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Enhancing College Students' Academic Performance via Tailored Tutoring Programs: Effective Strategies

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Abstract

A systematic review was carried out on the production and publication of research papers related to the study of Academic Performance and Personalized Tutoring during the period between 2017 and 2022 under the PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) approach. The purpose of the analysis proposed in this document was to know the main characteristics of the publications registered in the Scopus and Wos databases during the study and their scope in the study of the proposed variables, achieving the identification of 25 publications in total. Thanks to this first identification, it was possible to refine the results through the keywords entered in the search button of both platforms, which were ACADEMIC PERFORMANCE, PERSONALIZED TUTORING, reaching a total of 14 documents, excluding duplicates and those that did not meet the analysis criteria. The identified scientific publications were analyzed in the hope of knowing the main characteristics within the execution of research projects related to the study of the impact it generates on students, the implementation of personalized tutoring programs, and how it positively or negatively affects the performance in the fulfillment of academic assignments. In this way, it is possible to argue, with previous studies, the usefulness or not of this type of strategies among the teaching-learning processes.

Keywords: *academic performance, personalized tutoring.*

1. Introduction

In the constant evolution of higher education, which is responsible for perfecting academic excellence within universities, this performance factor continues to be a primary axis for this educational sector that is incumbent on all universities globally. Universities, as institutions of higher education, aim at the power not only to provide knowledge to students in undergraduate training but also to foster an environment conducive to integral development. A crucial element in this quest is the academic performance of college students, a multifaceted aspect influenced by various factors

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ranging from individual aptitude to instructional methodologies. In recent decades, where artificial intelligence has given way to new learning methods, the incorporation of personalized tutoring has emerged as a transformative focus that seeks to maximize student success and thus increase academic performance.

Traditional educational methods have given way to an individually focused analysis of learning needs and preferences. Recognizing the diverse academic backgrounds, cognitive styles, and learning rhythms among students, universities are increasingly turning to personalized tutoring programs as a strategic intervention to tailor educational experiences to each student's unique requirements. This paradigm shift represents a departure from conventional lecture-based instructional methods, underscoring a commitment to student-centered approaches that prioritize individual growth and achievement.

Personalized tutoring programs are based on the premise of being able to provide students with better academic results and academic support in a personalized way. The execution of these programs personalized to each student's needs, has the quality of taking advantage of pedagogical tools, the innovative factor executes new technological platforms and individual learning plans, with this it seeks to create an environment focused on the individual needs of each student. In doing so, they foster a more engaging and interactive learning environment, thereby improving subject matter comprehension and retention.

The potential impact of customized programs on academic performance is significant. The incorporation of these tutorials not only offers assistance in the academic weaknesses present in challenging subjects, but also provides personalized support to each student so that they develop skills such as analytical thinking, problem-solving skills, and a deeper understanding of the subject matter. In this comprehensive exploration, we delve into the intricate dynamics of one-on-one tutoring programs and their influence on the academic performance of college students. Based on empirical research, case studies, and best practices, we aim to elucidate the multifaceted ways in which personalized mentoring programs contribute to the educational landscape. From utilizing state-of-the-art technology to establishing strong mentor-student relationships, we will navigate the key components that make one-on-one mentoring an indispensable tool for shaping the academic trajectory of college students.

In conclusion, it is important to recognize the nature of a changing globalization, where education is a topic of general interest, based on this premise it is important to highlight the importance of incorporating personalized programs in universities, which transforms the traditional paradigm in education. In doing so, we seek not only to unravel the impact of personalized tutoring on academic achievement, but also to advocate for a pedagogical approach that prioritizes the unique needs and aspirations of each student, ultimately paving the way for a more inclusive, dynamic, and successful education. Educational experience in the 21st century.

2. General Objective

To analyze, from a bibliometric and bibliographic perspective, the production of research papers on the Academic Performance and Personalized Tutoring variable during the period 2017-2022.

3. Methodology

The present research is qualitative, according to Hernández, et al., qualitative approaches correspond to the investigations that carry out the procedure of obtaining information to review and interpret the results obtained in these studies; To do this, she searched for

information in the Scopus and Wos databases using the words ACADEMIC PERFORMANCE, PERSONALIZED TUTORING. (2015)

3.1 Research design

The research design proposed for the present research was the Systematic Review that involves a set of guidelines to carry out the analysis of the collected data, which are framed in a process that began with the coding to the visualization of theories On the other hand, it is stated that the text corresponds to a descriptive narrative since it is intended to find out how the levels of the variable affect; and systematic, because after reviewing the academic material obtained from scientific journals, theories on knowledge management were analyzed and interpreted. (Strauss & Corbin, 2016) (Hernandez, Baptista, & Fernandez, 2015)

The results of this search are processed as shown in Figure 1, through which the PRISMA technique for the identification of documentary analysis material is expressed. It was taken into account that the publication was published during the period between 2018 and 2022 limited to scientific production originating in institutions in Latin American countries and open to any area of knowledge, as well as to any type of publication, namely: Journal Articles, Reviews, Book Chapters, Book, among others.

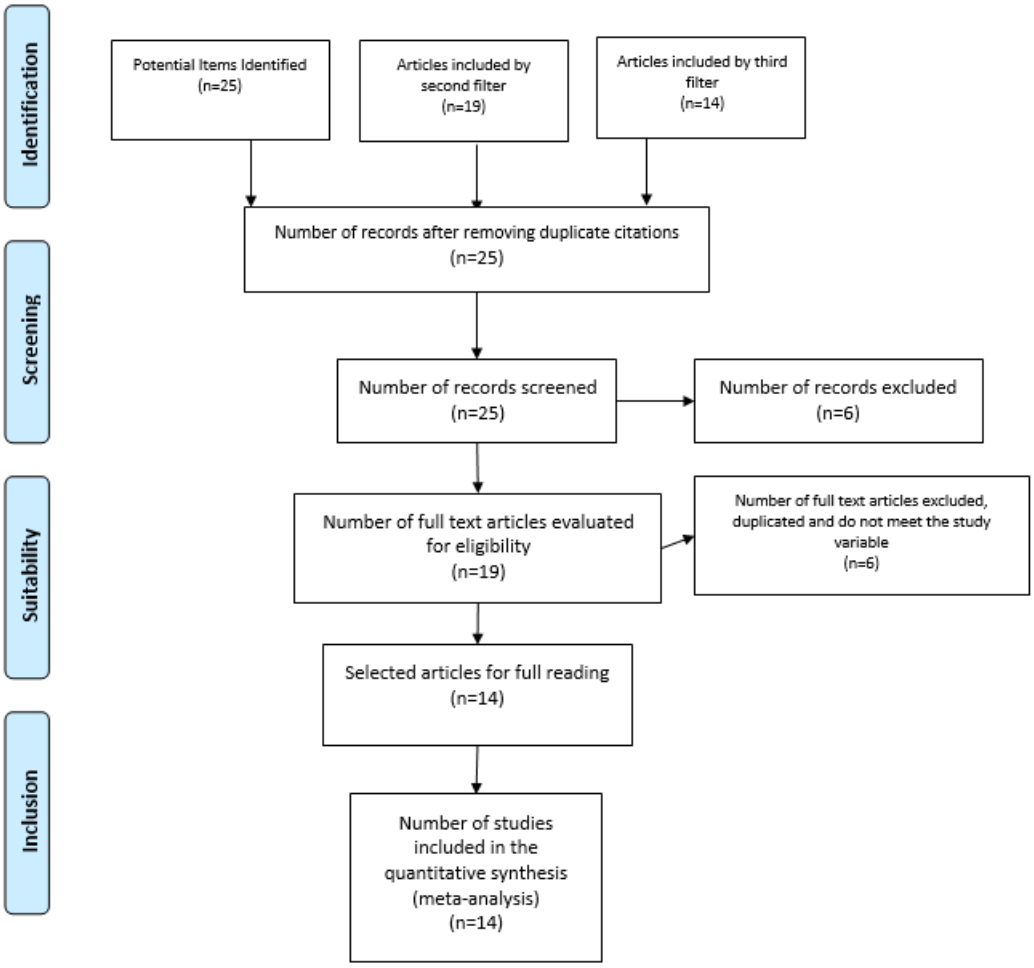

Figure 1. Flowchart of a systematic review carried out under the PRISMA technique (Moher, Liberati, Tetzlaff, Altman, & Group, 2009)

Source: Authors' own creation; Based on the proposal of the Prisma Group (Moher, Liberati, Tetzlaff, Altman, & Group, 2009)

4. Results

Table 1 shows the results after applying the search filters related to the methodology proposed for this research, after recognizing the relevance of each of the referenced works.

No.	RESEARCH TITLE	AUTHOR/YEAR	COUNTRY	TYPE OF STUDY	INDEXING
1	Develop Academic Question Recommender Based on Bayesian Network for Personalizing Student's Practice	Zhang, Q., Yang, D., Fang, P., Liu, N., & Zhang, L. (2020)	CHINA	QUALITATIVE	SCOPUS
2	Predicting Students' Performance with School and Family Tutoring Using Generative Adversarial Network-Based Deep Support Vector Machine	Chui, K. T., Liu, R. W., Zhao, M., & De Pablos, P. O. (2020).	HONG KONG, CHINA, SPAIN	QUALITATIVE	SCOPUS
3	Automation of the tutoring process in online environments through the analitycs of learning	Simanca, H. F. A., Burgos, D., Crespo, R. G., & Baena, L. R. (2018, June).	COLOMBIA, SPAIN	QUALITATIVE	SCOPUS
4	Personalized Tutoring System for Elearning	Livingston, L. J., Livingston, L. M., Livingston, L. A., & Portia, A. A. (2019, March).	INDIA	QUALITATIVE	SCOPUS

5	Cross-Age Tutoring: Experimental Evidence from Kenya	Romero, M., Chen, L., & Magari, N. (2022).	KENYA	QUANTITATIVE	SCOPUS
6	Advanced techniques in the analysis and prediction of students' behaviour in technology-enhanced learning contexts	Gómez-Pulido, J. A., Park, Y., & Soto, R. (2020).	CHILE, UNITED STATES, SPAIN	QUALITATIVE	SCOPUS
7	Design considerations for personalised supported learning: implications for higher education	Prowse, A., Ruiz Vargas, V., & Powell, S. (2021)	UNITED KINGDOM	QUALITATIVE	WOS
8	Toward Effective Robot-Child Tutoring: Internal Motivation, Behavioral Intervention, and Learning Outcomes	Ramachandran, A., Huang, C. M., & Scassellati, B. (2019)	UNITED STATES	QUANTITATIVE/QUALITATIVE	WOS
9	Intelligent tutorial system based on personalized system of instruction to teach or remind mathematical concepts	Paiva, R. C., Ferreira, M. S., & Frade, M. M. (2017).	PORTUGAL	QUALITATIVE	WOS

10	Knowledge interaction enhanced sequential modeling for interpretable learner knowledge diagnosis in intelligent tutoring systems	Gan, W., Sun, Y., & Sun, Y. (2022).	CHINA, JAPAN	QUALITATIVE	WOS
11	Integrating instructional designs of personalized learning through the lens of universal design for learning	Zhang, L., Carter Jr, R. A., Basham, J. D., & Yang, S. (2022).	UNITED STATES	QUALITATIVE	WOS
12	Efficacy of a Robot-Assisted Intervention in Improving Learning Performance of Elementary School Children with Specific Learning Disorders	Papadopoulou, M. T., Karageorgiou, E., Kechayas, P., Geronikola, N., Lytridis, C., Bazinas, C., ... & Evangeliou, A. E. (2022).	GREECE	QUALITATIVE	WOS
13	Knowledge structure enhanced graph representation learning model for attentive knowledge tracing	Gan, W., Sun, Y., & Sun, Y. (2022).	JAPAN	QUANTITATIVE	WOS

14	Identification of personal traits in adaptive learning environment: Systematic literature review	Normadhi, N. B. A., Shuib, L., Nasir, H. N. M., Bimba, A., Idris, N., & Balakrishnan, V. (2019)	MALAYSIA	QUALITATIVE	WOS

Table 1. List of articles analysed

Source: Authors' own creation

4.1 Co-occurrence of words

Figure 2 shows the relationship between the keywords used to search for the study material for the systematic analysis proposed for this research.

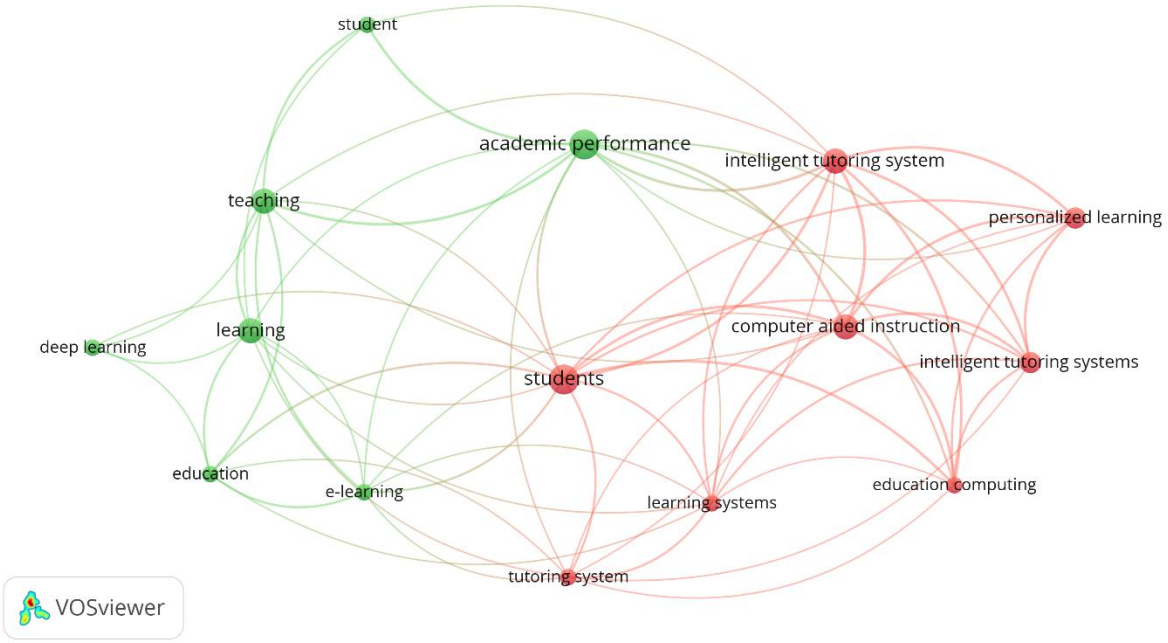

Figure 2. Co-occurrence of keywords.

Source: Authors' own creation

Figure 2 shows the most frequently used keywords and their correlation with research on topics associated with the problems of Academic Performance and Personalized Tutoring. In this way, it is possible to affirm that Academic Performance constitutes the central axis of the research identified for the analysis developed in this article, directly related to research in Students, Smart Tutoring Systems, Teachers, E-Learning, Tutoring Systems, Personalized Learning, among others, The field of personalized tutoring is dynamic and continuous research is essential to understand its long-term effects and refine best practices. Academic institutions should continually evaluate the effectiveness of their mentoring programs through data analysis, student feedback, and outcome measures. Personalized tutoring programs have the potential to positively impact the academic performance of college students by addressing individual learning needs, increasing engagement, and promoting a sense of confidence and motivation. However, successful

implementation requires careful planning, continuous evaluation, and a commitment to allocate resources effectively.

4.2 Discussion

The purpose of this article was to analyze, from a systematic perspective, the contribution of the authors, through their publications, to the study Academic Performance and Personalized Tutoring, carried out in high-impact journals indexed in Scopus and Wos databases during the period 2018-2021 by authors affiliated with Latin American institutions. In this way, it is possible to affirm that the publications indicated in the body of this document have carried out research at different levels whose findings contribute to the generation of new knowledge regarding the variables proposed for this study, which is how great contributions are identified, as contemplated in the article entitled "Automation of the tutoring process in online environments through learning analytics." This article presents the preliminary results of a research project on new classroom technologies in online learning, whose main objective is the design of a new technological tool in an online environment, through personalized tutorials. The model has six elements: access and permanence, usability, activity and participation, communication, internal trajectory, and dynamics of personal interaction. It is based on the principle of learning analytics supported by big data and focuses on learning elements with formative and evaluative components. As part of the model, an acceptability matrix was developed with statistical functions that show signaled indications, alerting the tutor about the performance of each student typified as superior, high, basic, low and very low. By applying the matrix in pilot tests, it was conceived as an instrument for bringing tutor and student closer together that allows personalized follow-up and its result is reflected in an increase in academic performance. Therefore, it is absolutely necessary to know first-hand the real needs of them in order to line strategies that pursue success within their training. In support of the above idea, the contribution made by the development of the article entitled "Towards an effective robot: child tutoring: internal motivation, behavioral intervention and learning outcomes" is evidenced. In this article, we demonstrate that motivation in young learners corresponds to observable behaviors when interacting with a robotic tutoring system, which, in turn, impact learning outcomes. First, we detailed a user study involving children interacting one-on-one with a robotic tutoring system over multiple sessions. Based on empirical data, we show that academic motivation derived from one's own values or goals assessed by the Academic Self-Regulation Questionnaire (SRQ-A) correlates with an observed suboptimal help-seeking behavior during the initial tutoring session. We then show how an interactive robot that intelligently responds to these behaviors observed in subsequent tutoring sessions can positively impact both student behavior and learning outcomes over time. However, like any methodology, it is not exempt from presenting problems through its use, as shown in the article entitled "Intelligent tutorial system based on a personalized instruction system to teach or remember mathematical concepts." This article describes the design, development, implementation, and evaluation of a tutoring system (TS) to improve student engagement in higher mathematics. The design of the TS was based on the Personalized Instructional System of the Mastery Learning pedagogical approach and can be implemented in any higher education course with mathematical needs. The TS consists of small, modular units of self-paced educational content, including video tutorials, notes, and formative e-assessments with personalized feedback. The TS ensures that the student is only allowed to move on to the next unit after they reach the required mastery criteria of the current unit. The TS was implemented in the subject of Quantitative Methods of the undergraduate program and was well accepted by the students. It was also recognized that TS contributed to learning and engagement with the discipline. Through experimental research experience, it has been shown that imposing constraints on advancement to the next level by means of a mastery criterion leads to a significant improvement in student engagement and performance.(Simanca, Burgos, Crespo, & Baena, 2018)(Aditi Ramachandran, 2019) (R.C. Paiva, 2017)

5. Conclusions

This review article concludes, highlighting the importance of knowing the updated status of the bibliography published in databases such as Scopus or Wos, referring to the study of Knowledge Management, Organizational Innovation and Public Education during the period between 2018 and 2021, It can be concluded that the impact of university tutoring programs with the premise of improving the academic performance of students can be differentiate themselves in many ways, which are broken down by academic load, level of proactive student involvement, When students receive personalized attention and support, they can better understand those complex concepts, improve their understanding of the course material. Likewise, it can be stated that this pedagogical methodology of personal approach can substantially improve the performance of students, it is important to highlight the work done by these educational practices which seek to make students feel that their needs and difficulties are addressed, managing to maintain a status of motivation and commitments to their studies, with this it seeks to promote a scenario of high student performance. One of the benefits of incorporating these university tutoring programs is the ability to comprehensively address the different learning styles and rhythms of each student. This is evidenced in the way in which each student has different skills and strengths, therefore, it is sought that these training programs address the challenges and weaknesses of the same and improve in terms of learning. Individualized support can increase students' confidence in their academic abilities. As they experience success with personalized guidance, students can develop a stronger belief in their ability to overcome challenges, leading to greater self-efficacy. There are preliminary studies that affirm that implementing these programs in universities has a positive impact on student retention and graduation rates. The aim is for students to feel the support they need and to be able to successfully complete their academic training. While personalized mentoring programs have numerous benefits, challenges can arise in their implementation. These include limitations, scalability issues, and the need for highly qualified tutors. Institutions must carefully plan and allocate resources to ensure the effectiveness of such programs.

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