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# VIRTUAL LEARNING ENVIRONMENTS AND THEIR INFLUENCE ON EDUCATIONAL INCLUSION

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**KEYWORDS**

*Learning environments*
*Virtuality*
*Education*
*Inclusion*

**ABSTRACT**

*This article presents a systematic review to build a conceptual and theoretical framework addressing how virtual learning environments impact educational inclusion. Using the PRISMA methodology, eight key academic sources were identified and analyzed. The findings highlight the significant role of Information and Communication Technologies (ICTs) in fostering inclusive education. ICT integration has accelerated knowledge acquisition and improved inclusion in various educational processes vital for personal development. The study emphasizes the transformative potential of virtual learning environments in promoting equitable, accessible education, demonstrating their capacity to support diverse learners and enhance educational opportunities for all.*

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## 1. Introduction

According to Cheung et al. (2021), virtual learning environments are playing an increasingly pivotal role in the educational landscape. As digital technologies become more deeply embedded in teaching and learning processes, traditional pedagogical models are being challenged to adapt. This shift highlights the pressing need for educational institutions to adopt innovative and flexible strategies that not only integrate technology effectively but also promote the development of essential 21st-century skills. Among these, critical thinking and reflective competencies are particularly vital, as they empower students to engage meaningfully with content, question assumptions, and apply knowledge across diverse contexts. Furthermore, these strategies should aim to strengthen foundational knowledge across multiple disciplines, ensuring that learners are well-equipped to navigate complex academic and real-world challenges.

Information and Communication Technologies (ICTs) undoubtedly represent a transformative paradigm in contemporary society. Their widespread adoption has become a driving force behind innovation, economic growth, and social development. In the academic domain, this technological evolution has prompted a growing number of researchers and educators to focus on enhancing the quality and accessibility of education. Their efforts are directed toward ensuring that these advancements are inclusive and equitable, taking into account the diverse needs, backgrounds, and learning styles present within educational environments. As Alamri et al. (2021) emphasize, embracing ICTs in education is not merely about integrating tools, but about rethinking pedagogical approaches to foster meaningful, inclusive, and student-centered learning experiences.

It is imperative that educational environments uphold the principle of non-discrimination, ensuring that no individual is marginalized on the basis of ethnic origin, race, socioeconomic status, or prior level of knowledge. Every person possesses inherent and equal dignity, which must be recognized and respected within all educational practices. To this end, it is essential to design and implement learning environments that support the gradual, personalized development of each student's unique skills and abilities. Such inclusive approaches not only foster individual growth but also contribute to a more just and equitable educational system one that provides all learners with the opportunity to thrive and succeed, regardless of their background or starting point.

Virtual learning environments have significantly expanded the possibilities for inclusive education, enabling academic models developed by schools and societies to reach a broader and more diverse audience with greater ease. This increased accessibility is one of the key reasons behind the growing adoption of virtual platforms aimed at enhancing the overall quality of education. By leveraging Information and Communication Technologies (ICTs), virtual education facilitates the teaching and learning process in a flexible and dynamic manner. It allows educational activities to take place independently of physical location, eliminating the need for teachers and students to be present in the same space. This flexibility not only supports continuity in education but also promotes equity by accommodating learners from various geographical, social, and economic backgrounds.

Based on a comprehensive documentary review conducted by Asad et al. (2021) on virtual learning environments within the context of inclusive education, the authors underscore the critical importance of implementing a techno-pedagogical model that fosters collaborative knowledge construction among faculty members. This model emphasizes the value of teamwork, where educators contribute from their respective areas of expertise some offering technological proficiency, others bringing pedagogical insight, and others providing deep content knowledge. Such interdisciplinary collaboration is essential for developing robust and adaptive educational practices. From both psychological and social perspectives, this approach represents an emerging necessity in teacher training, as it aims to reshape and enhance the educational system to meet the evolving demands of a digitally-driven society. By promoting shared responsibility and continuous professional development, this model supports the creation of inclusive, innovative, and effective learning environments.

Pedagogical support, when combined with the strategic use of information and communication technologies (ICTs), serves as a foundational pillar in the process of educational inclusion. These tools play a crucial role in fostering students' independence and autonomy, enabling them to take greater control over their own learning journeys. By providing adaptable resources and personalized learning pathways, this integration empowers learners to progress at their own pace, according to their individual needs and capabilities. Moreover, such an approach not only enhances academic performance

but also promotes self-confidence and active participation, which are essential for meaningful and equitable inclusion in diverse educational settings.

Therefore, technology has become indispensable, as it allows individuals to acquire skills and knowledge at their own pace, rather than collectively. Each person can progress according to their own time and rhythm, without being limited by specific schedules, facilitating the path to autonomy and self-learning. In virtual education, there is a constant exchange of ideas and knowledge between facilitators and students. Being a non-face-to-face teaching system, a variety of activities and tasks can be carried out that are not possible in traditional classes. Additionally, it fosters the construction of meanings during the learning process and the resolution of problems in real situations. This includes creating mind maps, graphics, and understanding the objectives of subjects more deeply and meaningfully (Ngale y Nkeng, 2022).

In every educational process, social interaction plays a crucial role, as much of the learning is acquired through interaction with other people. Therefore, in both face-to-face education and virtual environments, it is essential to use synchronous communication tools such as chats, video calls, and video conferences, as well as asynchronous ones such as email and interaction platforms. the basis of this learning process lies in collaborative work and group work, where an exchange of experiences occurs that facilitates problem-solving. In this context, interaction among participants in real-time or deferred manner is essential for the cognitive and social development of students.

Haleem et al. (2022) explain that virtual education has evolved to establish its own set of norms, structures, and operational dynamics, thereby emerging as an increasingly effective pedagogical model within educational institutions. This transformation reflects a broader shift in how teaching and learning are conceptualized and delivered in the digital age. Technologies have exerted a profound influence on this process, becoming indispensable tools that are now seamlessly integrated into the daily routines of school environments. Their presence not only facilitates instructional delivery but also redefines the roles of educators and learners, fostering more interactive, flexible, and student-centered educational experiences. As virtual education continues to mature, it offers promising avenues for innovation and inclusion across diverse academic contexts.

Also to what has been mentioned and referring to the (Arteaga et al., 2023) they carried out research and intervention at the School Normal Superior de Manizales. In this study, the pedagogical and technological process for developing multimedia didactic materials accessible from a virtual platform was revealed. Subsequently, they identified different learning styles: visual, auditory, kinesthetic, and reading-writing, with the help of the SAVMoodle application, a platform designed to adapt to these learning styles proposed in teaching objectives.

The results showed a more attractive teaching-learning process for students, adapting to their individual needs. The platform offered availability to support multimedia content, assess the student, identify their profiles, locate them, and guide them throughout the learning process. Each student was able to progress at their own pace and achieve the proposed objectives, thus enriching their knowledge significantly.

As stated by Jordan et al. (2021), formative virtual environments are conceptualized as dynamic spaces that actively support student learning through the integration of technology. These environments are designed to facilitate meaningful interaction between students and teachers, fostering engagement, collaboration, and the co-construction of knowledge. Virtual education, when effectively implemented, enables the development of essential competencies required in today's rapidly evolving digital society. However, the success of this educational model largely depends on the teacher's ability to design and manage a conducive virtual environment one that promotes active participation, critical thinking, and meaningful learning experiences tailored to the diverse needs of learners.

Virtual education should be considered a transformative agent, as it breaks with the schemes of traditional education by incorporating collaborative work, information and communication technologies (TIC) as tools that provide information and allow its application in contexts to verify data and systematize processes, leading to the development of cognitive competencies. In this new paradigm, the student assumes an active role as an educational agent, capable of developing their own critical and creative thinking.

According to Weiss et al. (2020), mobile technologies present a valuable opportunity to enhance academic outcomes by enabling innovative pedagogical practices. These technologies open new avenues for teaching and learning, allowing educators to design more flexible, engaging, and student-centered

experiences. The integration of mobile tools into educational settings has shown positive effects on both the quality and equity of the learning process. Notably, productivity-enhancing solutions provided by mobile technologies afford teachers more time to interact meaningfully with students, while also improving the operational efficiency of educational institutions. This dual impact pedagogical and administrative positions mobile technologies as essential components in the advancement of modern education systems.

The ability of technologies to create enriched educational environments that extend beyond traditional classroom boundaries is particularly significant. These environments not only support academic development but also enhance the social fabric of learning by fostering collaboration, communication, and shared problem-solving. Through the integration of digital tools, students and educators are empowered to engage in more interactive and inclusive educational experiences. This collaborative potential contributes to the cultivation of socially responsible individuals and can serve as a catalyst for broader improvements in contemporary society, promoting equity, innovation, and collective progress.

In accordance with this Sahlberg (2021) the COVID-19 pandemic has underscored the need for education to implement "comprehensive support mediated by resources and technological devices," thus transforming dynamics of human interaction. This situation requires an educational approach that empowers the student to comprehend the complexity of life from an ethical perspective, expanding communication horizons and nurturing competencies that enable both teachers and students to adapt to the challenges posed by globalization.

Virtual education can be implemented in two distinct formats: one involving the active presence of a teacher who guides and facilitates the learning session, and another relying on a standardized digital platform that operates independently of direct teacher involvement. In both cases, the effectiveness of virtual education depends on well-structured educational management. According to (Zamora et al., 2022) this management is composed of a coordinated set of systematic tasks organized into four key dimensions: organizational, technological, educational, and social impact. These dimensions work together to ensure that virtual learning environments are not only functional and efficient but also inclusive and responsive to the diverse needs of learners in a digital context.

Organizational management involves monitoring the training processes of both teachers and students. Technological management refers to the use of tools with which communication processes are carried out, fundamental for the development and support of classes. Educational management includes the creation of study plans or subject objectives, as well as the distribution of content that collaborates in the teaching-learning process. Finally, social impact management encompasses the values and opinions that arise from educational praxis in the field of virtual education (Ouariach et al., 2024).

According to the documentary and descriptive research conducted by Mota et al. (2020), which draws on statistical data provided by the Ministries of Education of Chile, Peru, and Colombia, there has been a marked increase in the use of Information and Communication Technologies (ICTs) within the educational sector. This growth reflects a broader regional trend toward digital transformation in education. ICTs are being utilized not only as academic support tools in traditional face-to-face classrooms but also as essential pedagogical resources in virtual learning environments. Their dual application underscores their versatility and growing importance in enhancing teaching and learning processes across diverse educational contexts.

Over the years, the implementation of virtual education has steadily increased, giving rise to a wide range of effective teaching and learning alternatives. These alternatives have played a significant role in enriching educational practices within institutions, offering flexible and innovative approaches that respond to the evolving needs of learners. By leveraging digital tools and platforms, virtual education has facilitated the development of meaningful learning experiences that promote deeper understanding and long-term knowledge retention. As a result, it has contributed to the formation of competent individuals equipped with the skills and competencies required to thrive in a knowledge-based society.

After analyzing the cases of three Latin American countries, it becomes evident that the global trend is increasingly shifting toward virtual education. This shift is contributing valuable elements to teaching processes and transforming traditional educational presence into dynamic digital environments. These virtual spaces are no longer merely supplementary tools; rather, they have become foundational platforms for delivering a wide range of academic content. As (Rodriguez et al., 2020) highlight, digital environments now serve as essential frameworks for instruction across various educational levels,

including secondary, university, and technical education. Their integration reflects a broader transformation in how education is accessed, delivered, and experienced in the digital age.

The integration of technology in learning processes enhances actions for training and research, while also contributing to the socialization and understanding of a wide range of content in educational practice. This advancement towards virtual education reflects the evolution of educational methods in response to the demands and opportunities of the digital era.

Virtual learning models have demonstrated a positive impact on the teaching and learning process by introducing innovative approaches that enhance student engagement and educational outcomes. These models not only stimulate greater interest in the acquisition of knowledge but also provide diverse and enriching learning experiences. Moreover, they offer practical solutions to longstanding educational challenges, such as accessibility, personalization, and resource limitations. While some critics continue to question the overall effectiveness of virtual education, its growing adoption is supported by the development of targeted programs that improve key academic skills. For instance, initiatives focused on reading comprehension, mathematical and geometrical simulation tools, and logical reasoning programs have contributed to strengthening the credibility and effectiveness of virtual education (Abuhassna et al., 2020; Bernate et al., 2021).

In summary, virtual education represents a clear positive contribution to the management of interactive learning, providing tools and resources that enrich the educational process and help students achieve their academic goals more effectively.

According to the research, this article aims to conduct a systematic review of virtual learning environments in education and their impact on school inclusion.

## 2. Method

This study employed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) methodology to guide the systematic review process. PRISMA was selected for its evidence-based framework that ensures transparent, complete, and replicable reporting of systematic reviews (Sarkis-Onofre et al., 2021). It provides a structured approach for identifying, screening, and selecting relevant literature, which is essential for maintaining methodological rigor in educational research.

The review began with the identification of 1,306 studies related to virtual learning environments and educational inclusion. After removing duplicates and applying relevance filters, 170 articles remained. These were screened based on inclusion criteria: (1) empirical studies published in Spanish between 2020 and 2024; (2) samples including children, adolescents, or young adults; (3) use of quantitative measures to assess virtual learning environments and their cognitive or holistic outcomes; and (4) documentary review design focused on inclusive education.

Studies lacking population and sample data were excluded. Eight high-quality studies were selected and evaluated using a scoring system based on methodological rigor, including randomization, control groups, pre- and post-intervention measures, retention, power analysis, validity, and follow-up.

Data extraction included titles, authors, methodological details, and findings related to the effectiveness of virtual learning environments in promoting inclusion. Bibliographic cross-referencing was also used to identify additional relevant sources. The PRISMA flow diagram (Figure 1) illustrates the selection process.

This methodology aligns with current best practices in systematic review reporting, as outlined by Sarkis-Onofre et al. (2021), who emphasize PRISMA's role in enhancing the quality and transparency of research synthesis.

Objective:

How do virtual learning environments influence educational inclusion?

**Table 1.** Terms derived from research

| | |
|---|---|
| Virtual learning environments | It is an online platform used to facilitate and enhance teaching and learning. |
| Inclusion | A process aimed at guaranteeing the right to quality education for all students under equal conditions. |

Source: Own elaboration, 2025.

**Table 2.** Variable combination or cross

| | |
|---|---|
| (virtual) and (learning environments) | Virtual learning environments |
| (educational) and (inclusion) | Educational inclusion |
| (technology) and (education) | Technology and education |
| (technology) and (importance) | Importance of technology in the educational field |
| (impact) and (inclusion) | Impact of virtual learning environments on inclusion |

Source: Own elaboration, 2025.

Regarding the eligibility criteria, the following inclusion criteria were used for each study: (1) published in Spanish between the years 2020 and 2024 as peer-reviewed empirical research; (2) sample composed of children, adolescents, and young adults; (3) utilized quantitative measures in the assessment of virtual learning environments and cognitive and holistic outcomes after their implementation; (4) study design was a documentary review aimed at evaluating the benefits of implementing these virtual learning spaces within the educational and inclusive scope. On the other hand, studies without evidence of population and sample were not included in the eligibility process. Note. "+" related to positive (explicitly described and present in detail); "-" refers to negative (inadequately described and absent); "Yes" indicates a significant positive effect, NA indicates no significant effect. The "Score" column shows the overall quality score of the study design. The score is obtained from the sum of points assigned to design analysis qualities, such as randomization, presence of a control group, pre- and post-intervention measurements, participant retention, power analysis, validity measurement, and follow-up.

For this review, the score ranges from 5 to 7, where 7 indicates a study design that meets quality standards. For data extraction through a review, articles were independently examined by evaluating the titles. When the relevance of a study to the topic could not be determined, the abstract was evaluated.

The following information was extracted: (1) Title and author names; (2) methodological details; (3) key findings regarding the effectiveness and potential of virtual learning spaces within education and inclusion. Finally, relevant studies were further identified through cross-referencing the bibliographies of selected articles.

**Table 3.** Variable combination or cross

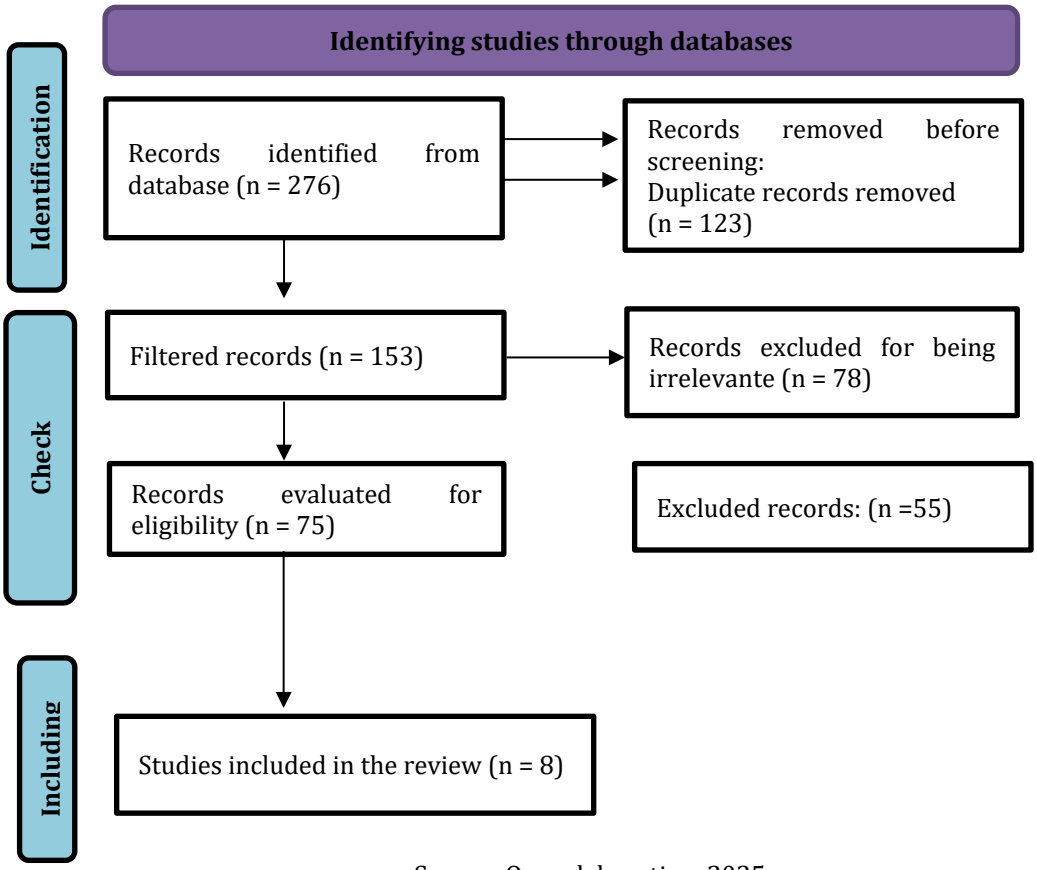
| Randomization | control | Pre-post | Retention: | Power analysis: | Validity measurement: | Follow-up: | Score | Efficacy | Authors |
|---|---|---|---|---|---|---|---|---|---|
| + | + | + | + | + | + | + | 7 | Yes | (Yang et al., 2022) |
| + | + | + | + | + | + | + | 7 | Yes | (Salameh et al., 2020) |
| + | + | + | + | + | + | + | 7 | Yes | (Romanyuk et al., 2024) |
| + | + | + | + | + | + | + | 6 | Yes | (Honorato et al., 2024) |
| + | + | + | + | + | + | + | 6 | Yes | (Mota et al., 2020) |
| + | + | + | + | + | + | + | 7 | Yes | (Medina et al., 2020) |
| + | + | + | + | + | + | + | 7 | Yes | (Yakubova et al., 2022) |
| + | + | + | + | + | + | + | 6 | Yes | (Sundari & Leonard, 2021) |

Source: Own elaboration, 2025.

The selection process resulted in 1306 studies initially identified on the topic. Subsequently, after applying filters, this number was reduced to 170 articles, out of which 8 studies were included in the analysis presented here. Additionally, the exclusion criteria identified by the authors led to a reduction of over 90% from the initially identified studies.

Based on this, the PRISMA Diagram (Figure 1) is presented.

**Figure 1.** Flowchart for item selection.




Source: Own elaboration, 2025.

**Table 4.** Results

| Author(s) Year | Sample | Type of Measurement | Results/Instruments | Follow-up | Implemented Treatment |
|---|---|---|---|---|---|
| (Yang et al., 2022) | Four master's theses and two doctoral theses were reviewed, along with articles published and indexed according to the guidelines set forth by UNESCO | techniques of documentary research. | The importance of being able to implement a techno-pedagogical system in the educational field was emphasized, as these systems constitute important tools during the inclusion process, enabling teachers to engage in a constant process of innovation. | The analysis of the information began with a general synthesis of 5 doctoral theses and 4 master's theses related to the topic, followed by the compilation of information from various researchers. | Subsequently, a review and analysis of the selected material was conducted. |
| (Salameh et al., 2020) | documentary review was conducted, examining 98 indexed journals from five countries related to Technology and Education, which collectively contained 442 articles | documentary review | Key aspects were identified for achieving transformations in educational institutions, such as shifting from individual work practices to integrating multidisciplinary teams and promoting collaboration. | Some findings and contributions from researchers classified in this category are presented, exploring various possibilities of educational environments | Subsequently, a review and analysis of the selected material was undertaken. |

| | | | | | |
|---|---|---|---|---|---|
| | published during the period of 2015-2019. | | | that utilize the Internet to enhance learning. | |
| (Romanyuk et al., 2024) | 3rd grade students in Physical Education at a school in Montería, through the LUDOS platform using Information and Communication Technologies, within the context of the COVID-19 pandemic | The research approach is quantitative, utilizing a descriptive correlational study | The results show that 100% of the participants have access to electronic devices with internet connection, demonstrating that through virtual workshops, academic performance progressed by 36%, and remained stable in 43%. Additionally, the students' technological competencies, skills, and physical conditions improved. | The administration of a survey and two pedagogical workshops aimed to determine the correlation between technology-mediated learning and academic performance of students | Class sessions with didactic and multimedia materials. |
| (Honorato et al., 2024) | Identification of the determining factors and motivations among higher education students, who were surveyed in various business schools in Madrid and Andalusia, Spain | Descriptive analysis | The students, while acknowledging that collaborative learning in virtual environments is an opportunity for their education, demand greater motivation and monitoring of activities from teachers. They perceive room for improvement in this aspect from the teaching staff, as they do not always receive the necessary supervision and feedback from the teacher. | Study of the various motivations and potential skills of students in the context of virtual teamwork environments | Complete a structured digital questionnaire. The data obtained from the questionnaire were analyzed in a preliminary phase to detect missing values and refine the information. |
| (Mota et al., 2020) | Article | Documentary and descriptive research | Over time, the implementation of virtual education is becoming increasingly common, offering diverse options for effective teaching and learning for educational institutions, for the formation of competent individuals through meaningful learning | Analyzing virtual education as transformative agents of learning processes, with statistics provided by the Ministries of Education of Chile, Peru, and Colombia regarding the use of information and communication technologies (ICTs). | Review and analysis of the selected material |
| (Medina et al., 2020) | Synchronous interventions, or real-time, to understand teaching and | Descriptive exposition aimed at depicting the efforts made | Evidence of equal opportunities and spaces for the participation of all was apparent, allowing for the | Additionally, some inclusive experiences that occurred within the virtual | Utilization of didactic material and synchronous interventions. |

| | | | | | |
|---|---|---|---|---|---|
| | learning from the Multigrade Individualized Aid (MAI) project of the Elementary School at the University of Puerto Rico | to bring teaching and learning to a virtual environment at the Elementary level. | strengthening of peer work, and the adaptation of activities according to the skills and needs of each individual. | learning community are shared | |
| (Yakubova et ., 2022) | Article will explore how eLearning technologies are working to make online education more accessible for people with disabilities. | Documentary review | Accessibility and adaptive technologies are essential elements for truly inclusive education. It not only involves complying with accessibility regulations but also having a mindset that prioritizes the individual needs of each student. | Discovering technological innovations that enhance inclusive online education and how virtual reality (VR) can be a valuable tool for people with disabilities. | Adaptations in existing virtual learning environments for people with disabilities |
| (Sundari & Leonard, 2021) | The most commonly used virtual educational platforms. | Documentary and descriptive research with a mixed-methods approach. | Providing a new array of available resources at any given moment for educational processes in different areas or subjects, where collaboration and activities related to learning can take place, extending beyond physical spaces such as classrooms, and catering to the needs of each individual. | A study was conducted comparing each of the platforms Moodle, Edmodo, Canvas, Desire2Learn, Blackboard, and Sakai, based on a series of relevant characteristics in virtual learning environments | Review and analysis of the selected material. |

Source: Own elaboration, 2025.

The reviewed studies collectively reveal a nuanced landscape regarding the role of virtual environments in fostering educational inclusion. Across various contexts, virtual platforms are shown to offer significant opportunities for inclusive practices, particularly when they are designed with accessibility, adaptability, and pedagogical innovation in mind. For instance, (Yakubova et al., 2022; et Yang al., 2022) emphasize the importance of techno-pedagogical systems and adaptive technologies, respectively, as essential tools for supporting diverse learners, including those with disabilities. These technologies not only comply with accessibility standards but also reflect a deeper commitment to meeting individual educational needs.

(Romanyuk et al., 2024; Medina et al., 2020) provide empirical evidence that virtual environments can enhance academic performance and foster equal participation. Their findings suggest that when students have access to digital tools and structured virtual activities, their competencies and engagement improve. However, these benefits are contingent on the presence of supportive teaching practices. (Honorato et al., 2024) highlights a critical challenge: students often perceive a lack of motivation and feedback from teachers in virtual settings, which can hinder the effectiveness of collaborative learning. This underscores the importance of teacher involvement and the need for ongoing professional development to ensure that educators are equipped to facilitate inclusive virtual learning.

Collaboration and teamwork emerge as recurring themes in the literature. Salameh et al. (2020) and Sundari & Leonard (2021) point to the transformative potential of virtual platforms that support multidisciplinary collaboration and flexible learning environments. These platforms extend learning beyond traditional classroom boundaries, allowing for more personalized and interactive experiences.

Yet, the success of such environments depends on equitable access to technology. While Romanyuk et al. (2024) reports full access among their sample, this may not reflect broader realities, especially in underserved regions where digital divides persist.

Institutional support also plays a vital role in shaping inclusive virtual education. Mota et al. (2020) illustrates how national education policies in Chile, Peru, and Colombia are increasingly embracing virtual education as a means to promote meaningful learning and competency development. This suggests that systemic change, backed by policy and infrastructure, is essential for sustaining inclusive practices in digital education.

Despite these promising trends, several studies caution against assuming that virtual environments are inherently inclusive. Honorato et al. (2024) and Yakubova et al. (2022) remind us that inclusion requires more than technological access it demands intentional design, teacher engagement, and a mindset that prioritizes equity. In summary, virtual environments have the potential to foster educational inclusion, but their effectiveness depends on a constellation of factors including accessibility, pedagogical quality, institutional support, and the active participation of educators and learners alike.

## 3. Discussion

Virtual Learning Environments (VLEs) have emerged as pivotal instruments in the transformation of contemporary education, challenging conventional pedagogical paradigms and fostering more inclusive, learner-centered approaches. The integration of digital technologies into instructional design has enabled educators to transcend the limitations of traditional classroom settings, offering personalized learning experiences that cater to diverse cognitive profiles and educational needs. Scholars such as Bizami et al. (2023) and Mejía (2019) emphasize the capacity of VLEs to accommodate varied learning styles through adaptive tools and multimodal content delivery, thereby enhancing student engagement and instructional flexibility. These environments facilitate differentiated instruction, promote autonomy, and support the development of critical thinking and problem-solving skills. However, the full potential of VLEs remains constrained by systemic challenges, particularly the widespread lack of teacher preparedness in digital pedagogy. Asad et al. (2021) advocate for techno-pedagogical models that integrate interdisciplinary collaboration and curricular innovation, yet the operationalization of such models is often hindered by institutional resource limitations, fragmented policy frameworks, and resistance to change within educational cultures.

In parallel, VLEs have significantly expanded access to education, particularly for learners in geographically isolated or socioeconomically marginalized communities. The democratizing potential of Information and Communication Technologies (ICTs) is well-documented in studies by Alamri et al. (2021); Mohamed et al. (2023), which highlight how digital platforms enable asynchronous learning, self-paced progression, and remote participation. These features are especially valuable in contexts where physical infrastructure is lacking or where traditional schooling is disrupted. Nevertheless, the promise of equitable access is undermined by persistent technological disparities. Limited internet connectivity, inadequate hardware, and digital illiteracy continue to exclude large segments of the population from meaningful participation in virtual education. Moreover, the increasing commercialization of educational platforms raises ethical concerns about equity and inclusion. Proprietary systems often require costly subscriptions or institutional licenses, creating barriers for low-income learners and reinforcing existing educational inequalities. This commodification of digital learning risks prioritizing profit over pedagogical integrity, thereby compromising the foundational principles of inclusive education.

The motivational dimension of VLEs constitutes another area of significant scholarly interest. Research by Batista et al. (2020); Mukasheva et al. (2023) reveals that virtual environments can enhance student motivation by fostering autonomy, engagement, and a sense of ownership over the learning process. Interactive features such as multimedia content, gamified activities, and real-time feedback mechanisms contribute to a dynamic and responsive educational experience. These elements not only stimulate curiosity but also support sustained attention and persistence, which are critical for academic success. However, the motivational efficacy of VLEs is contingent upon thoughtful instructional design and skilled facilitation. Educators must be equipped to leverage these tools effectively, ensuring that technological features are aligned with pedagogical goals and learner needs. Without adequate training and support, teachers may struggle to integrate digital resources meaningfully, resulting in superficial

engagement or cognitive overload. Additionally, platform usability and user experience design play a crucial role in maintaining learner interest and minimizing frustration, particularly for students with limited digital fluency.

In terms of learning outcomes, empirical evidence suggests that VLEs can positively influence academic performance and skill acquisition. Studies by Abuhassna et al. (2020); Bernate et al. (2021) report improvements in reading comprehension, logical reasoning, and digital competencies among students engaged in virtual learning. These gains are often attributed to the personalized nature of instruction, the availability of diverse resources, and the opportunity for self-regulated learning. However, the literature reveals a notable gap in longitudinal research that examines the sustained impact of VLEs over time. Most studies focus on short-term interventions, which limits the ability to draw robust conclusions about long-term educational trajectories and the enduring effectiveness of virtual learning. Furthermore, there is insufficient exploration of how VLEs influence higher-order cognitive skills, socio-emotional development, and academic persistence across diverse learner populations.

Despite the promising findings across these thematic axes, several critical gaps and limitations persist. The absence of longitudinal data restricts our understanding of how VLEs shape learning experiences and outcomes over extended periods. Technological inequities and insufficient teacher preparation continue to impede the scalability and effectiveness of virtual education, particularly in low-resource settings. Moreover, the commercialization of educational platforms threatens to undermine the principles of equity and access, as market-driven priorities may conflict with the pedagogical needs of diverse learners. These challenges underscore the need for a more holistic and equity-oriented approach to the design, implementation, and evaluation of VLEs.

To address these multifaceted challenges, a series of strategic interventions is required. First, substantial investment in teacher professional development is essential, with a focus on digital pedagogy, inclusive practices, and the integration of neuroeducational principles. Such training should be ongoing, context-sensitive, and aligned with the realities of diverse educational environments. Second, governments and institutions must prioritize the development of robust technological infrastructure, particularly in underserved regions, to ensure reliable and equitable access to digital learning. Third, inclusive policy frameworks should be established to regulate the commercialization of educational platforms, safeguarding against exclusionary practices and promoting open-access models. Finally, the academic community must commit to conducting longitudinal and mixed-methods research that captures the complex, evolving impact of VLEs on student learning, teacher practices, and institutional transformation.

In conclusion, Virtual Learning Environments hold immense potential to advance educational inclusion, innovation, and learner engagement. However, their success is not guaranteed by technology alone. It requires deliberate, strategic implementation, critical evaluation, and sustained support from educators, policymakers, and institutions. By addressing existing limitations and embracing inclusive, evidence-based practices, VLEs can evolve from technological novelties into transformative tools that promote equitable, high-quality education for all learners.

Practical Recommendations:

To address these challenges, the following recommendations are proposed:

- Invest in teacher training programs focused on digital pedagogy.
- Enhance technological infrastructure to support equitable access.
- Develop inclusive policies that safeguard against platform commercialization.
- Encourage longitudinal research to evaluate long-term outcomes of VLEs.

In sum, VLEs offer substantial contributions to educational inclusion, yet their success depends on strategic implementation, critical evaluation, and sustained support.

## 4. Conclusions

The systematic review concluded that technology and virtual spaces provide society with greater opportunities to access comprehensive academic education. These resources not only allow educational institutions to have inclusion tools but also facilitate the creation of spaces that optimise the teaching and learning process in various social contexts. This has been crucial in establishing more equitable educational environments, where learning is not limited by physical or geographical barriers, thus promoting the democratisation of knowledge.

The concept of inclusion through virtual learning environments has gained significant momentum with the use of technological tools. Today, anyone can use these tools according to their abilities and learning pace, which has enabled the personalisation of the educational process. This flexibility is essential in the digital age, as it respects the diversity of learning needs, strengthening educational equity and the participation of individuals with diverse abilities, cultural backgrounds, and socio-economic contexts. In this way, ICT (Information and Communication Technologies) are not only transforming education but are also contributing to improving the quality of life in different environments and regions of the country.

The accelerated progress in knowledge acquisition facilitated by ICT has been reflected in greater inclusion in the various processes necessary for the holistic formation of individuals. It is not just about providing access to information, but about generating interactive, collaborative, and adaptive spaces where students can learn and develop skills in an environment tailored to their needs. This approach has enabled the inclusion of students who might otherwise have been excluded from formal education due to physical, geographical, or economic limitations.

In teaching and learning processes, the student's work and their inclusion through virtual education are fundamental. However, it cannot be overlooked that teachers and educational leaders are key players in this process. They require technological tools to better convey their knowledge, train themselves, and reinforce their skills. Teacher training in the use of ICT is crucial to ensure that these technologies are used effectively, maximising their impact on teaching and learning. Teachers must not only master the technologies but also adapt them pedagogically to address the diversity of their students.

Moreover, ICT offers teachers the opportunity to innovate in their methodologies, creating more interactive and dynamic learning environments. The use of virtual platforms, multimedia resources, and collaborative tools not only enhances students' understanding of the content but also fosters transversal skills such as teamwork, problem-solving, and critical thinking. These technologies also enable more detailed and personalised tracking of students' progress, facilitating the identification of areas for improvement and the implementation of more effective educational strategies.

It is undeniable that the quality of education is fundamental to a country's progress. In a globalised and increasingly interconnected world, the ability to adapt to new technologies and use them for teaching is a decisive factor in forming a more prepared and competitive society. Therefore, investment in technological infrastructure, as well as in the continuous training of teachers and students, is essential to ensure a future where inclusive and quality education is an accessible reality for all.

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