Analysis Of The Development Of Educational Competencies According To Teaching Modalities: TIC

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Abstract

A documentary review was carried out on the production and publication of research papers related to the study of the variable Development of Educational Competences according to Teaching Modalities. The purpose of the bibliometric analysis proposed in this document is to know the main characteristics of the volume of publications registered in the Scopus database during the period 2016-2021, achieving the identification of 115 publications in total. The information provided by the said platform was organized through tables and figures categorizing the information by Year of Publication, Country of Origin, Area of Knowledge, and Type of Publication. Once these characteristics were described, the position of different authors regarding the proposed topic was referenced using a qualitative analysis. Among the main findings of this research, it is found that the United States, with 32 publications, is the country with the highest production. The Area of Knowledge that made the greatest contribution to the construction of bibliographic material referring to the study of the Development of Educational Competencies according to the Teaching Modalities was Medicine with 50 published documents, and the Type of Publication that was most used during the above-mentioned period was the Journal Article, which represents 75% of the total scientific production.

Keywords: Educational competencies, teaching modalities

1. Introduction

Teaching models are how the teaching-learning processes are developed depending on the teacher's needs, the context, time, and what best suits the students, thus covering all forms of learning and improving the teaching practice. The main objective of the Teaching Models is to achieve effective and integral learning in the education of students, within these models the most used is the traditional model where the teacher has the main role as a source of knowledge characterized by being inflexible, the behaviorist model which determines the skills to be developed by students and thus applies pedagogical strategies to develop the necessary educational

competencies and the constructivist model where the main actor is the student and the teacher is a guide in the construction of knowledge from critical thinking by identifying relevant information for their training process being possible a greater strengthening of knowledge.

These Teaching Models are applied depending on the Educational Competencies that are sought to be developed, the educational competencies are the knowledge and skills necessary to complete activities or solve problems individually and in groups. These Educational Competencies help both the apprehension of knowledge and its practice in society, giving them the necessary tools to play an active role in social progress. With the pandemic declared in March 2020, the virtual educational model had greater relevance as it was the alternative to continue with the teaching-learning processes, so it also implied the creation of new methodologies that would satisfactorily allow the development of Educational competencies. Thanks to the above, it can be said that there are teaching modalities that can be much more effective in each course depending on the context, the amount of information, and the age group, thus helping to develop the desired Educational Competencies, since there is no universal and exact guide for successful pedagogical processes.

Therefore, it is important to know in terms of bibliographic resources, the current state of research related to the Development of Educational Competencies according to the Teaching Modalities, so a bibliometric analysis of the scientific production registered in the Scopus database during the period 2015-2020 is proposed to answer the question: How has been the production and publication of research papers related to the study of the variable Development of Educational Competencies according to the Teaching Modalities during the period 2016-2021?

2. General objective

To analyze from a bibliometric and bibliographic perspective, the production of high-impact research papers on the variable Development of Educational Competencies according to Teaching Modalities during the period 2016-2021.

3. Methodology

Quantitative analysis of the information provided by Scopus is performed under a bibliometric approach to the scientific production related to Management Accounting for Decision Making. Also, from a qualitative perspective, examples of some research papers published in the area of the study mentioned above are analyzed from a bibliographic approach to describe the position of different authors on the proposed topic.

The search is carried out through the tool provided by Scopus and the parameters referenced in Table 1 are established.

3.1 Methodological design

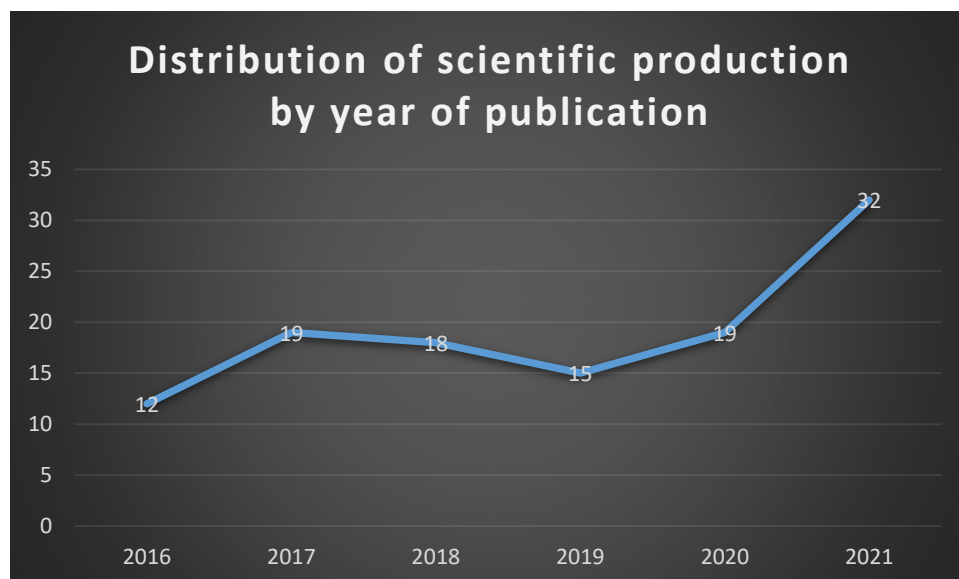|	PHASE	DESCRIPTION	CLASSIFICATION
PHASE 1	DATA COLLECTION	Data was collected using the Scopus web page search tool, through which a total of 115 publications were identified.	Published papers whose study variables are related to the Development of Educational Competencies according to the Teaching Modalities.

			Research papers were published during the period 2016-2021. Without distinction of the country of origin. Without distinction of the area of knowledge. Without distinction of the type of publication.
PHASE 2	CONSTRUCTION OF ANALYSIS MATERIAL	The information identified in the previous phase is organized. The classification will be made through graphs, figures, and tables based on data provided by Scopus.	Word Co-occurrence. Year of publication Country of origin of the publication. Area of knowledge. Type of publication
PHASE 3	DRAFTING OF CONCLUSIONS AND FINAL DOCUMENT	After the analysis carried out in the previous phase, we proceed to the drafting of the conclusions and the preparation of the final document.	

Table 1. Methodological design.
Source: Own elaboration (2022)

4. Results

4.1 Co-occurrence of words

Figure 1 shows the co-occurrence of keywords within the publications identified in the Scopus database.

Figure 1. Co-occurrence of words
Source: Own elaboration (2022); based on data provided by Scopus.

As shown in Figure 1, the most used keyword is education which refers to the process by which there is an exchange of information to develop skills necessary to develop specific tasks with specialized knowledge, it also forms integral people who have critical thinking and social awareness to be a good citizen. Skills, learning, and procedures are keywords that refer to the knowledge obtained necessary for the development of Educational Competencies oriented to solve problems or carry out activities depending on the knowledge provided, this development of Competencies goes hand in hand with the Teaching Modalities since it must be determined which of them is more efficient in its development taking into account the particularities of the class. This shows that there is no universal way of imparting knowledge, on the contrary, it can be determined that there are several ways and methodologies to achieve a good academic objective, which is to ensure that all students have the same level of knowledge. Finally, there are keywords such as COVID 19, social distancing, and virtual learning which give light to the educational model adopted since March 2020 to continue with the pedagogical processes respecting the biosecurity measures, so virtual education became recurrent being necessary both to obtain digital competences and the creation of new methodologies that would allow continuing having a quality education.

4.2 Distribution of scientific production by year of publication.
Figure 2 shows how the scientific production is distributed according to the year of publication, taking into account the period from 2016 to 2021.
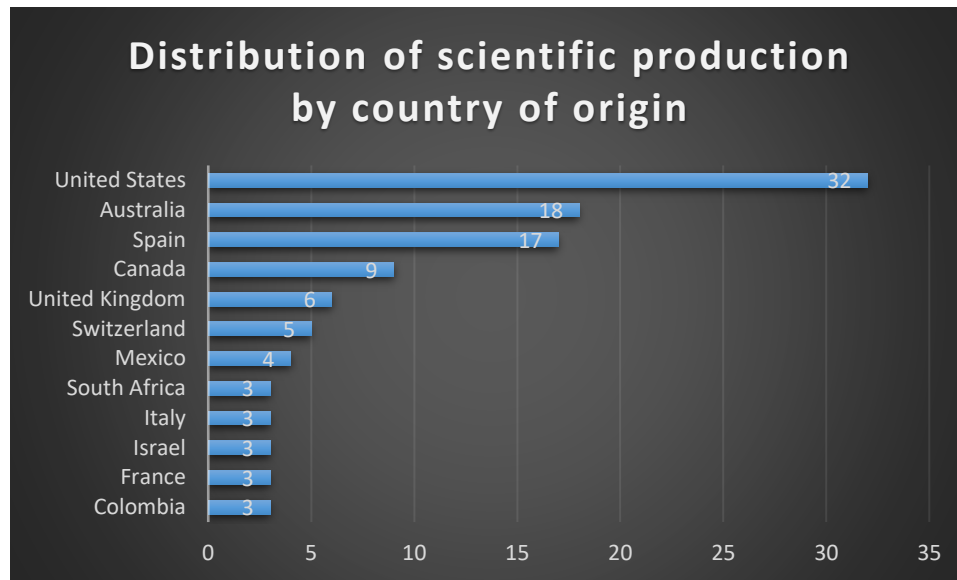
Figure 2. Distribution of scientific production by year of publication.
Source: Own elaboration (2022); based on data provided by Scopus.

2021 is the year with the highest number of documents published related to the variables under study, presenting 32 documents, among which we can find "analysis of the acquisition of the teamwork competence of undergraduate students in the classroom and virtual environment" (Guerrero et al., 2021). This document aims to analyze and compare the acquisition of the "teamwork" competence of students enrolled in the subject Projects in the classroom and virtual teaching modalities and the factors that influence it. With the arrival of COVID-19, it became necessary to adapt education to ICT, all this was accelerated, so it is sought to determine if it has the same satisfactory results in the teaching modalities, in this research a statistical study is carried out to determine its effectiveness.

In second place is 2020 where 19 documents were registered in the Scopus database within which we can find "Training of STEAM educators in the emergency of COVID-19: Redesigning teaching" (Sastre-Merino et al., 2020) this document aims to determine how the change from face-to-face to virtual education has affected, through an analysis to two classes and student surveys it was determined that virtual education has affected, in general, the objectives, contents and pedagogical performance. Therefore, it is necessary to redesign to meet the demands of their students, so it is concluded that it is necessary to transform the educational practice since it is not only applying the same strategies of face-to-face education in virtual education.

4.3 Distribution of scientific production by country of origin.

Figure 3 shows the distribution of scientific production according to the nationality of the authors.

Figure 3. Distribution of scientific production by country of origin.
Source: Own elaboration (2022); based on data provided by Scopus.

The United States is the country with the highest number of publications related to variables during the period 2016-2021 presenting 32 documents, among which is the one entitled "Development of Soft Competencies in Engineering in the Framework of Education 4.0" (Caratozzolo et al., 2021). This document aims to show the educational implementation of different cognitive theories, specifically adapted for engineering students belonging to generations Y/Z taking into account the need to generate soft competencies specific to industry 4. The program presented showed to help in the improvement of the development of these competencies by having a better understanding of scientific concepts and additionally, a greater capacity and intellectual commitment.

At this point, it is worth noting that the production of scientific publications, when classified by country of origin, presents a special characteristic and that is the collaboration between authors with different affiliations to both public and private institutions, and these institutions can be from the same country or different nationalities so that the production of an article with co-authorship of different authors from different countries of origin allows each of the countries to add up as a unit in the general publications. This is best explained in Figure 4, which shows the flow of collaborative work from different countries.
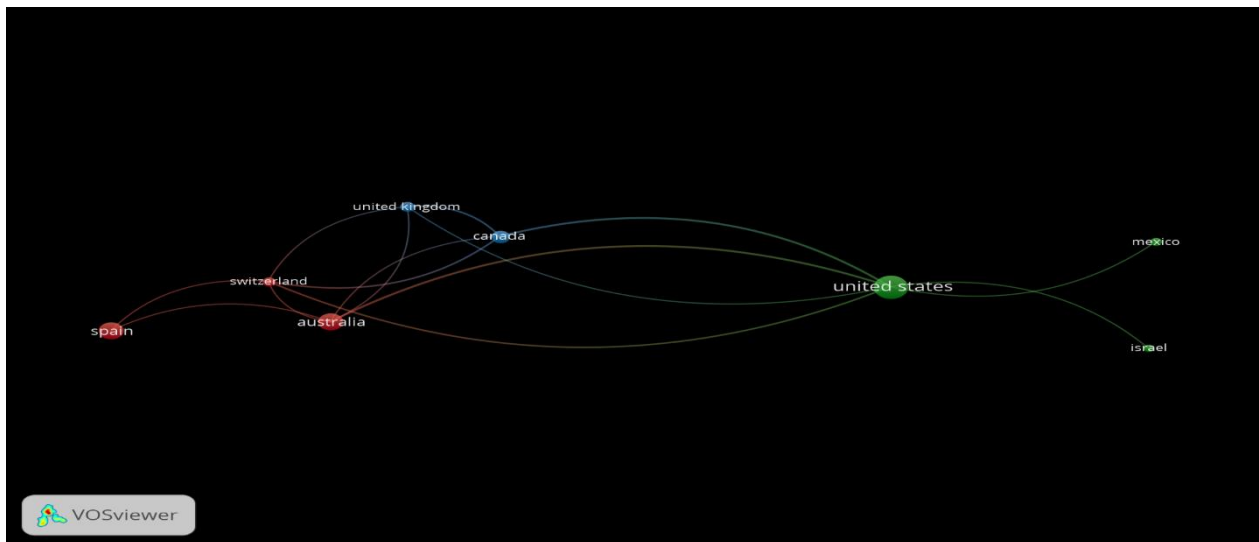
Figure 4. Co-citations between countries.
Source: Own elaboration (2022); based on data provided by Scopus.

As mentioned above, the United States is the country with the largest number of publications registered in Scopus, with articles in collaboration with countries such as Mexico and Israel that allow for comparative studies identifying the progress of each country concerning teaching modalities, especially in virtual education. In second place is Australia with 18 documents within which it has documents with authors affiliated with countries such as Canada, Switzerland, and Spain presenting "Transition to E-Learning during the COVID-19 pandemic: How have higher education institutions responded to the challenge?" (Turnbull, Chugh, & Luck, 2021) This document has as its main objective to identify the role of educational technologies in the transition from face-to-face to online teaching and learning activities during the COVID-19 pandemic in addition to offering strategies that are in line with the needs that arise from virtual education. It was concluded that the learning process within a modality-neutral learning space is presented as a suggested framework to offer higher education programs in this challenging environment that allows the development of new educational competencies where the use of technological tools is necessary.

4.4 Distribution of scientific production by area of knowledge

Figure 5 shows how the production of scientific publications is distributed according to the area of knowledge through which the different research methodologies are executed.
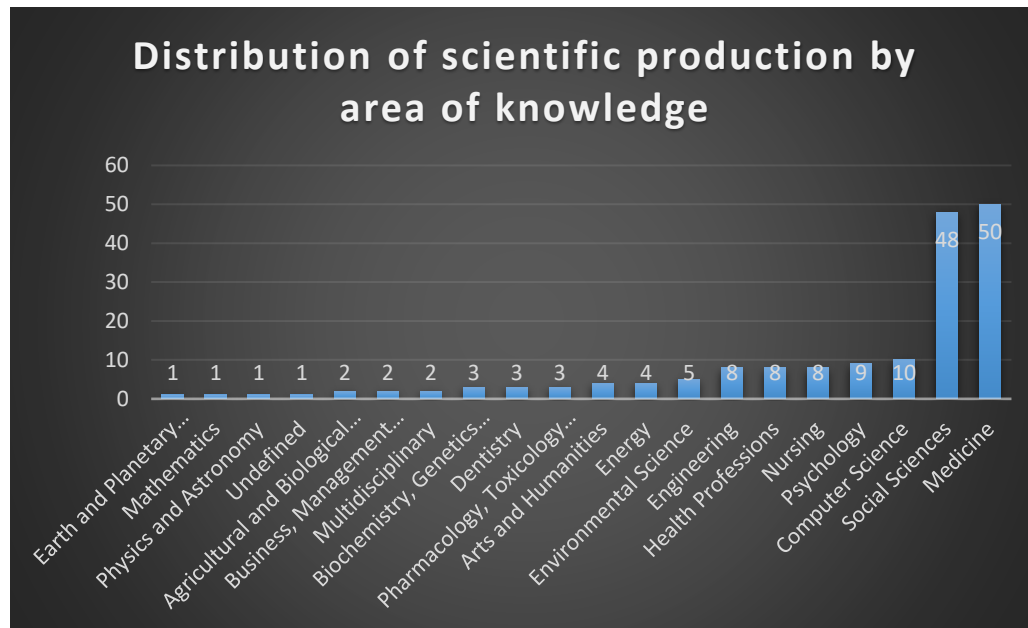
Figure 5. Distribution of scientific production by area of knowledge.
Source: Own elaboration (2022); based on data provided by Scopus.

Medicine is the area of knowledge with the largest number of contributions through the theories that are framed in it, in the search for new knowledge on the Development of Educational Competencies according to Teaching Modalities having 50 documents, within which is the title "Virtual Education in Pediatric Surgery in the COVID-19 Era: Facing and Overcoming Current Challenges" (Aubert et al., 2021). This document seeks to determine the challenges imposed by the pandemic and describes the various learning modalities that can be implemented to ensure the development of competencies during the pandemic taking into account that ICT and virtual spaces will play a considerable role in the future of surgical specialties and surgical education.

In second place is Social Sciences where 48 documents were written following the guidelines of the topics related to that area which is the one entitled "Digital skills and interest in studying in the E-Learning modality in high school students" (Guillermo et al., 2021). The main objective of this paper is to evaluate the digital skills from the self-perceived knowledge and interest in studying in the e-learning modality of the students by conducting a questionnaire to 175 students which allows glimpsing technological literacy strategies that facilitate students to move toward the knowledge society.

4.5 Type of publication

Figure 6 shows how the bibliographic production is distributed according to the type of publication chosen by the authors.
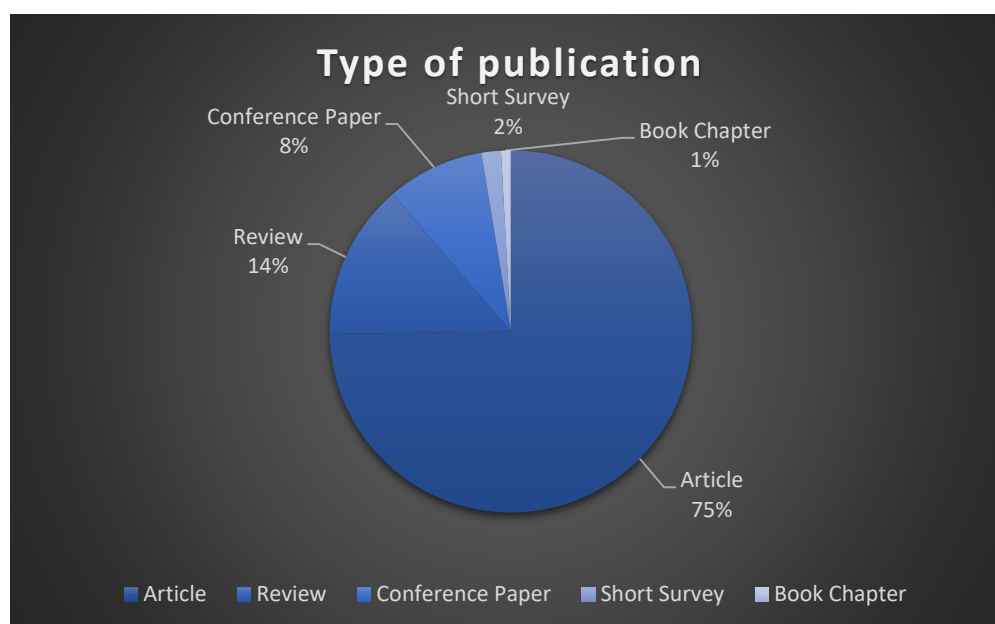
Figure 6. Type of publication
Source: Own elaboration (2022); based on data provided by Scopus.

As shown in Figure 6, within the different types of publications, 75% of the total number of documents identified through Phase 1 of the Methodological Design, correspond to Journal Articles, among which is the one entitled "Intervening in oral and written language to improve the academic competencies of students in compulsory secondary education" (Resina & Salas, 2021). The main objective of this document is to determine the repercussions of teaching argumentative oral discourse on the development of argumentative writing and vice versa to develop communicative competencies through different modalities. In conclusion, there is evidence that the effects of intramodality were greater for the intervention of written language than for oral language.

In second place are the reviews presenting 14% of the total of the documents registered in this study within which we can identify "Sustainability and teaching digital competence in higher education" (Colás-Bravo et al., 2021). This document aims to determine the relationship between sustainability and teaching digital competence in the university environment so a literature review was conducted in the Scopus and WOS databases from 2011 to 2021 where it was possible to determine the areas of sustainable development, linked to the teaching of digital competence, such as inclusion, educational quality or lifelong learning.

5. Conclusions

Thanks to the bibliometric analysis proposed in the present research, it can be determined that the United States is the country with the largest number of bibliographic records in the Scopus database during the period from 2016 to 2021 with a total of 115 documents. The scientific production related to the study of the Development of Educational Competencies according to the Teaching Modalities has presented an important growth during the previously mentioned period, going from 12 publications in 2016 to 32 units in 2021, that is, it was possible to double the creation of bibliographic records in 5 years, which indicates the importance of determining the most effective teaching modality depending on the Educational Competencies that are sought to be developed taking into account that these can vary due to various factors.

The teaching modalities are the pedagogical strategies used in teaching to impart knowledge, these can vary depending on the subject matter, the context, and the needs of students, these modalities have the main purpose to ensure that all students develop the same level of knowledge on a specific topic. The teaching modalities are applied depending on the educational competencies to be developed, these being the set of knowledge to strengthen skills necessary for the realization of activities and problem solving, thus helping to understand the topics taught in class and giving them the necessary tools to apply them in their social context, all this shows that there is no single way to make education a successful process. All of the above allows this article to conclude, highlighting the importance of knowing the theory or bibliographic resources that seek to awaken the interest in the educational actors to learn about the different educational modalities and determine when they should be applied to achieve an effective pedagogical process. That is why the need for studies such as the one presented in this document is highlighted, which make a tour of those texts that address the aforementioned topic, to give the reader a broad view of the current situation of the bibliography on the Development of Educational Competencies according to the Teaching Modalities.

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