

Original Article

Technology-Mediated Teaching-Learning Strategies for Primary Education: A Comparative Analysis

Lida Asencios-Trujillo¹, Lucia Asencios-Trujillo²

^{1,2}Escuela de Posgrado, Universidad Nacional de Educación Enrique Guzmán y Valle, Lima, Perú.

¹Corresponding Author : asenciostrujilloida@gmail.com

Received: 23 July 2024

Revised: 14 October 2024

Accepted: 13 November 2024

Published: 29 November 2024

Abstract - The study explores and develops a blueprint for technology-mediated teaching-learning strategies for primary education to create an effective and motivating learning environment. The value of integrating Information and Communication Technologies (ICT) in the classroom is recognized, especially in the COVID-19 pandemic. ICTs offer opportunities to improve the accessibility and quality of primary education, promoting interactive, collaborative and meaningful learning. However, it underlines the importance of critically addressing the challenges and benefits of this technological integration, ensuring equity in access and providing adequate training to teachers. It highlights the need to continuously evaluate the impact of technological strategies on student learning and the overall quality of the educational process. The study seeks to identify best practices for effective technology implementation in primary education, highlighting the importance of critical reflection and constant evaluation.

Keywords - Educational technology, Teaching-learning, ICT, Primary education, Pandemic.

1. Introduction

Technology has permeated virtually every aspect of our lives in our digital age, and education is no exception. In particular, in the context of primary education, technology in the classroom has become an indispensable tool to enhance the teaching-learning process and adapt to the changing needs of students in the 21st century [1]. Technology-mediated teaching-learning strategies offer new opportunities to enrich the educational experience, promote students' active participation, foster digital skills development, and facilitate access to quality educational resources [2]. This study focuses on conducting a comprehensive comparative analysis of various technology-mediated teaching-learning strategies in the specific context of primary education [3].

Through this analysis, we explore how technology can be effectively integrated into the primary classroom to improve academic outcomes, stimulate student motivation and engagement, and prepare them to face the challenges of the modern world [4]. This comparative analysis will examine various technological strategies and tools used in primary education, such as mobile devices, educational applications, online learning platforms, educational games, and multimedia resources. The characteristics, advantages and challenges of each of these strategies will be evaluated, as well as their impact on the teaching-learning process and the integral development of students [5]. The main objective of this study is to provide a comprehensive view of

technology-mediated teaching-learning strategies in primary education to identify best practices and recommendations for their effective implementation in the classroom. Through this comparative analysis, it is hoped to contribute to the development of innovative pedagogical approaches that take full advantage of the potential of technology to improve educational quality and equity at the primary level [6].

2. Literature to Review

The author in [6] proposes to present how teaching is carried out using Information and Communication Technologies (ICT) and its impact on virtual distance learning. It begins with an analysis of various aspects, including challenges related to familiarity with ICTs, availability of educational resources, learning styles, and the current context as a determining factor in the learning process. The methodology used is qualitative, with an exploratory and descriptive approach. A theoretical review was carried out using empirical research that consisted of semi-structured interviews with teachers active in primary education in an urban environment at a medium- to low socioeconomic level. The study concludes by emphasizing the importance of documenting the experiences related to this new educational model to define its characteristics, strategies and models of educational intervention used by primary school teachers. In addition, it highlights how they have effectively coped with the challenging situations that arose during the COVID-19 pandemic, including lockdown and



social distancing. Likewise, the author [7], from the conviction of the importance of deepening the understanding of the processes and results of online learning, examines the evidence of student learning as a result of their participation in educational activities that use digital information and communication technologies. Attention is focused on various aspects, such as the environments in which these educational activities are carried out, the digital technologies used, the pedagogical methodologies used for their design and development, the types and characteristics of the learning achieved by the students, the research methodology used to collect and analyze the evidence, and, of course, the nature and characteristics of this learning evidence. Importantly, student learning outcomes, as well as the evidence supporting them, are aspects that are addressed in a relatively limited way when analyzing online learning. In addition, it is recognized that the quality criteria and the value attributed to this evidence have evolved over time and vary depending on the context. In this context, a variety of approaches to these topics are offered while also providing an overview of the current state of research in the Ibero-American region. In several of these approaches, the COVID-19 pandemic context plays a significant role, whether during the pandemic or in the post-pandemic period.

In this way, the author [8], The World Health Organization (WHO), has classified COVID-19 as a pandemic due to its rapid spread, and the educational field has been affected by this situation. Through digital platforms, schools can adapt pedagogical processes for students through the integration of web applications, aiming to continue providing educational services. The present study focused on analyzing how the incorporation of information and communication technology (ICT) tools becomes a didactic strategy for collaborative learning in academic environments as part of the reevaluation of the role of the teacher. A mixed approach was adopted to conduct this research. A questionnaire was used as an instrument, which made it possible to assess the mastery and use of ICT tools to meet the individual and collective needs raised by educators and educational authorities. The results indicated that educators were forced to assume a new role mediated by ICTs during preventive isolation. There was also a strengthening in the use of ICT in the virtual environment of the classrooms, driven by the educators themselves, which contributed to enriching the educational process with innovative and meaningful experiences. In conclusion, the pandemic has disrupted the education system. Therefore, education authorities must consider the virtual education model as an effective and complementary alternative in response to the new post-COVID-19 context.

On the other hand, the author [9] presents the results of quantitative research of a correlational nature, whose purpose was to propose a pedagogical strategy supported by Information and Communication Technologies (ICT) to

strengthen numerical thinking in third grade students of the Educational Institution "El Gas", located in the municipality of San Pelayo, Córdoba. The primary objective of this strategy was to improve the process of teaching and learning mathematics and, consequently, to raise the quality of education in that institution. The research was carried out in three distinct stages: in the first stage, a diagnostic assessment was administered to assess the level of numerical thinking of the institution's students; in the second stage, the pedagogical strategy called MATE was implemented. ICTs use Google's Classroom platform as the main tool. Finally, in the third stage, a final evaluation was carried out to determine the student's progress due to the tool's impact on the teaching and learning process. The results revealed a reduced percentage of incorrect answers, suggesting that the didactic tool improved the problem-solving indicator and the application of mathematical operations. Although there are areas identified for improvement in the development of mathematical thinking, it is concluded that the implementation of the pedagogical strategy managed to achieve the objective of promoting a significant advance in student performance.

3. Methodology

A free methodology has been implemented to develop a plan for technology-mediated teaching-learning strategies for primary education, with the main objective of facilitating an effective and motivating learning environment for primary education students through the strategic use of technology. Likewise, in order to develop the strategy plan, the following phases must be carried out:

3.1. Needs Analysis and Assessment

- Identification of objectives: In this phase, objectives will be established to facilitate an effective and motivating learning environment for primary school students through the strategic use of technology.
- Analysis of available technological resources: The technological infrastructure of the schools that are planned to establish the strategy plan will be evaluated, including devices, internet connectivity and available software.
- Student Needs Assessment: Surveys or focus groups will be conducted to understand students' and teachers' technology preferences, skills, and needs.

3.2. Design and Planning

- Technology Strategy Selection: Use predictive analytics and learning data to identify each student's most promising and personalized technology strategies, leveraging artificial intelligence and machine learning. Consider implementing emerging technologies such as augmented virtual reality and artificial intelligence in the classroom to improve engagement and understanding of content.

- Content and Resource Development: Collaborate with educational technology experts and instructional designers to create immersive and adaptive learning experiences that fit individual student needs.
- Explore using intelligent content authoring tools that automatically generate educational materials customized to each learner's skill level and interests.

3.3. Implementation and Execution

- Implementation Planning: Incorporate an agile approach into implementing technology strategies, allowing for rapid iterations and adjustments based on real-time feedback from students and staff. Establish a flexible edtech infrastructure that can easily adapt to changes in the educational environment and take advantage of emerging opportunities for technology innovation.
- Assessment and Feedback Consideration: Implement automated assessment systems that use advanced data analytics to continuously assess student progress and performance, providing individualized feedback and recommendations for improvement. Foster a culture of continuous feedback among students, teachers, and parents, using online feedback tools and virtual meetings to discuss the impact of technology strategies on student learning and well-being.

3.4. Evaluation and Continuous Improvement

- Data Collection and Feedback: Implement advanced data collection systems that use sensors, voice analytics, and facial recognition to gain detailed insights into student engagement, understanding, and progress during educational activities. Use online surveys and sentiment analysis tools to collect the perception of teaching staff, students, and parents on the effectiveness and satisfaction with the technology strategies implemented.
- Results Analysis: Apply big data analysis and machine learning techniques to identify patterns and trends in the data collected, allowing for a deeper understanding of the impact of technology strategies on student learning and achievement. Use dashboards and interactive visualizations to effectively communicate data analytics findings to all stakeholders and facilitate informed decision-making.
- Iteration and Refinement: Establish an agile process of continuous improvement that allows for the rapid implementation of changes and adjustments in technology strategies based on the results of data analysis and the feedback received. Foster collaboration between interdisciplinary teams of educators, researchers, and technology experts to generate innovative ideas and effective solutions to address identified challenges.
- Planning for the Future: Staying on top of emerging technology trends and best practices in education to develop a long-term vision for the continued integration

of technology in primary education. Establish strategic alliances with technology companies, academic institutions, and non-profit organizations to access resources, knowledge, and professional development opportunities that drive educational innovation.

4. Results and Discussions

The author [6] highlights the importance of documenting experiences related to the use of technology in teaching, especially in the current context marked by the COVID-19 pandemic. We agree that the effective integration of ICT in primary education is essential to adapt to current challenges and improve the teaching-learning process. However, it is crucial to document these experiences and critically analyze their effectiveness and long-term implications on student learning.

The author [7] highlights the importance of deepening the understanding of online learning processes and the role of digital technologies in this context. We agree that online learning has gained significant relevance, especially during the pandemic, and that it is critical to research and understand how these technologies affect student learning. However, it is important to bear in mind that the quality and value attributed to this evidence may vary, so a critical and reflective approach is necessary when interpreting the results of such research.

The author [8] focuses his study on the impact of the COVID-19 pandemic on the education system and the adaptation of schools through the integration of technological tools. We agree that the pandemic has significantly disrupted education and accelerated technology adoption in the classroom. However, it is important to consider how these tools affect student learning in the long term and how they can be effectively integrated into the educational process.

On the other hand, the author [9] presents quantitative research results on a specific pedagogical strategy to strengthen numerical thinking in primary school students. While this approach provides concrete evidence about the effectiveness of a particular strategy, it is essential to consider how these findings relate to other strategies and how they can be generalized to different educational contexts. In addition, it is necessary to critically evaluate the results and consider possible limitations of the study, such as selection biases or difficulties in measuring learning.

5. Conclusion

The comparative analysis of technology-mediated teaching-learning strategies for primary education allows us to understand better the impact of Information and Communication Technologies (ICT) on the educational process. Throughout this study, we have observed the growing importance of integrating technology effectively

into the classroom, especially in a context marked by the COVID-19 pandemic. ICTs offer significant opportunities to improve the quality and accessibility of primary education by facilitating access to varied educational resources tailored to individual student needs. In addition, these tools can foster more interactive, collaborative, and meaningful learning, enriching the educational experience for both students and teachers. However, it is important to approach this process of

technological integration critically and thoughtfully, considering both the benefits and the challenges that come with it. It is crucial to ensure equity in access to technology and promote adequate training for teachers in effectively using these tools. Likewise, it is essential to constantly evaluate the impact of technology-mediated teaching-learning strategies on student learning and the overall quality of the educational process.

References

- [1] Maria Cristina Rangel, and Viviana Marcela Suárez, “*The Edublog Used as a Pedagogical Strategy in Teaching-Learning English in Third Grade of Primary School*,” University of Cartagena, 2021. [[Google Scholar](#)] [[Publisher Link](#)]
- [2] Epigmenio Muñoz-Guevara, Guillermina Velázquez-García, and Jorge Francisco Barragán-López, “Analysis of the Technological Evolution Towards Education 4.0 and the Virtualization of Higher Education,” *Transdigital*, vol. 2, no. 4, pp. 1-14, 2021. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [3] Yeimi Marcela Bettin Arrieta et al., “*Teaching Learning Strategy Mediated by ICT based on Gamification to Strengthen Vocabulary in the English Area of Fifth Grade Students at the Marceliano Polo Educational Institution in Cereté - Córdoba*,” University of Cartagena, 2021. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [4] María Cecilia Roma, “Teaching Strategies Mediated by Information and Communication Technologies (ICT) in Primary Level Students With Special Educational Needs,” *MenteClara Foundation Peer Reviewed Scientific Journal*, vol. 7, pp. 1-21, 2022. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [5] John Edwin Valencia Moreno, “Teaching Strategies in the Teaching Processes of School Physical Education Mediated by ICTs During the COVID 19 Lockdown,” *International Journal of Pedagogy and Educational Innovation*, vol. 2, no. 1, pp. 73-100, 2022. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [6] Yesenia Bautista García, and Maricela Zúñiga Rodríguez, “Teaching Practice Mediated by Information and Communication Technologies. Challenges And Experiences In Basic Education,” *Conrado*, vol. 17, no. 79, pp. 81-88, 2021. [[Google Scholar](#)] [[Publisher Link](#)]
- [7] Cesar Coll Salvador et al., “Evidence Of Learning In Educational Practices Mediated By Digital Technologies,” *RIED-Ibero-American Journal of Distance Education*, vol. 26, no. 2, pp. 9-25, 2023. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [8] C.H. Sandoval, “Education in the Time of Covid-19 ICT Tools: The New Teaching Role in Strengthening the Teaching Learning Process of Innovative Educational Practices,” *Docentes 2.0 Magazine*, vol. 9, no. 2, pp. 24-31, 2020. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [9] Alba Luz Martínez Cogollo, Aleida Miranda Padilla, and Sandra Ruiz Beltrán, “Implementation of a Pedagogical Strategy Mediated by ICT to Strengthen Numerical Thinking in Third Grade Students of the Educational Institution “El Gas”, San Pelayo, Córdoba,” *Revista SEXTANTE*, vol. 24, pp. 2-12, 2021. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]