

B-LEARNING AND MOODLE AS A STRATEGY IN HIGHER EDUCATION: CHALLENGES AND OPPORTUNITIES FOR IMPROVEMENT

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Abstract

A documentary review was carried out on the production and publication of research papers referring to the study of the variable B-learning, Moodle 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 2017-2022, achieving the identification of 57 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 Brazil with 17 publications was the Latin American 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 B-learning, Moodle in Latin American Higher Education was Social Sciences with 39 published documents, and the Type of Publication most used during the

period indicated above were Journal Articles with 54% of the total scientific production.

Keywords: B-learning, Moodle, Higher Education, Latin America.

1. Introduction

The implementation of b-learning, also known as blended or blended learning, and the Moodle platform as strategies in higher education has been a growing trend in recent years. These technological tools have revolutionized the way knowledge is imparted and accessed, providing flexibility, interactivity and an enriched learning experience. B-learning combines elements of face-to-face learning and online learning. Students participate in activities both in the classroom and through virtual platforms. This allows you to take advantage of the benefits of both approaches: interaction and collaboration with peers and teachers in the physical environment and the autonomy and flexibility of accessing online content and activities.

One of the most widely used e-learning platforms in higher education is Moodle. Moodle is an open source learning management system (LMS) that offers a set of tools and resources for managing, organizing, and distributing educational content. It provides a virtual environment where teachers can create and share course materials, assign assignments, manage assessments, and communicate with students. The combination of b-learning and Moodle in higher education offers several advantages. On the one hand, it allows students to access educational material anytime, anywhere, facilitating autonomous learning and reconciling studies with other responsibilities. In addition, it encourages interaction and collaboration between students and teachers through tools such as discussion forums, chats and videoconferences, thus promoting collaborative learning and the exchange of ideas.

Another outstanding advantage is the possibility of personalizing learning. Moodle allows you to adapt the contents and activities according to the needs and rhythm of each student, providing a more individualized learning experience. It also offers the possibility of detailed monitoring of student progress, which facilitates personalized evaluation and feedback. However, it is important to consider some challenges when implementing b-learning and Moodle in higher education. It requires an adequate technological infrastructure and prior training for both teachers and students. In addition, it is critical to carefully design and plan courses to ensure a consistent and effective learning experience. 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 B-learning, Moodle and Higher Education, as well. As the description of the position of certain authors affiliated with institutions, during the period between 2017 and 2022.

2. General Objective

Analyze from a bibliometric and bibliographic perspective, the elaboration and publication of research papers in high impact journals indexed in Scopus database on the variables B-learning, Moodle and Higher Education during the period 2017-2022.

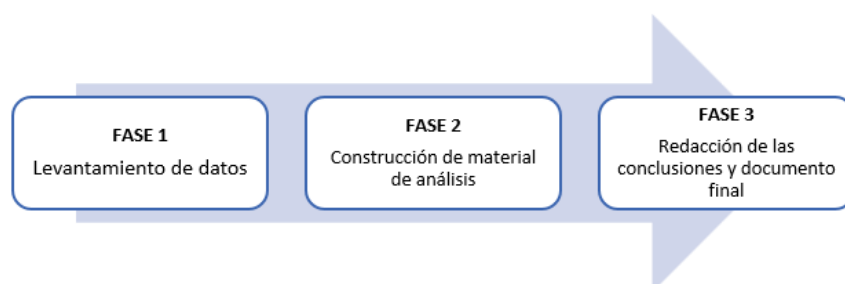
3. Methodology

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 B-learning, Moodle and 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 carried out from the Search tool on the Scopus website, where 57 publications were obtained from the choice of the following filters:

TITLE-ABS-KEY (moodle, 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)) AND (LIMIT-TO (AFFILCOUNTRY , "Brazil") OR LIMIT-TO (AFFILCOUNTRY , "Ecuador") OR LIMIT-TO (AFFILCOUNTRY , "Chile") OR LIMIT-TO (AFFILCOUNTRY

, "Mexico") OR LIMIT-TO (AFFILCOUNTRY , "Peru") OR LIMIT-TO (AFFILCOUNTRY , "Cuba") OR LIMIT-TO (AFFILCOUNTRY , "Colombia") OR LIMIT-TO (AFFILCOUNTRY , "Uruguay") OR LIMIT-TO (AFFILCOUNTRY , "Argentina"))

- Published documents whose study variables are related to the study of Teaching Modalities, Learning Modalities, ICT, Higher Education
- Limited to years 2017-2022.
- 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

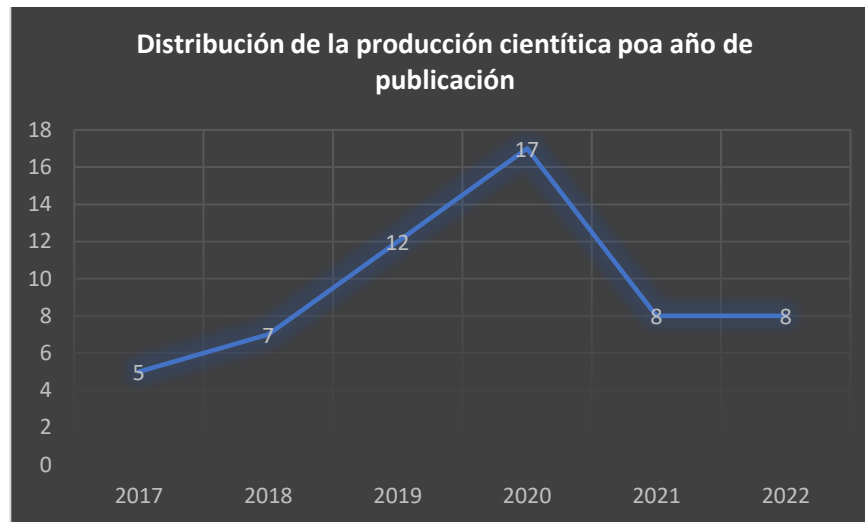
In this phase, we proceed with the analysis of the results previously yielded resulting in the determination of conclusions and, consequently, the obtaining of the final document.

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 3. Distribution of scientific production by year of publication.



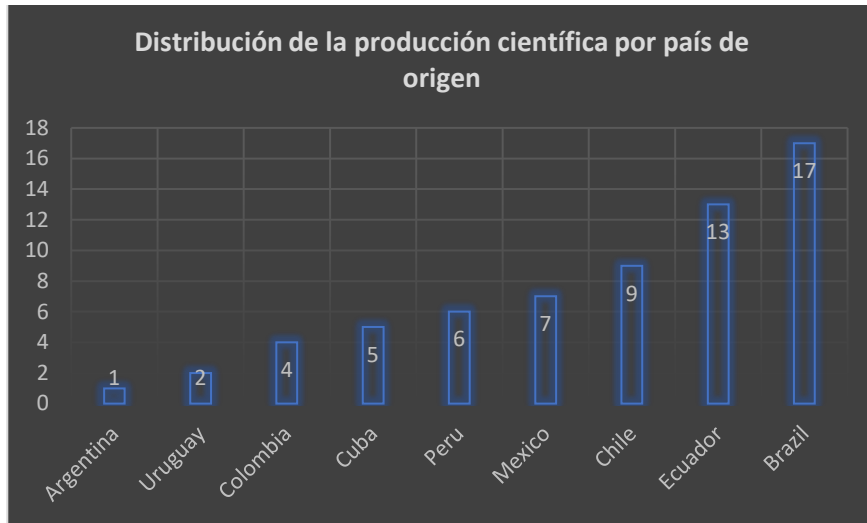
Source: Own elaboration (2023); based on data exported from Scopus

Among the main characteristics evidenced by the distribution of scientific production by year of publication, a level of number of publications registered in Scopus is notorious in the years 2020, reaching a total of 17 documents published in journals indexed in said platform. The above can be explained thanks to articles such as the one entitled "Analysis on the use of technology in the course of Clinical Method during the Covid-19 pandemic considering data science" The objective of this mixed research is to analyze students' perceptions about the use of technology in the Clinical Method course considering data science (Salas-Rueda, 2022) (machine learning) through linear regression techniques and trees of decision. The participants are 77 students from the Faculty of Psychology who attended the Clinical Method course at the National Autonomous University of Mexico during the 2020 school year. The results of the machine learning technique indicate that the use of Zoom, Moodle, audios and Padlet during the educational process on observation and inquiry in Clinical Psychology positively influences the assimilation of knowledge and motivation of students. Likewise, data science identifies 8 predictive models on the use of these technological tools in the educational process through the decision tree technique. In conclusion, ICT allows the construction of new educational spaces that facilitate the learning process from anywhere, allow the active participation of students at any time and meet the educational demand during the Covid-19 pandemic.

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.



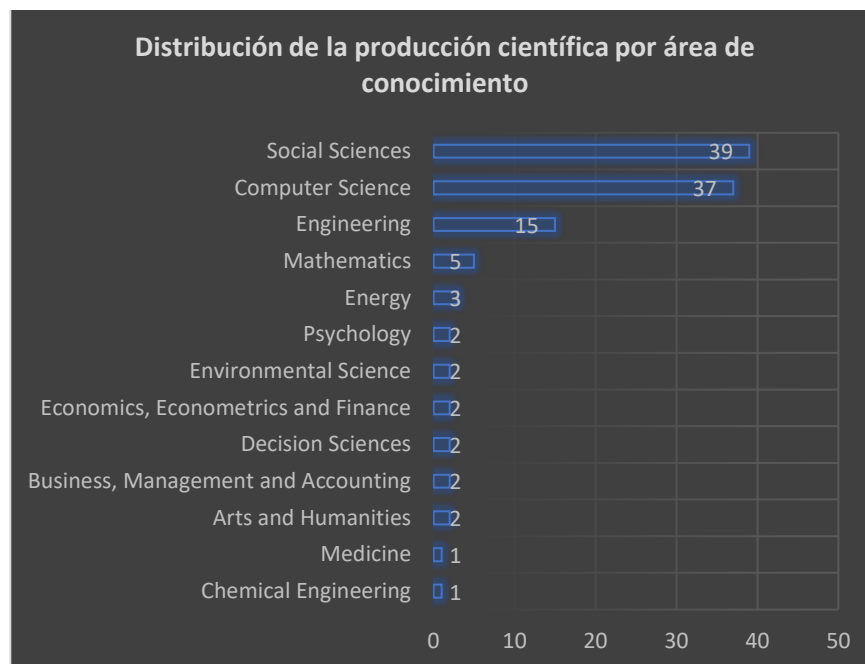
Source: Own elaboration (2023); based on data provided by Scopus.

Within the distribution of scientific production by country of origin, records from institutions were taken into account, establishing Brazil, as the country of that community, with the highest number of publications indexed in Scopus during the period 2017-2022, with a total of 17 publications in total. In second place, Ecuador with 13 scientific documents, and Chile occupying the third place presenting to the scientific community, with a total of 9 documents among which is the article entitled "The transformation to an online course in higher education translates into a better academic performance of students" (Rodríguez, 2022) this article has We aim to investigate the academic performance of an online learning environment in a course with a high number of enrolled students conducted in the context of the pandemic in 2020 and compare it with the face-to-face version of the course in 2019. The e-learning version of the course included some changes with respect to the face-to-face modality to allow active student learning, the digital learning environment, the application of knowledge and a greater exploitation of the activities available on the Moodle platform as for the face-to-face modality. Of course, although the curriculum remained unchanged. This study finds that e-learning based on synchronous and asynchronous problem solving along with self-assessment and team-based individual and continuous questionnaire assessments are valuable instructional methods that enabled higher academic student performance compared to face-to-face academic students. results. In addition, academic performance was directly related to students' participation in both individual and team activities during the course, demonstrating that the adaptation of the face-to-face course to the e-learning environment was at least as efficient as the traditional course, despite the students' resistance to e-learning and e-assessment.

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

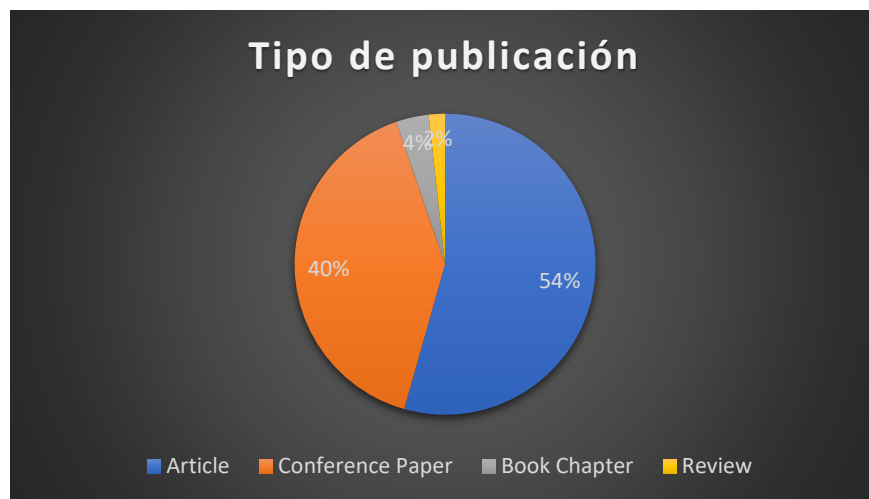
Social Sciences was the area of knowledge with the highest number of publications registered in Scopus with a total of 39 documents that have based their methodologies B-learning, Moodle and Higher Education Insecond place, Communication Sciences with 37 articles and Engineering in third place with 15. The above can be explained thanks to the contribution and study of different branches, the article with the greatest impact was registered by the Social Sciences area entitled "recognition of learning patterns to raise educational quality in higher education measured on an indeterminate neutrosophic scale of Likert" (Rodriguez J. R., 2022) The objective of this study is based on the analysis of the data obtained in the Moodle platform and its processing in the Orange tool, using the CRIP-DM methodology. Neural networks were used to predict the final evaluation and the SHAP index to explain the model. It can be noted that the three most important attributes are related to the knowledge acquired and the level of effort. Questionnaires were applied to the students, who answered using an indeterminate Likert scale that consists of the evaluation of each

question with five components instead of just one, so the answers are more indeterminate and precise.

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 the Journal Article with 54% of the total production identified for analysis, followed by the Conference Room Paper with 40%. The Book Chapters are part of this classification, representing 4% of the research papers published during the period 2017-2022 in journals indexed in Scopus. In this last category, the one entitled "Perception of medical students on the virtualization of courses of general pathology and special pathology " stands out, whose scope of study is based on Describe the process of (Mori, 2022) virtualization of general and special pathology courses and the perception of students. Methods. Non-experimental, prospective and cross-sectional study. For the virtual delivery of the courses, the Moodle platform was used; and, for histopathology practices, the Pathpresenter platform was used. 126 students of the general pathology course and 133 of special pathology participated. The questionnaire developed by Justin Krawiec and Quality Matters for Higher Education Rubric was used, which consists of 27 questions with answers on a Likert scale ranging from 1 to 5, where 1 is rated as totally disagreeing and 5 as totally agreeing. It has a reliability of 0.96 according to Cronbach's alpha coefficient. Overall ratings were established using percentiles. Results. Use of Moodle: the clarity of the content obtained a rating of 3.9 and 4,

while the presence of problems accessing Moodle obtained an average rating of 2.4 and 3. In the dimension classes and assessment, the usefulness of virtual practices obtained an average rating of 3.8 and 3.5. As for the third dimension, microscopy virtualization experience, the statement "The Pathpresenter platform is easy to use and effective for the purpose of the courses", obtained an average score of 4.1 and 4.2. Conclusion. Students value positively the virtual pathology practices, the ease of access and the quality of the images. However, they report having technical difficulties accessing the Moodle platform.

5. Conclusions

Through the bibliometric analysis carried out in the present research work, it was established that Brazil was the country with the largest number of records published for the variables B-learning, Moodle and Higher Education with a total of 17 publications in the Scopus database. In the same way, it was established that the application of theories and framed in the area of Social Sciences, were the most frequently used in the measurement of the positive impact of the implementation of b-learning and Moodle in higher education is evidenced in several aspects. First, the flexibility provided by these tools allows students to access course content anytime, anywhere, adapting to their needs and pace of learning. This promotes autonomy and self-learning, essential skills in today's world. In addition, the interaction and collaboration facilitated by Moodle encourages collaborative learning and the exchange of ideas between students and teachers. Discussion forums, communication tools and group activities promote active participation, debate and collective knowledge construction. Another significant impact is the personalization of learning. Moodle allows content and activities to be tailored to meet individual student needs. Teachers can provide additional resources, assign differentiated tasks, and provide personalized feedback, which streamlines the teaching process and supports the development of each student's specific strengths and abilities. However, it is important to be aware of the challenges that arise when implementing these strategies. It requires a solid technological infrastructure, training for teachers and students, as well as careful course design to ensure a coherent and effective learning experience.

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