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MODALITIES OF TEACHING LEARNING THROUGH INFORMATION AND COMMUNICATION TECHNOLOGIES IN HIGHER EDUCATION

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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 Modalities of Teaching, Learning, ICT and Higher Education. The purpose of the bibliometric analysis proposed in this document was to know the main characteristics of the volume of publications registered in the Scopus database during the period 201 7-2022, achieving the identification of 838 publications. The information provided by this platform was organized through graphs and figures categorizing the information by Year of Publication, Country of Origin, Area of Knowledge and Type of Publication. Once these characteristics have been described, the position of different authors towards the proposed theme is referenced through a qualitative analysis. Among the main findings made through this research, it is found that Spain, with 138 publications, was the country with the highest scientific production registered in the name of authors affiliated with institutions in that country. The Area of Knowledge that made the greatest contribution to the construction of bibliographic material referring to the study of teaching and learning modalities in the ICT environment for higher education was Social Sciences with

526 published documents, and the Type of Publication most used during the period indicated above werethe Journal Articles with the 54% of total scientific production.

Keywords: Teaching Modalities, Learning Modalities, ICT, Higher Education.

1. Introduction

Today, the integration of information and communication technologies (ICT) into higher education has significantly transformed the way people are taught and learned. ICT-based teaching-learning modalities have become of crucial importance in this context, offering numerous advantages and opportunities for both students and teachers.

Online teaching-learning modalities, also known as distance education or virtual education, have broken down geographical and temporal barriers that traditionally limited access to higher education. Now, students can access prestigious academic programs regardless of their geographic location, which has democratized access to education and expanded learning opportunities. Flexibility and convenience are key features of these modalities. Students can tailor their study schedule to their individual needs, accessing teaching materials and participating in online academic activities at a time that is most convenient for them. This allows them to reconcile their personal, professional or family responsibilities with their studies, eliminating the limitations of time and space.

In addition, ICT offers interactive tools that promote the active participation of students in their learning process. Online discussion forums, video conferences, collaborative activities and online assessments encourage interaction between participants, facilitating the exchange of ideas, problem solving and teamwork. In this way, a dynamic and enriching educational environment is created. The availability of online educational resources is another significant advantage. Students have access to a wide variety of materials such as e-books, academic articles, videos, simulations and databases, allowing them to delve deeper into the topics of study and expand their knowledge autonomously.

In addition, these modalities encourage the development of digital skills in students. As they use various tools and technologies, they acquire competencies related to online information search and evaluation, digital communication, information management, and the use of specific educational software. These skills are increasingly in demand in today's working world and prepare students to face the challenges of the digital society. For this reason, this article seeks to describe the main characteristics of the compendium of publications indexed in the Scopus database related to the variables Modalities of Teaching, Learning, ICT

and Higher Education, as well. As the description of the position of certain authors affiliated with institutions, during the period between the years 2022 and 2022.

2. General Objective

Analyze from a bibliometric and bibliographic perspective, the elaboration and publication of research works in high impact journals indexed in Scopus database on the variables Teaching Modalities, Learning Modalities, ICT, Higher Education during the period 201 7-2022.

3. Methodology

This article is carried out through a mixed orientation research that combines the quantitative and qualitative method.

On the one hand, a quantitative analysis of the information selected in Scopus is carried out under a bibliometric approach of the scientific production corresponding to the study Teaching Modalities, Learning Modalities, ICT, Higher Education. On the other hand, examples of some research works published in the area of study indicated above are analyzed from a qualitative perspective, starting from a bibliographic approach that allows describing the position of different authors against the proposed topic. It is important to note that the entire search was performed through Scopus, managing to establish the parameters referenced in Figure 1.

3.1. Methodological design

Figure 1. Methodological design

Source: Authors.

3.1.1 Phase 1: Data collection

Data collection was executed from the Search tool on the Scopus website, where 838 publications were obtained from the choice of the following filters:

- TITLE-ABS-KEY (teaching, AND learning, AND ict, AND higher AND education) AND (LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017))
- Published documents whose study variables are related to the study of Teaching Modalities, Learning Modalities, ICT, Higher Education
- Limited to years 201 7-2022.
- Without distinction of country of origin.
- Without distinction of area of knowledge.
- Regardless of type of publication.

3.1.2 Phase 2: Construction of analysis material

The information collected in Scopus during the previous phase is organized and subsequently classified by graphs, figures and tables as follows:

- Co-occurrence of words.
- Year of publication.
- Country of origin of the publication.
- Area of knowledge.
- Type of publication.

3.1.3 Phase 3: Drafting of conclusions and outcome document

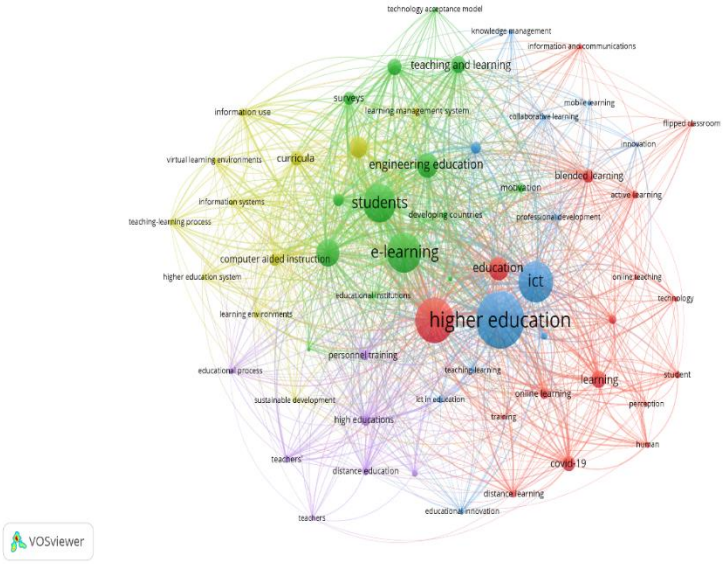
In this phase, we proceed with the analysis of the results previously yielded resulting in the determination of conclusions and, consequently, the obtaining of the final document.

4. Results

4.1 Co-occurrence of words

Figure 2 shows the co-occurrence of keywords found in the publications identified in the Scopus database.

Figure 2. Co-occurrence of words



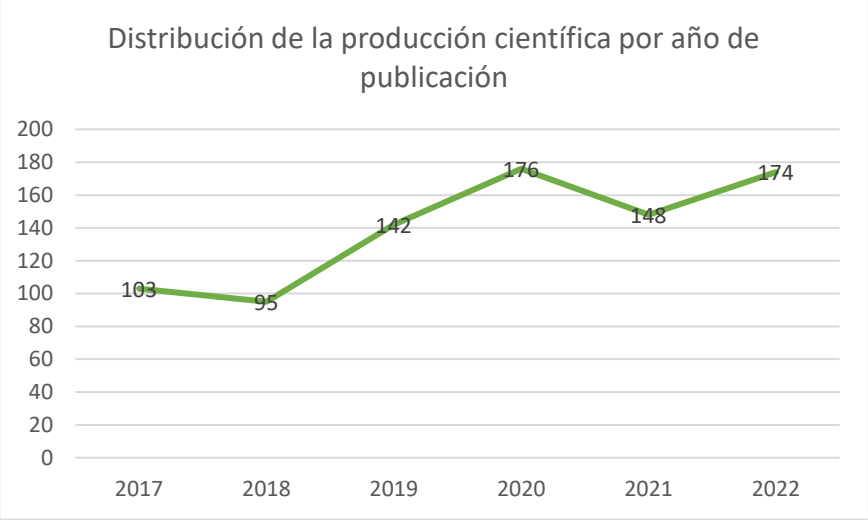
Source: Own elaboration (2023); based on data exported from Scopus.

Higher education was the most frequently used keyword within the studies identified through the execution of Phase 1 of the Methodological Design proposed for the development of this article. E-Learning is also among the most frequently used variables, associated with variables such as ICT, Students, Distance Education, Teacher. In this digital age, ICT has made it possible to overcome traditional barriers of time and space, giving students the opportunity to access higher education from anywhere and at any time. This has greatly expanded the possibilities of academic training, allowing more people to access educational programs without having to physically travel to a university campus. In addition, online teaching-learning modalities offer flexibility and convenience to students. They can tailor their study schedules to their individual needs, allowing them to reconcile their personal, work and family responsibilities with their academic background. This is especially beneficial for those who work full-time or have other obligations that make it difficult to regularly attend face-to-face classes.

4.2 Distribution of scientific production by year of publication

Figure 3 shows how scientific production is distributed according to the year of publication

Figure 3. Distribution of scientific production by year of publication.



Source: Own elaboration (2023); based on data exported from Scopus

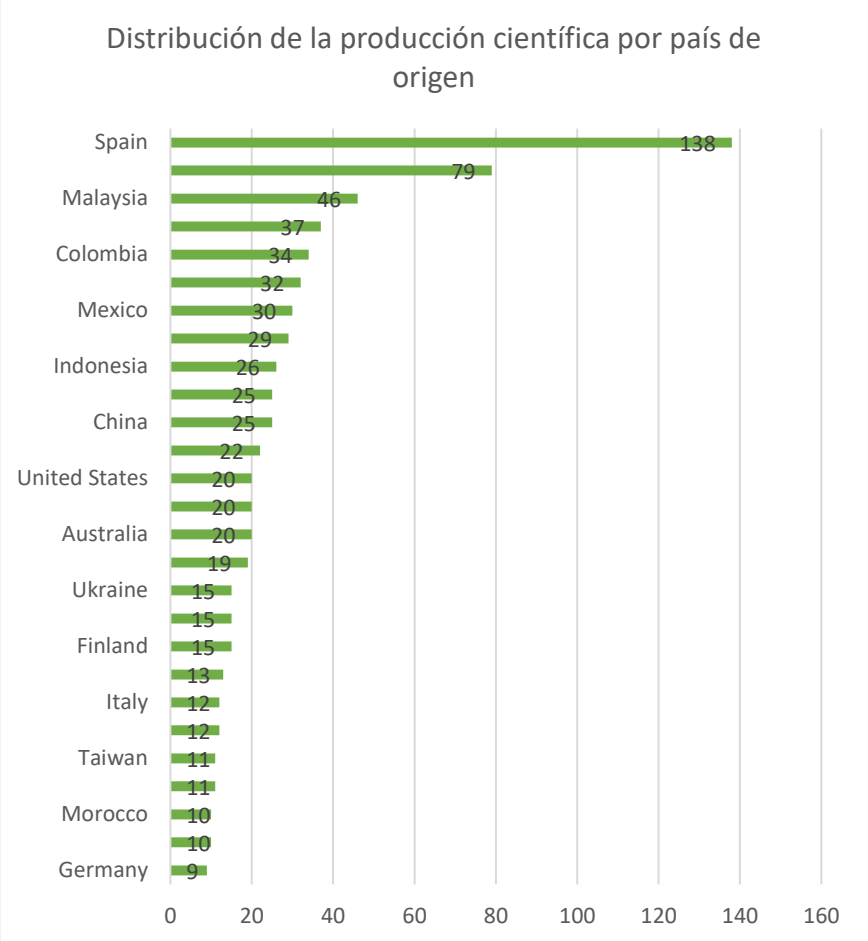
Among the main characteristics evidenced by the distribution of scientific production by year of publication, it is notorious that the year in which the highest number of publications were registered in Scopus was 2022, reaching a total of 174 documents published in journals indexed in said platform. This can be explained thanks to the interest on the part of the scientific community to identify Teaching Modalities, Learning Modalities, ICT, Higher Education, this position is evident, thanks to articles such as the one entitled "The effect of external factors on the use of technology among university professors of Ha'il: evidence from Saudi Arabia" (Khan, 2022) The purpose of this paper is to explore external factors: organizational technical support, organizational administrative support, organizational infrastructure and resources, and the effect of the organization's ICT policy on engagement in technology use among faculty at Hail University, Saudi Arabia. Design/methodology/approach: A cross-sectional survey approach was used to collect data. A sample of 300 full-time employees, with administrative and teaching responsibilities, participated through a self-completion questionnaire. Data were analyzed using exploratory factor analysis (EFA), correlation and multiple regression to determine the impact of external factors on commitment to technology use. Findings: Overall, the results provided evidence that organizational technical support, organizational administrative support, and organizational infrastructure and resources have a significant positive impact on commitment to technology use. However, the organization's ICT policy has a negligible negative impact on engagement in the use of technology. The findings could be generalized to other public sector universities in the Kingdom of Saudi Arabia. Limitations/implications of the research: Data were collected from a public sector university in Hail

Province, Kingdom of Saudi Arabia. Only four external factors were taken into consideration when investigating their influence on engagement in technology use. There could be other external/environmental factors that could be useful to support the theory and advance the literature. Practical implications: in-service and trainee faculties should take advantage of the use of the learning management system. Teachers need to create a positive learning environment in their online classes so that students can benefit from the immense investment in ICT by the Ministry of Higher Education.

4.3 Distribution of scientific production by country of origin

Figure 4 shows how scientific production is distributed according to the country of origin of the institutions to which the authors are affiliated.

Figure 4. Distribution of scientific production by country of origin.



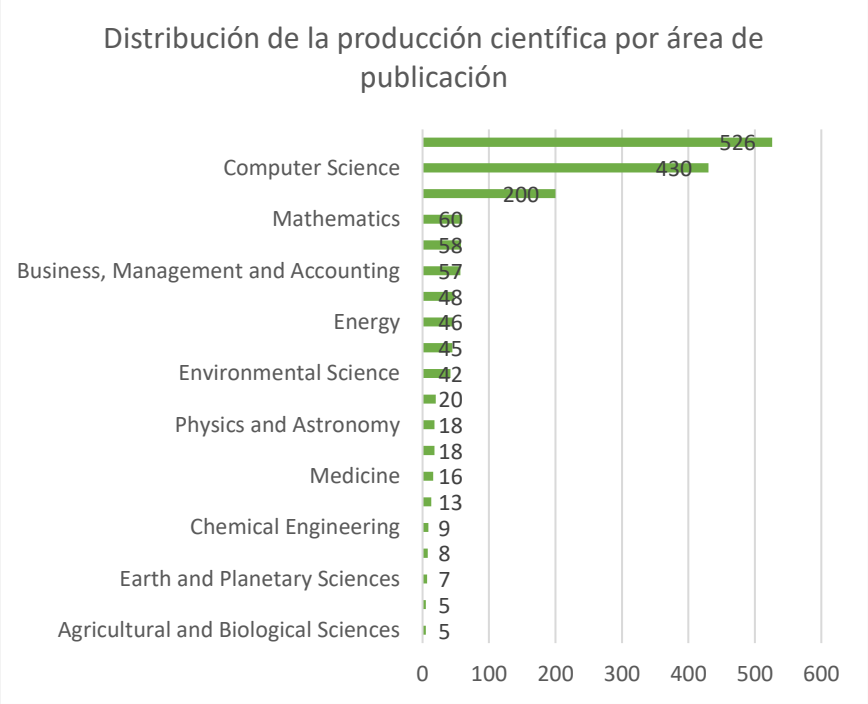
Source: Own elaboration (2023); based on data provided by Scopus.

Within the distribution of scientific production by country of origin, records from institutions were taken into account, establishing Spain, as the country of that community, with the highest number of publications indexed in Scopus during the period 2017-2022, with a total of 138 publications in total. In second place, India with 79 scientific papers, and Malaysia with 4-6. South Africa the fourth place presenting to the scientific community, a total of 37 documents among which is the article entitled "Digital education: aspects and growth in socioeconomic development: towards a sophisticated practice of education 4.0" (P.K, 2022) It is important to note that most of these are widely used in the teaching-learning process and, At present, the entire education system becomes more focused on technology. There are many concerns about digital education, including e-learning, online education, educational technology, virtual education, and blended learning. However, previously only ET, i.e. Educational Technology or E-Learning, was treated as ICT practice in education and gradually other areas have led the development of Digital Education, not only as a practical concept, but also as a field of study. The most recent nomenclature, "Digital Education", has become a theme in many international universities to offer the best in the practice of planning, conducting education and also general educational approaches so that sophisticated teaching and learning activities can be developed. Digital education partially known as educational technology necessary in the process of communication and exchange of views using IT and computing.

4.4 Distribution of scientific production by area of knowledge

Figure 5 shows the distribution of the elaboration of scientific publications from the area of knowledge through which the different research methodologies are implemented.

Figure 5. Distribution of scientific production by area of knowledge.



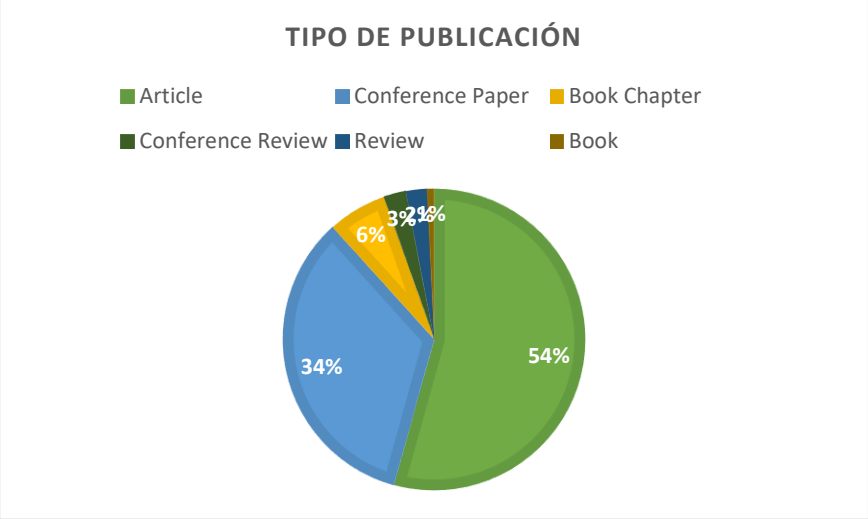
Source: Own elaboration (2023); based on data provided by Scopus

Social Sciences was the area of knowledge with the highest number of publications registered in Scopus with a total of 526 documents that have based their methodologies on the study of Teaching Modalities, Learning Modalities, ICT, Higher Education. In second place, Computer Science with 430 articles and Engineering in third place with 200. among which is the article entitled "Analysis and Comparison of International Digital Competence Frameworks for Education" (Mattar, 2022) This article aims to analyze and compare international digital competence frameworks for education. The study compares characteristics such as the purpose, structure, competencies and levels of frameworks, as well as indicators for instrument development. The results indicate that the objective, the theoretical framework and the target group define the characteristics of the framework. Most of the frameworks analyzed focus on teacher education. The comparison identified common competencies: communication, collaboration, sharing, information and data, content, technique, teaching, learning and ethics. All frameworks include profiles, objectives, descriptors, activities, examples and cases of knowledge, skills and attitudes. The article concludes that digital competence frameworks should be segmented by educational actors (students, teachers and administrators) and levels (infant, primary, higher and corporate) with the corresponding evaluation instruments.

4.5 Type of publication

In the following graph, you will observe the distribution of the bibliographic finding according to the type of publication made by each of the authors found in Scopus.

Figure 6. Type of publication.



Source: Own elaboration (2023); based on data provided by Scopus.

The type of publication most frequently used by the researchers referenced in the body of this document was Articles 54% of the total production identified for analysis, followed by Session Papers with 34% of the research papers published during the period 2017-2022 in journals indexed in Scopus. In this last category, the one entitled "Skills and Experiences of Students in the Use of Information and Communication Technologies in Distance Physical Education Classes" stands out. (Rutkauskaite, 2022) The aim of this research was to determine the relationship of Lithuanian students in grades 8 to 12 with information and communication technologies and to reveal students' experiences when participating in remote lessons of physical education. A total of 268 students selected by the convenience sampling method completed a questionnaire composed of four blocks with 53 closed and 4 open questions divided by topics. The relationships between physical activity during quarantine and its predictors were assessed using linear and hierarchical regression analyses. It was estimated that students' computer literacy skills were slightly above average and that students' positive attitudes towards ICT would prevail in the educational process. In remote physical education lessons, students typically exercised independently or together using a video communication program. Students' expectations for distance physical education lessons included the completion of sports, interesting and active challenges, and the opportunity to be independent. Older students and students who spent

more time with ICT and had fewer computer skills were less physically active and fit. During the quarantine, students' physical activity and fitness declined.

5. Conclusions

Through the bibliometric analysis carried out in the present research work, it was established that Spain was the country with the largest number of records published for the variables Teaching Modalities, Learning Modalities, ICT, Higher Education with a total of 138 publications in the Scopus database. In the same way, it was established that the application of the Social Sciences were the most frequently used in measuring the impact generated by the use of teaching and learning modalities through communication technologies (ICT) in higher education is of vital importance today. These modalities have revolutionized the way education is conducted, providing numerous benefits for both students and teachers and educational institutions. The flexibility and convenience offered by these modalities allow students to access higher education without the barriers of time and space, adapting their study schedules to their individual needs. This expands training opportunities for those who face geographical, work or family limitations, and allows them to reconcile their personal responsibilities with their academic development. The interactivity and active participation fostered by ICT in education allow students to engage more deeply in their learning process. Through online tools and platforms, they can interact with peers and teachers, participate in discussions, collaborate on projects, and share knowledge. This enriches their educational experience by promoting the exchange of ideas, the collective construction of knowledge, and the development of collaborative skills. Access to online educational resources is another fundamental aspect of these modalities. Students have at their disposal a wide range of teaching materials, such as e-books, academic articles, videos and simulations, which enrich their learning process. This gives them the possibility to access up-to-date and relevant information, delve into the topics of study and develop research skills. In addition, the use of teaching and learning modalities through ICT encourages pedagogical innovation and constant updating. Teachers have the opportunity to use new educational tools and approaches, adapt teaching content and methods, and provide a more personalized and effective education. This contributes to improving the quality of education and preparing students for the challenges of today's world.

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