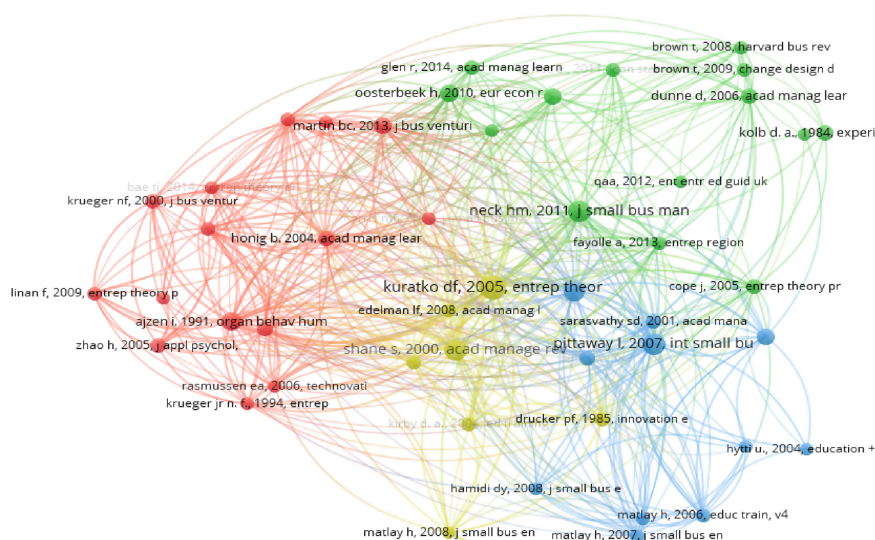
Most cited publications

**Source(s):** Web of Science (2019)

green cluster focused on the theme DT stands out with ten references such as Brown, an author with great prominence in the international literature. The cluster of blue color has 11 items, consisting of the red cluster focused on DT and the green cluster focused on Innovation references, such as Fayolle and Schumpeter, and finally, the yellow cluster composed of seven references: Drucker, Edelman, Fiet, Kirby, Kuratko, Matlay and Shane.

#### 4.7 Textual map (competition analysis of items in titles and abstracts)

From the choice of complete count were detected 4,727 terms. For 10 terms, cut off occurrences according to a minimum number of terms, 128 results were obtained. We chose a minimum frequency of 10 terms for better visualization of the sample, resulting in 128 terms that meet the criterion of occurrence. For each, a relevance score was calculated. We chose the standard of choice of 60% of the most relevant terms, resulting in 77 terms.



**Source(s):** Elaborated by the authors through the VOSViewer

**Figure 5.**  
Co-citation map

We identified three clusters with a total of 77 terms that resulted in 2,611 links or link occurrence elements: Cluster 1 with 38 items, Cluster 2 with 36 items and Cluster 3 with only three items, according to Figure 6.

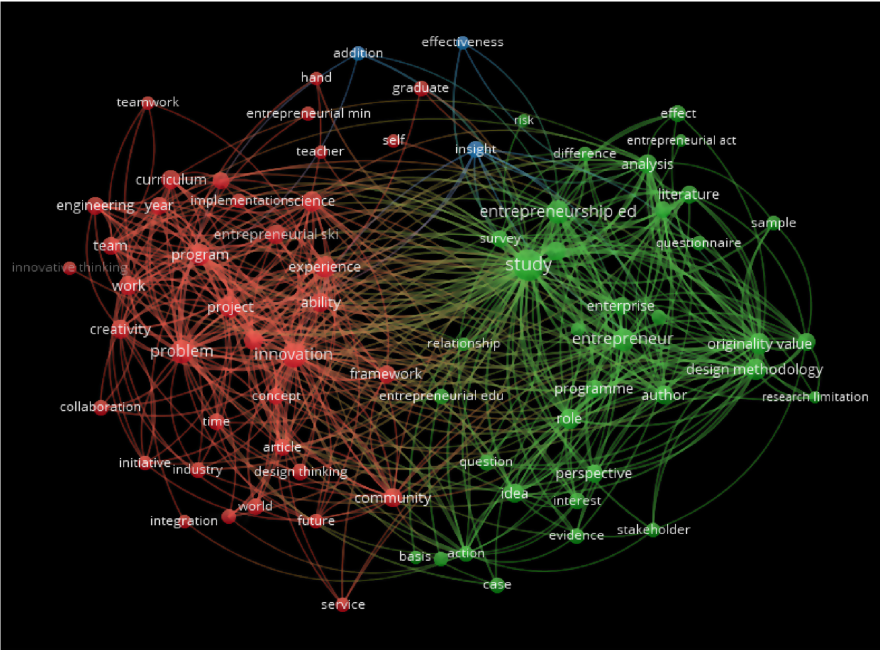
In the network there are three predominant clusters with 77 keywords, the main one corresponds to the red cluster with 38 keywords composed of words like innovation, DT and engineering. The green colored cluster with 36 items, where the word entrepreneur has the highest number of links with the other words, relating to other words such as entrepreneurial education and entrepreneurial thinking; and therefore, the third cluster in blue color composed of three key words. Figure 7 shows a density diagram:

The key word density diagram, whose colors are similar to that of a thermal chart, where the red cluster is linked to the design area with keywords as innovation, technology, projects and challenge and green cluster is focused on entrepreneurial education with key words as an entrepreneur. In the smaller cluster, the blue matches the terms idea, action, and interest. The term density visualization generates a color contrast map from the hottest (red) to the coolest (green), hence from the largest to the smallest cluster, one can clearly see the denser regions of a cluster. Co-occurrence connects words when they appear in the title, abstract, or keywords.

## 5. Final considerations

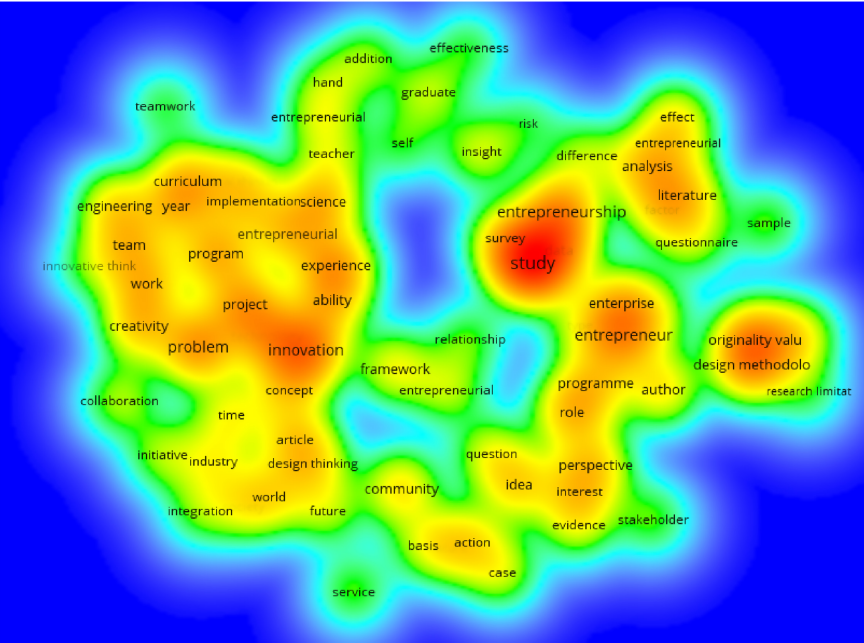
DT is an approach to human-centered innovation applied through creative experiments. Some international universities are already working with DT focused on education, the method adapted to the school context has enabled teachers and managers to act as agents of change identifying problems and provided through the creative solutions method in addition to generating students' participation in a way creative and engaged.

The concept of DT presents as a current and expressive theme in growing interest on the part of the academic environment, used in several disciplines of high school and graduation and also used by companies like tool of innovation for creation of products and services. Thus, DT from the perspective of entrepreneurial education is a subject to be developed, and



**Figure 6.**  
Network of words

Source(s): Elaborated by the authors through the VOSViewer



**Figure 7.**  
Keyword density  
diagram: map view by  
item density

Source(s): Elaborated by the authors through the VOSViewer

as demonstrated in the study has been heavily worked. In the study it is evident the insertion of the methodology of DT as a tool to develop entrepreneurial mentality in the teaching of entrepreneurship in disciplines of entrepreneurial education in all scholastic scope from initial series to undergraduate courses. This practice is observed in several European countries strongly and since 2015 has been gaining strength but with little representativeness in Brazilian schools and universities.

In this article, the search for publications on DT and entrepreneurial education in the Web of Science database resulted in 117 researches. Thus, after the completion of the present bibliometric study, it can be seen that publications with visibility in the year 2014, but in 2015 it was the year with the highest number of 25 published researches. It was verified that the majority of publications are related to two areas of knowledge: education and business economics. It was also verified that; although, in the main countries, the United States of America is at the top with 113 works. Consequently, the language with the largest number of papers counted is English with 96.5%.

About the most relevant authors when discussing about DT and entrepreneurial education, it was identified that there are a diversity of authors with focus on this theme which are homogeneously distributed in the number of publications, which calls attention that the authors are from different countries, which demonstrates the representativeness of the theme in a global way. Results were presented in this article to understand how this theme has been approached in recent years through the number of studies produced per year, areas of interest, as well as institutions and authors involved.

At the end of this study the importance of the subject and its relevance to the academy was perceived, and the path to insertion of the methodology DT presents itself as a tool of extreme importance in the disciplines of entrepreneurship. In this way the objective of the research was to verify the intellectual productivity in the area of DT in the context of the education focused on Entrepreneurship.

However, this study is only a small clipping and does not end the possibilities of research in this subject, and it recommends new studies for discussion in other databases. Faced with this, case studies are recommended so that schools and universities can use this strategy in a didactic way to develop the entrepreneurial mindset in children in the early grades to young people in universities. From the study, one can perceive the importance of the theme, as well as the need to deepen the discussions of DT and entrepreneurial education in the school context.

However, this study is only a small clipping and does not end the possibilities of research in this subject, it is recommended new studies for discussion in other databases. Faced with this, case studies are recommended so that schools and universities can use this strategy in a didactic way to develop the entrepreneurial mindset in children in the early grades to young people in universities. From the study, one can perceive the importance of the theme, as well as the need to deepen the discussions of Design thinking and entrepreneurial education in the school context.

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