Section A-Research paper
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POWERING THE LEARNING EXPERIENCE IN MOODLE: HOW TO LEVERAGE AI AND ChatGPT TO BOOST ONLINE EDUCATION

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Summary

A documentary review was carried out on the production and publication of research papers referring to the study of the variable LEARNING, MOODLE, ARTIFICIAL INTELLIGENCE. 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 76 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 India with 8 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 LEARNING, MOODLE, ARTIFICIAL INTELLIGENCE was Computer Science with 63 published documents,

and the Type of Publication most used during the period indicated above were Conference Articles with 67% of the total scientific production.

Keywords: LEARNING, MOODLE, ARTIFICIAL INTELLIGENCE.

1. Introduction

In recent years, the popularity of online education has increased significantly due to the development of technology and the increased availability of the Internet. As a result, learning management systems (LMS) have become the main tools for organizing courses and facilitating distance learning. One such effective and widely used learning platform is Moodle. However, with the integration of artificial intelligence (AI) and advanced language models such as chatgpt, Moodle has become a dynamic platform that provides personalized and interactive learning experiences.

This article explores how teachers and students can use the power of Moodle's AI and chatgpt to improve online education. We explore the many ways these technologies can be used to optimize student engagement, provide personalized support, and create an immersive virtual classroom. With AI and chatgpt features, educators can create a more interactive, adaptable, and effective online learning experience for their students.

First, we explored how AI can be used to automate administrative tasks such as grading and feedback, saving teachers valuable time and allowing them to focus on more meaningful interactions with students. We are also exploring the role of artificial intelligence in data analytics, which can provide valuable insights into student performance, identify knowledge gaps, and tailor learning content to individual needs.

We then explored the integration of the state-of-the-art language model ChatGPT into Moodle. ChatGPT can act as a virtual assistant, providing real-time support to students by answering their questions and providing additional clarification or resources. By simulating a human conversation, chatgpt can enhance the student experience, promote critical thinking, and encourage active participation in the learning process.

In addition, we discussed the inclusion of AI-based recommender systems in Moodle. These systems can intelligently recommend additional materials, assignments, or discussion topics based on each student's unique learning style, preferences, and progress. By tailoring content recommendations to individual learners, Moodle becomes a personalised learning environment that facilitates a deeper understanding of the subject and encourages self-directed learning. Finally, we explore the ethical aspects of integrating AI and chatgpt into online education. We deal with issues related to data protection, bias and the potential impact on human interaction. By critically examining these questions, educators can ensure the responsible and fair use of AI technologies in the Moodle ecosystem. For this reason, this article seeks to describe the main characteristics of the compendium of publications indexed in Scopus database related to the variables LEARNING, MOODLE, ARTIFICIAL INTELLIGENCE, 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 works in high impact journals indexed in Scopus database on the variables LEARNING, MOODLE, ARTIFICIAL INTELLIGENCE 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 LEARNING, MOODLE, ARTIFICIAL INTELLIGENCE. 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

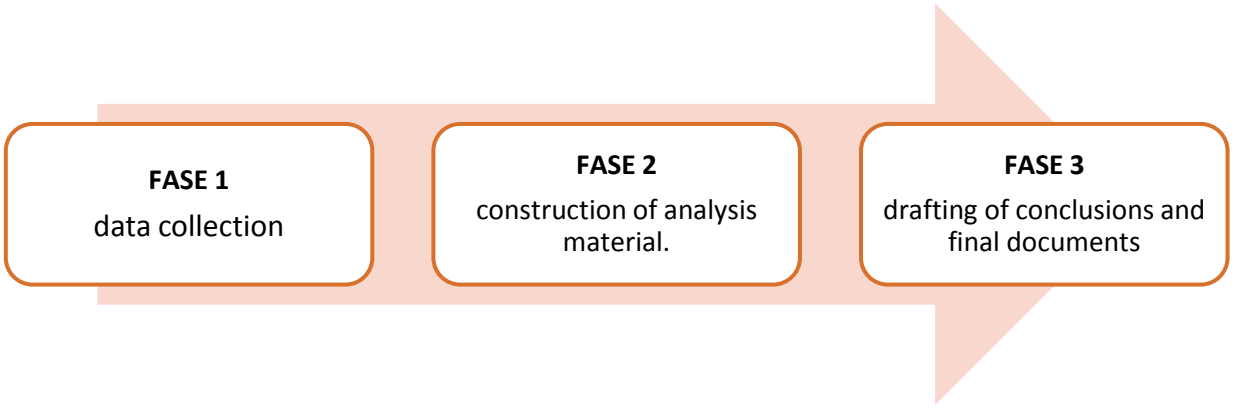

Figure 1. *Methodological design*
Source: Authors.

3.1.1 Phase 1: Data collection

Data collection was executed from the Search tool on the Scopus website, where 76 publications were obtained from the choice of the following filters:

- TITLE-ABS-KEY (learning, AND moodle, AND artificial AND intelligence) 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 LEARNING, MOODLE, ARTIFICIAL INTELLIGENCE
- Limited to the years 2017-2022.
- No 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.

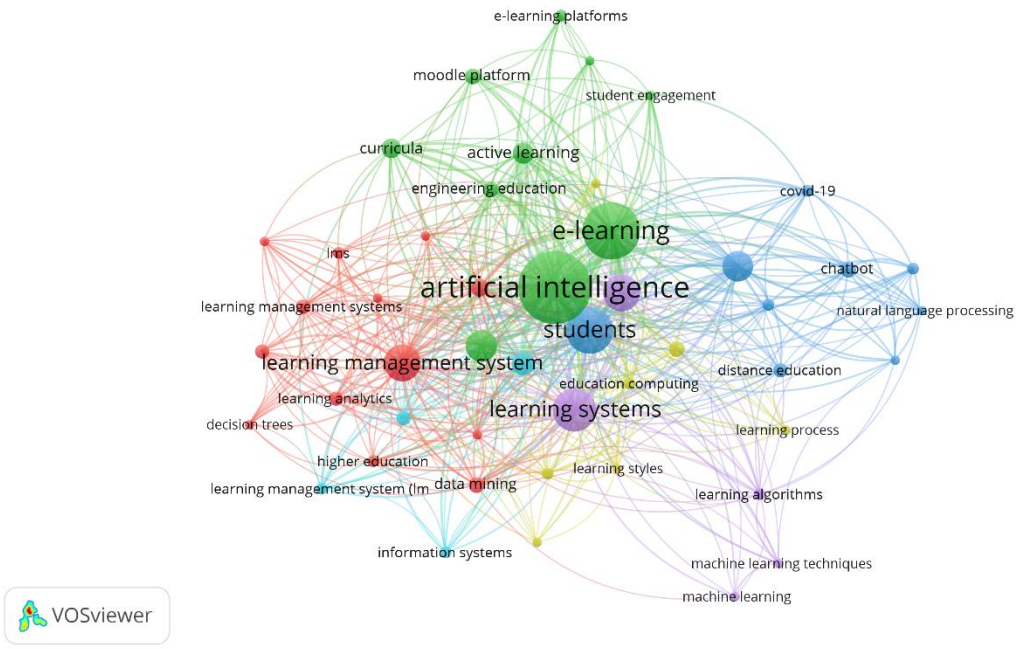

Figure 2. *Co-occurrence of words*
Source: Own elaboration (2023); based on data exported from Scopus.

Artificial Intelligence 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 Distance Education, Education Engineering, Digital Technology, Teaching, System for the Management of Performance. From the above, it is striking that, Moodle with AI and ChatGPT can be used to improve online education. We'll delve into the benefits and features AI offers in Moodle, discuss the potential impact of AI-based chat agents on student engagement and support, and highlight real-world examples of how these technologies have already transformed learning experiences. Learn online. Ultimately, you will gain a better understanding of how AI and ChatGPT can be used in Moodle to optimize the learning experience for students and teachers.

4.2 Distribution of scientific production by year of publication

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

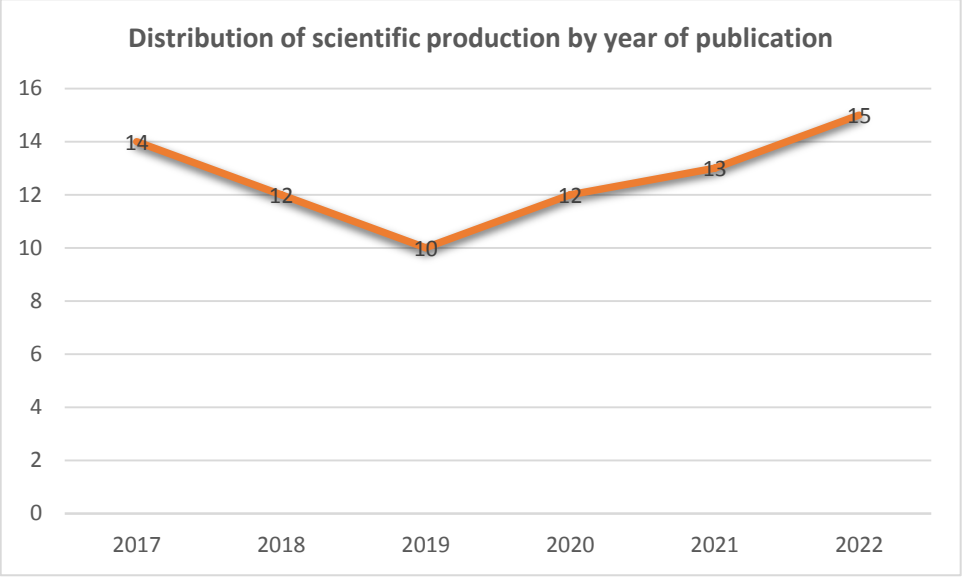

Figure 3. *Distribution of scientific production by year of publication.*
Source: Own elaboration (2023); based on data exported from Scopus

Among the main characteristics evidenced by the distribution of scientific production by year of publication, a level of number of publications registered in Scopus is notorious in the years 2022, reaching a total of 15 documents published in journals indexed in said platform. This can be explained thanks to articles such as the one entitled "Development of an intelligent system based on the learning of the meta verse for students with disabilities" the present article aimed to design and create a virtual learning environment using Open Simulator based on a 3D virtual environment and simulation of the real world environment. We then connected this environment to a learning management system (Moodle) through technology for 3D virtual environments (Sloodle) to allow the management of students, especially those with different abilities, and track their activities, tests and exams. This environment also has the advantage of storing educational content. We evaluate the performance of Open Simulator in standalone and grid modes based on login times. The result showed times in the standalone and grid modes of 12 s and 16 s, which demonstrated the robustness

of the proposed platform. We also tested the system on 50 disabled students, based on the t-test of independent samples. A test was carried out in the mathematics course, in which the students were divided into two equal groups (n = 25 each) to perform the test in a traditional way and using the chair test tool, which is one of the most important tools of Sloodle technology. According to the results, the null hypothesis was rejected and the alternative hypothesis demonstrating a difference in performance between the two groups was accepted. Copyright(Sghaier, 2022)

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.

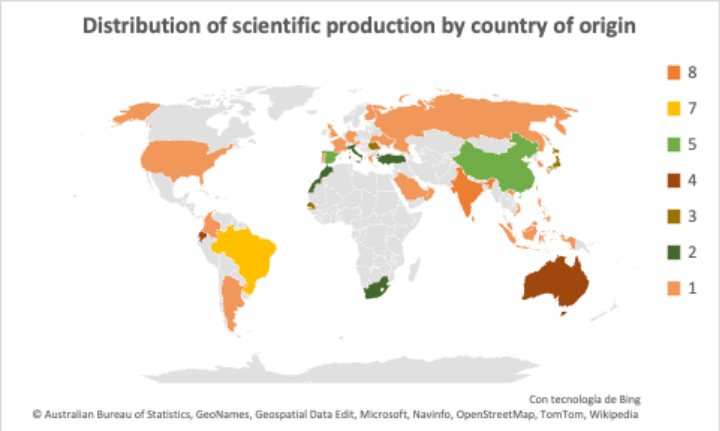

Figure 4. *Distribution of scientific production by country of origin.*
Source: Own elaboration (2023); based on data provided by Scopus.

Within the distribution of scientific production by country of origin, records from institutions were taken into account, establishing India, as the country of that community, with the highest number of publications indexed in Scopus during the period 2017-2022, with a total of 8 publications in total. Secondly, Brazil with 7 scientific papers, and China ranking third presenting to the scientific community, with a total of 5 papers among which is the article entitled "A systematic review on trends in the use of Moodle for teaching and learning" this review aims to summarize this research to help three stakeholder groups: educators, researchers and software developers. It identifies: (a) how and where Moodle has been adopted; (b) what are the concerns, trends and gaps to lead software research and development in the future; and (c) innovative and effective methods to improve online teaching and learning. The review used the 4-step PRISMA-P process to identify 155 suitable journal articles from 104 journals in 55 countries published from January 2015 to June 2021. The database was searched using Scopus and Web of Science. Knowledge about the educational use of Moodle was determined by bibliometric analysis with Vosviewer results and thematic analysis. Results: This review shows that Moodle is mainly used within university STEM disciplines and effectively improves student performance, satisfaction and engagement. Moodle is

increasingly used as a platform for adaptive and collaborative learning and is used to enhance online assessments. The use of Moodle is rapidly developing to address issues of academic integrity, ethics and security to improve speed and navigation, and incorporate artificial intelligence.(Gamage, 2022)

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.

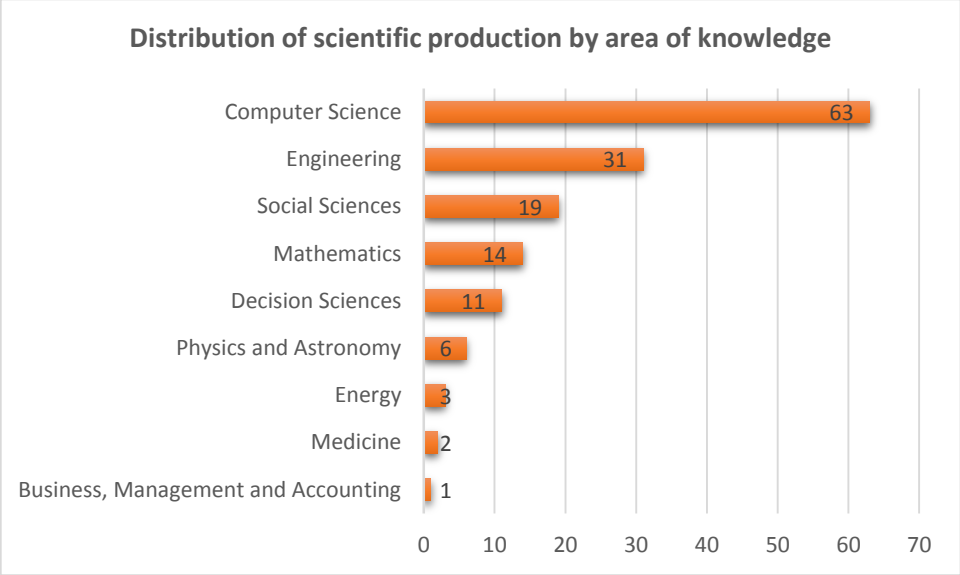

Figure 5. *Distribution of scientific production by area of knowledge.*
Source: Own elaboration (2023); based on data provided by Scopus

Computer Science was the area of knowledge with the highest number of publications registered in Scopus with a total of 63 documents that have based their methodologies LEARNING, MOODLE, ARTIFICIAL INTELLIGENCE In second place, Engineer with 31 articles and Social Sciences in third place with 19. The above can be explained thanks to the contribution and study of different branches, the article with the greatest impact was registered by the Computer Science area entitled "Online peer instruction in Moodle to encourage student participation at the time of the COVID-19 pandemic" this article shows that peer instruction can be applied synchronously and effectively to a distance learning course, using the Moodle learning platform along with a video conferencing tool. Background: Due to the COVID-19 pandemic, all global education has shifted from face-to-face to distance learning. As the debate continued about the efficacy of active learning alternatives to traditional lectures, teachers were faced with an additional difficulty: how to engage students in a fully online learning process, where personal contact is completely non-existent. The authors found the answer in the online peer-to-peer instruction app.(Vallarino, 2022)

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.

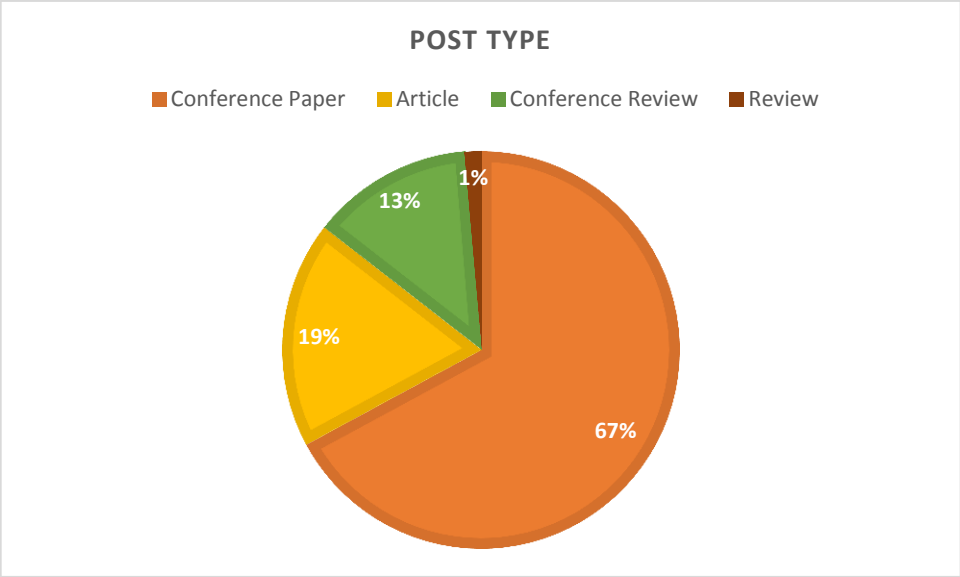

Figure 6. *Type of publication.*
Source: Own elaboration (2023); based on data provided by Scopus.

The type of publication most frequently used by the researchers referenced in the body of this document was the one entitled Conference Articles with 67% of the total production identified for analysis, followed by Journal Articles with 19%. Conference Journal are part of this classification, representing 13% of the research papers published during the period 2017-2022 in journals indexed in Scopus. In this last category, the one entitled "Quantitative analysis of teaching activity in the Chinese classroom under the background of artificial intelligence" stands out, whose scope of study makes a quantitative analysis of teaching behavior in the classroom and technology using the behavior of 3 teachers and 151 students in the integrated teaching of information technologies and curriculum, and makes a comparative analysis with data obtained from the survey questionnaire on behavior in education of information from 213 teachers and many students in 36 secondary schools in southern Henan. After researching and investigating, three findings have been found: first, the initiative of many Chinese teachers is still in the hands of teachers. Secondly, the interaction between teachers and students in classroom teaching has a major impact on teaching and learning. Third, the involvement of information technology can effectively promote students' autonomous learning and teachers' reflection. Therefore, under the background of artificial intelligence, this paper proposes the following teaching countermeasures: First, it is imperative that teachers use information technology for effective teaching. Second, teachers should encourage students to use information technology to improve their cognitive ability and inquiry. Thirdly, teachers are encouraged to pay attention to formative assessment of the learning process and individual learners.(Yuan, 2022)

5. Conclusions

Through the bibliometric analysis carried out in the present research work, it was established that India was the country that has the largest number of records published for the variables LEARNING, MOODLE, ARTIFICIAL INTELLIGENCE Internal with a total of 8 publications in Scopus database. In the same way, it was established that the application of theories framed in the area of Communication Science, were the most frequently used in measuring the impact generated by the integration of AI and ChatGPT in Moodle, this marked the beginning of a new era of online education, transforming the way students and teachers interact with course materials and virtual tutors. Harnessing the power of artificial intelligence, Moodle has become a dynamic platform that adapts to the needs of individual students, providing personalised learning experiences, automated assessment, intelligent feedback and adaptive assessments. One of the most important advantages of Moodle's artificial intelligence is the ability to provide real-time feedback and support to learners. In addition, the integration of artificial intelligence facilitates the automation of Moodle administrative tasks. AI-powered tools can analyze large amounts of data, identify patterns, and generate insights that can inform instructional design and improve the effectiveness of online courses. In the future, the future of Moodle learning lies in new advances in artificial intelligence and natural language processing. As AI technology advances, the functionality of ChatGPT and similar chat brokers will expand, enabling even more sophisticated interactions and personalized learning experiences. We can expect AI to play an increasingly important role in meeting the diverse needs of students, including language support, accessibility, and personalized instruction.

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