

Emotional And Cognitive Development Of University Students As A Result Of The New E-Learning Model

By

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Abstract

A documentary review was carried out on the production and publication of research papers concerning studying Emotional Development and Cognitive Development variables during the Virtual Learning process for university students. The purpose of the bibliometric analysis proposed in this paper was to know the main characteristics of the volume of publications registered in the Scopus database during the period 2017-2022 and to identify the current situation in Ecuadorian institutions regarding the study of the variables above, achieving the identification of 63 publications in total. The information provided by the said platform was organized using tables and figures for categorizing the information by Year of Publication, Country of Origin, Area of Knowledge and Type of Publication. Once these characteristics were described, a qualitative analysis was used to refer to the position of different authors on the proposed topic. Among the main findings of this research, it is found that the United States, with 9 publications, was the country with the highest scientific production registered in the name of authors affiliated with institutions of that country. The Area of Knowledge that made the greatest contribution to the construction of bibliographic material referring to the study of Emotional Development, Cognitive Development during the Virtual Learning process for university students was Computer Science, with 37 published documents, and the Type of Publication that was most used during the period indicated above was the Journal Article, which represents 40% of the total scientific production.

Keywords: Emotional Development, Cognitive Development, Virtual Learning, University Students.

1. Introduction

Education is a channel for the construction of knowledge, and the development of skills and abilities is a relatively recent concern since, previously, training models were based on rote learning models, through reception and not compression. However, distance education mediated by new training and communication technologies is gaining space in learning models worldwide, especially in the university environment with the purpose of improving or maximizing different educational variables such as teacher training based on competencies, scientific research, formulation, evaluation and formulation of projects, learning evaluation and cognitive and emotional development of undergraduate students in virtual training.

Therefore, learning models in virtual training show an innovative teaching alternative that approaches the transformation and inclusion of different mechanics and structured interaction tools to models of virtual environments framed in designs and production of content encompassing all digital resources subject to the web.

Therefore, ICT training and communication technologies in virtual training complexes for cognitive development are based on complete learning that encompasses the development of competencies and thinking skills, as well as knowledge construction; in this way, it is important to reflect on the epistemological bases of the learning models that bet on a diversified and non-globalized education that seek to systematize the educational processes dynamically and creatively capable of interacting being a participant of critical phenomena taking technological tools toward a much more developed system, seeking to merge innovation with relevant aspects of teaching and cognitive development in the virtual learning models for students in university training. For this reason, this paper seeks to describe the main characteristics of the compendium of publications indexed in the Scopus database related to the variables of *Emotional Development* and *Cognitive Development* during the Virtual Learning process for university students, as well as the description of the position of specific authors affiliated to Latin American institutions, during the period between 2017 and 2021.

2. General Objective

To analyze from a bibliometric and bibliographic perspective, the production of research papers on the variables Emotional Development, Cognitive Development and Virtual Learning registered in Scopus during the period 2017-2022.

3. Methodology

Quantitative analysis of the information provided by Scopus is performed under a bibliometric approach to the scientific production related to studying the variables *Emotional Development*, *Cognitive Development* and *Virtual Learning*. Also, from a qualitative perspective, examples of some research works 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 performed through the tool provided by Scopus, and the parameters referenced in Figure 1 are established.

3.1 Methodological design

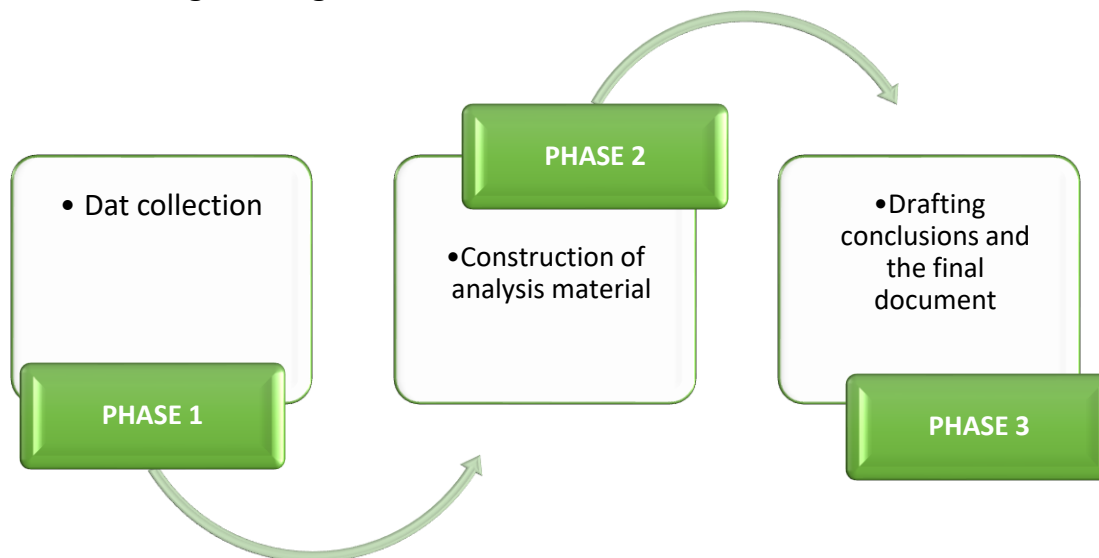


Figure 1. Methodological design

Source: Own elaboration

3.1.1 Phase 1: Data Collection

The data collection was carried out using the Scopus web page search tool, through which a total of 34 publications were identified. For this purpose, search filters were established consisting of:

TITLE-ABS-KEY (emotional AND development, AND cognitive AND development, AND virtual AND learning) 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 papers whose study variables are related to the study of Emotional Development, Cognitive Development and Virtual Learning variables.
- ✓ Without distinction of country of origin.
- ✓ Without distinction of area of knowledge.
- ✓ Without distinction of type of publication.

3.1.2 Phase 2: Construction of analysis material

The information identified in the previous phase is organized. The classification will be made employing graphs, figures and tables based on data provided by Scopus.

- ✓ Word Co-occurrence.
- ✓ Year of publication
- ✓ Country of origin of the publication.
- ✓ Knowledge area.
- ✓ Type of Publication

3.1.3 Phase 3: Drafting conclusions and final document

After the analysis carried out in the previous phase, we proceed to drafting the conclusions and preparing the final document.

4. Results

4.1 Co-occurrence of words

Figure 2 shows the Co-occurrence of keywords within the publications identified in the Scopus database.

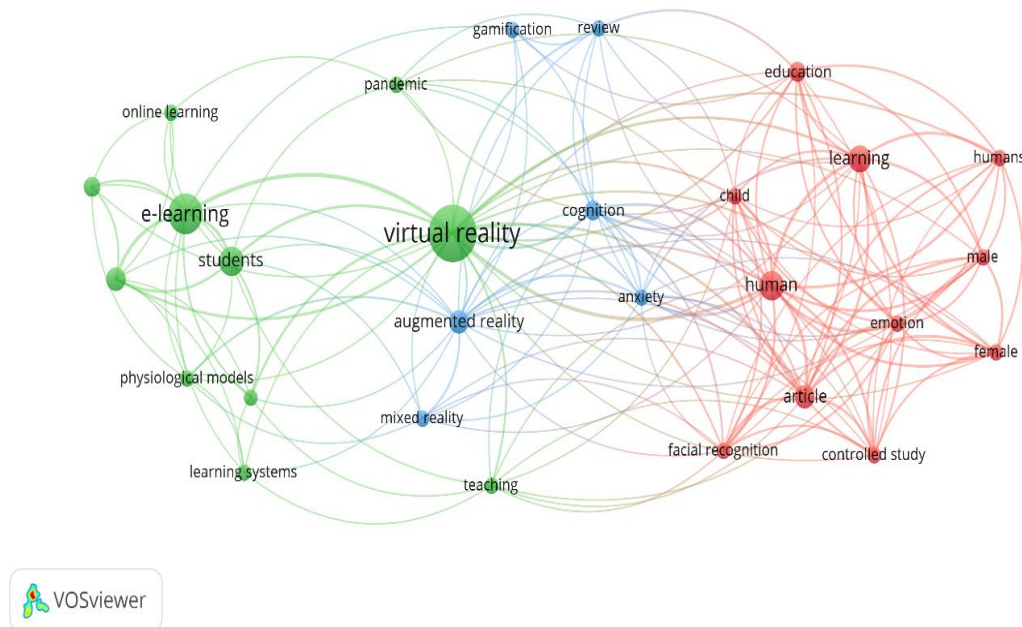


Figure 2. Co-occurrence of words

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

Within the study of the research shown by the Scopus platform, referring to the variables Emotional Development, Cognitive Development during the Virtual Learning process for university students, the object of this scientific debit, the importance of the implementation of ICT training and communication technologies in the learning processes in the virtual modality for undergraduate students is evident, since it diversifies the learning processes for the improvement of the required competences from good educational practices, improving the cognitive development present in the virtual learning environments for complete learning development. It is for this reason that through the interpretation of Figure 2, it is possible to determine how key words of the publications reported in Scopus, Virtual Reality, Teacher, Student, Cognitive, in attention to virtual education and thought development processes, it is possible to approach learning as a phenomenon of social construction, in which the participants, when reviewing the programmatic contents, construct meanings that are shared, in the first instance, with the academic community to which they belong, and when discussing it and the information they received through their senses, they can make contributions and transform the information to apply it to new contexts.

4.2 Distribution of scientific production by year of publication.

Figure 3 shows how the scientific production is distributed according to the year of publication, considering the period from 2017 to 2022.

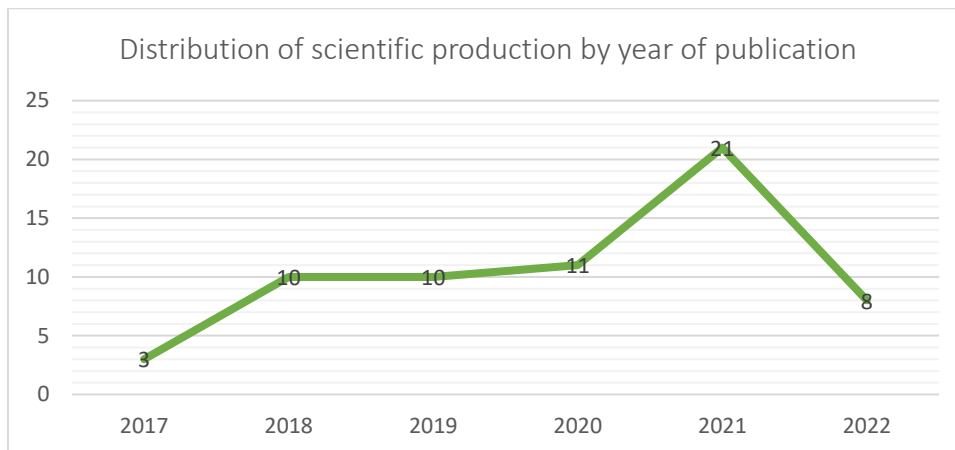


Figure 3. *Distribution of scientific production by year of publication.*
Source: *Own elaboration (2023); based on data provided by Scopus.*

Figure 3 shows the scientific production around the variables of *Emotional Development* and *Cognitive Development* during the Virtual Learning process in the period between 2017 and 2022, where the increase in production volume in the year 2021 is evidenced, with a total of 21 publications related to the keywords, among which stands out the article entitled “Immersing students in stories: a systematic review of the literature on educational narratives in virtual reality” (Calvert & Hume, 2022), whose object of study through a systematic review was to investigate the addition of narratives in immersive virtual reality (IVR) and the associated impacts on learning. Narratives in IVR put the learner into the story, which, until recent developments in IVR head-mounted display technology, was out of reach in most classrooms. The review found that the additional immersion offered by virtual reality is particularly important in relation to learning where situational context is desirable. Importantly, IVR experiences with a narrative may potentially increase affective outcomes for learners without reducing cognitive gains. In addition, data on learning theories and design methodologies were extracted from the studies. The systematic review yielded 12 relevant and applied articles, demonstrating that there are still significant gaps in the research on the impact on learning in narrative FTI.

4.3 Distribution of scientific production by country of origin.

Figure 4 shows the distribution of scientific production according to the nationality of the authors.

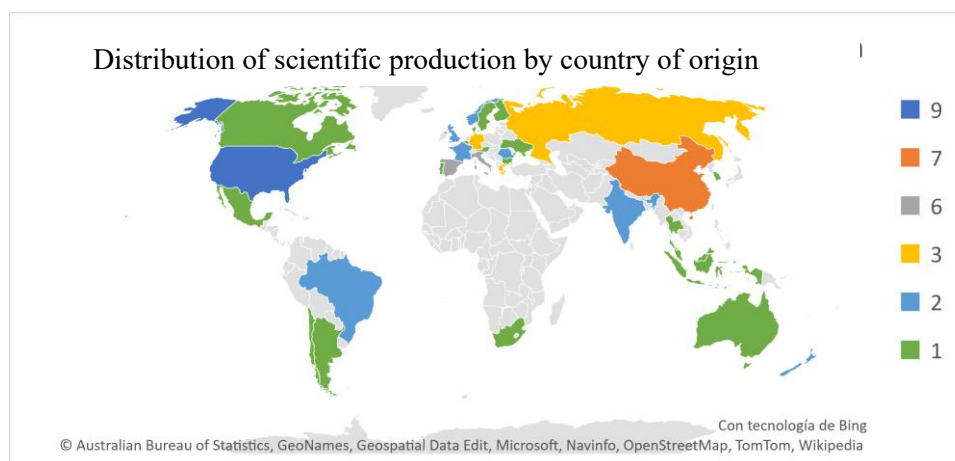


Figure 4. *Distribution of scientific production by country of origin.*
Source: *Own elaboration (2023); based on data provided by Scopus.*

The United States was the country with the highest number of publications registered in Scopus referring to the study Emotional Development, Cognitive Development during the Virtual Learning process during the period 2017-2021 with a total of 9 publications, followed by China with 7 registrations and Italy with 7. Of the latter, the article entitled “A comprehensive method to design and evaluate mixed reality simulations” stands out (Brunzini et al., 2022), whose objective of the present study proposes a method for designing a medical simulation and evaluating its effectiveness with the ultimate goal of achieving learning outcomes and not compromising the psychological safety of students. The method has been applied in designing and developing an MR application to simulate the diagnostic rachicentesis procedure in adults. The MR application has been tested with twenty students in the 6th year of Medicine and Surgery at the Università Politecnica delle Marche. Multiple measurement techniques, such as self-report, physiological indices and observer ratings on performance, and cognitive and emotional states of the students, have been implemented to improve the study’s rigor. In addition, a user experience analysis was conducted to discriminate between two different devices: Vox Gear Plus® and Microsoft Hololens®. The students also performed the simulation without using the MR application to compare the results with a benchmark. MR increased stress measured by physiological parameters without a large increase in perceived workload. It satisfies the objective of enhancing the realism of the simulation without generating cognitive overload, which is conducive to productive learning. User experience (UX) has found greater benefits in engagement, immersion and realism; however, it has emphasized devices’ technological limitations, such as obstruction and loss of depth.

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.

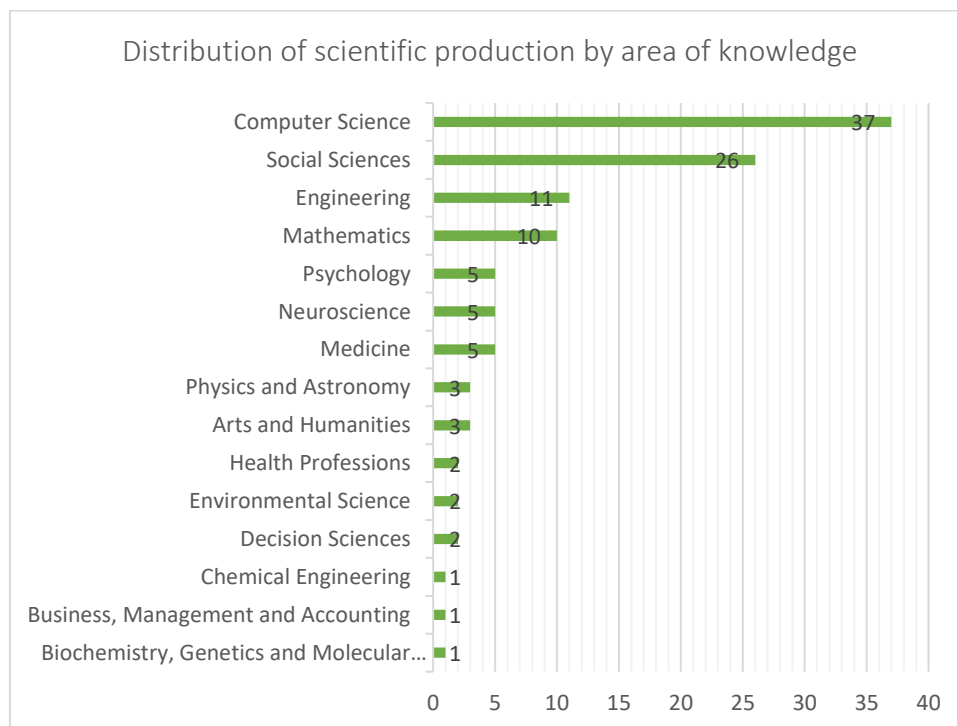


Figure 5. *Distribution of scientific production by area of knowledge.*
Source: *Own elaboration (2023); based on data provided by Scopus.*

Computer Science was the area of knowledge with the highest number of publications registered in Scopus, with 37 documents that based their methodologies on the variable of *Emotional Development* and *Cognitive Development* during the Virtual Learning process. In the second place, Social Sciences with 26 documents. The above can be explained thanks to the contribution and study of different branches. The article with the greatest impact was registered in Communication Sciences entitled “Modality of Teaching the Specialty of Mechanical Manufacturing Based on the Networked Teaching Platform” (Wang, 2021). This article aims to study the teaching modality of mechanical manufacturing specialties under the network teaching platform. This article analyzes and compares the key contents, such as the construction method of a network. Virtual platform and the working principle of X3D virtual reality technology determine the key technology and the overall plan to build a network teaching platform. This paper uses CATIA to configure and optimize the part model and generate file types that can be recognized by X3D language to ensure the reasonable configuration of each component’s start and stop time in the motion mechanism and the specific motion path and rotation angle. Based on the interactive, immersive, easy to make and use virtual reality technology, this article integrates professional knowledge resources related to mechanics to achieve the overall construction of the platform. It greatly improves the user’s perception of the part model, is intuitive, flexible and convenient, brings the user a virtual and realistic operating experience, and finally realizes the dynamic interaction and perceptual communication between humans and models in a three-dimensional scene. Research and investigations show that in the correlation between the learning inputs of mechanical manufacturing students and their learning readiness under the online teaching platform, there is a significant positive correlation between student learning readiness and behavioral input, emotional input and cognitive input.

4.5 Type of publication

Figure 6 shows how the bibliographic production is distributed according to the author’s chosen publication type.

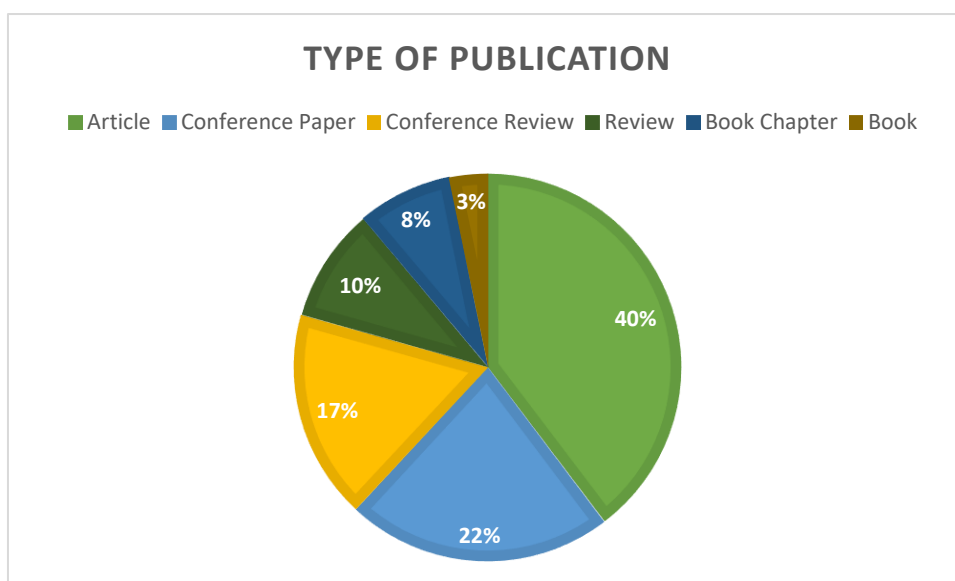


Figure 6. *Type of publication*

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

The type of publication most frequently used by researchers was the article; 40% of the total scientific production corresponds to this type of document. In the second place, section papers with 22% and Conference Reviews with 17%. In this last category, the one entitled “V

International Congress on User Science and Engineering, i-USEr 2018” stands out (5th International Conference on User Science and Engineering, i-USEr 2018, Communications in Computer and Information Science Volume 886/2018 5th International Conference on User Science and Engineering, i-USEr 2018 Puchong August 28, 2018 August 30, 2018 Code 217319). The special focus of this conference is user science and engineering. Topics include: a conceptual framework for co-design approach to support senior employability website; evaluating the application of video modeling to teach social interaction skills to autistic children; investigating the effect of exploring multimodal maps in different orientations on blind users’ cognitive maps and sense of directions; web-based adaptive learning courses for students with dyscalculia; gamification and using augmented reality for learning Islamic content: tajweed learning design and development; customer-centric service adoption in public university: a case study in Malaysia; gamification implementation in massive open online course (mooc) platform; data analysis on technology sector performance in Malaysia with entropy-topsis model; usability evaluation and recommendation according to factors affecting purchase intention: qlapa.com, a local handicraft marketplace in Indonesia; emotional response toward the design of a culture-based e-government portal using card sorting method; preliminary study of Junoblock: marker-based augmented reality for geometry educational tool; importance of user experience aspects for different categories of software products; designing a mobile solution for chronic pain self-management; a pattern for predicting the occurrence of an information overload moment during online information search; a comparison of gestural and tactile interface for designing a virtual percussion instrument; the problems of halal inspection process from the perspective of supply and demand in Malaysian halal certification system; towards achieving efficiency in zakat management system: interaction design for optimization in Indonesia; security evaluation of distortion technique for graphic authentication.

5. Conclusions

The development of cognitive thinking in students of the virtual modality has a very high social component because they must recognize and learn their environment and the possibility through complex and critical thinking to generate solutions to social conflicts and also understand how to make clear and efficient decisions. In this way, it is important to understand how the implementation of information technologies and virtual training environments offer university students the possibility of acquiring critical and educational thinking skills different from other present educational modalities since this allows them to build knowledge using other tools and the use of media and cutting-edge digital platforms.

On the other hand, virtual education has characteristics that differentiate it from face-to-face education. First, there is greater autonomy and independence enjoyed by the students for developing their learning processes, being the students who set their pace of study, making the study a greater self-regulated activity, with greater responsibility and commitment since students do not share their information but seek to learn to build knowledge, to determine their reliable sources and with academic quality that should be consulted and from which it is possible to feed the training process, all this with the support of a practical tutorial system; that is, learning to manage knowledge, beyond the memorization of data with the reliability and quality of the information.

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