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ORIGINAL

Technological Tools for Elementary School Children with Intellectual Disabilities That Cause Learning Difficulties. Los Olivos, 2025

Herramientas Tecnológicas para Niños de primaria con Discapacidad intelectual que ocasiona dificultades de Aprendizaje. Los Olivos, 2025

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ABSTRACT

This research addresses the issue of accessibility and adaptation of technological tools and their impact on learning difficulties among primary school children with intellectual disabilities, aligning with SDG 4 "Ensure inclusive, equitable and quality education." The aim was to explain the relationship between these tools and cognitive barriers in students from Los Olivos, 2025. Universal Design for Learning and Socio-Constructivist theories were reviewed. The study was applied, non-experimental, correlational, cross-sectional, and descriptive; the sample comprised 52 subjects and a validated questionnaire was used (α = 0,944). Descriptive results showed that 1,9 % of respondents disagreed, 13,5 % neither agree nor disagree, 17,3 % agreed, and 15,4 % strongly agreed with the use of adapted technologies. Inferentially, Spearman's rho was ρ = 0,652 (p = 0,000 < 0,05), demonstrating a moderate positive correlation. It is concluded that greater accessibility and pedagogical adaptation reduce cognitive barriers and enhance educational impact, guiding teacher training, inclusive interface design, and the development of inclusive school-equipment policies.

Keywords: Technological Tools; Intellectual Disability; Inclusive Education; Accessibility; Educational Intervention.

RESUMEN

La investigación aborda la problemática de la accesibilidad y adaptación de las herramientas tecnológicas y su impacto en las dificultades de aprendizaje de niños de primaria con discapacidad intelectual, se alinea al ODS 4 "Garantizar una educación inclusiva, equitativa y de calidad", ya que es un tema de relevante en el ámbito social y educativo El objetivo fue explicar la relación entre estas herramientas y las barreras cognitivas en estudiantes de Los Olivos, 2025. Se revisaron la Teoría del Diseño Universal para el Aprendizaje y la Teoría Socio-Constructivista. La investigación fue aplicada, de diseño no experimental, correlacional, transversal y descriptivo; la muestra comprendió 52 sujetos y se aplicó un cuestionario validado (α = 0,944). Los resultados descriptivos indicaron que 1,9 % de los encuestados estuvo en desacuerdo, 13,5 % ni de acuerdo ni en desacuerdo, 17,3 % de acuerdo y 15,4 % muy de acuerdo con el uso de tecnologías adaptadas. Inferencialmente, Spearman arrojó ρ = 0,652 (p = 0,000 < 0,05), evidenciando una correlación positiva moderada. Se concluye que una mayor accesibilidad y adaptación pedagógica reducen las barreras cognitivas y fortalecen el impacto educativo, orientando la capacitación docente, el diseño de interfaces inclusivas y la formulación de políticas de equipamiento escolar inclusivo.

Palabras clave: Herramientas Tecnológicas; Discapacidad Intelectual; Educación Inclusiva; Accesibilidad; Intervención Educativa.

INTRODUCTION

The problematic reality in the world regarding the use of and access to technology in education highlights the importance and crucial nature of quality education in the learning of children and young people. In the current scenario, incorporating technological tools is essential to promote the development of new learning. [1] Similarly, Sustainable Development Goal 4 (SDG) seeks to guide these actions toward achieving an education that promotes equal opportunities, participation for all, and excellence for each individual. In Latin America, the incorporation of digital tools plays a fundamental role in this endeavor. Technology is a valuable and engaging tool that helps develop cognitive skills and supports children's learning in the digital space. It is worth noting that, although technology has brought numerous benefits to learning in Latin America, it also faces significant challenges, including the integration of technology into education and unequal access to the internet in remote areas, among others.[2] In the context of Peru, a clear example of unequal access to technology emerged during the COVID-19 pandemic, when thousands of students lacked access to a technological device or the internet to attend remote classes, thereby affecting their learning.[3] In response to this situation, it became essential to provide teachers with greater support and training so that they could adapt to new teaching environments and ensure the continuity of their students' learning. On the other hand, according to the INEI[4], 58,4 % of households have an internet connection, whereas in rural areas, this service is available to only 19,3 % of households. According to surveys conducted by INEI[4], 79,2 % of households in metropolitan Lima have internet access. Young people between the ages of 19 and 24 have the highest access rate at 93,8 %, followed by adolescents between the ages of 12 and 18 at 93,8 %. At the same time, internet use is lower among children aged 6 to 11, at 58,3 %. There is no doubt that the influence and use of technology in learning has acquired an essential role in the educational development of students, contributing significantly to the improvement of their learning. This deserves special attention due to its growing impact, and it is crucial to utilize it through educational strategies that leverage the availability of information and the acquisition of digital skills. While technological tools facilitate the personalization of learning, virtual interaction, and access to quality content, they also present challenges such as distraction, overdependence on devices, and the digital divide. This analysis aims to explore the role of technological tools within the educational context, as well as their impact on teaching methods and student academic performance, acknowledging both the advantages and disadvantages of their use in a constantly evolving school environment. The general problem is: How does access to technological tools for primary school children with intellectual disabilities that cause learning difficulties relate to Los Olivos (2025)?

Regarding the justification for this research, it aims to contribute to the understanding of the use of technological tools by children with intellectual disabilities, a topic of particular relevance to inclusive education. In theory, the research enables various authors to highlight technological tools as pedagogical resources that enhance the cognitive and communicative abilities of students with intellectual disabilities, as they facilitate meaningful learning, promote autonomy, and encourage active participation among children. Furthermore, the integration of these technological tools represents a response to the principles of equity and educational accessibility. Therefore, in practical terms, the research is helpful because it guides the development of adapted pedagogical interventions, allowing teachers to plan more inclusive and effective teaching strategies that incorporate technological tools into educational practices. On the other hand, the study addresses the need for education that favors students with intellectual disabilities, ensuring their active inclusion in the educational process. It promotes equal opportunities for diverse people. In academic terms, this research seeks to contribute to raising awareness in the academic and school community about the need to incorporate inclusive technologies in the primary educational environment for students with intellectual disabilities in northern Lima, providing valuable information that can be compared with studies carried out in other contexts, thus helping to disseminate the use of technological tools for children with intellectual disabilities. The research presents a structured approach with precise dimensions, facilitating the analysis of technology use in inclusive contexts.

Additionally, its methodology can be replicated in other schools with similar characteristics, thereby strengthening its validity. The results will enable the design of adapted technological strategies to improve the education of children with intellectual disabilities. It will provide recommendations to teachers and schools to optimize their resources. Ultimately, our work is grounded in a commitment to inclusive, fair, and equitable education.

The overall objective is to explain the relationship between technological tools and primary school children with intellectual disabilities and learning disabilities, as outlined in Los Olivos 2025.

The specific objectives are to analyze the relationship between technological accessibility for primary school students with intellectual learning disabilities and Los Olivos 2025, and to examine the pedagogical adaptation of the technologies used, focusing on the application of inclusive methodologies such as Universal Design for Learning (UDL). Finally, to explain the relationship between the educational impact and the use of technological tools for primary school children with intellectual learning disabilities, Los Olivos 2025.

The general hypothesis posits the possible existence of a highly significant correlation between technological tools and primary school children with intellectual disabilities who experience learning difficulties. Los Olivos, 2025.

The specific hypothesis is formulated as follows: A possible statistically significant association exists between technological accessibility for primary school students with intellectual learning disabilities, as of Los Olivos 2025. Next, an analysis will be carried out on the possible considerable correlation between pedagogical adaptation for primary school students with intellectual learning disabilities, as per Los Olivos 2025. Finally, a study will be conducted to determine the existence of a substantial correlation between the educational impact of using technological tools for primary school students with intellectual learning disabilities, as per Los Olivos' 2025 guidelines.

The international background is as follows:

García[5], in his article entitled "Technology in Educational Inclusion," aimed to determine the existing problems and improve the implementation of technology in classrooms in Quevedo, Ecuador. The methodology used was qualitative with a descriptive approach. The results indicated that incorporating technologies into the school can optimize the educational process, promoting more dynamic learning that is better suited to the demands of students. This includes utilizing technological tools as a valuable resource for enriching teaching practices, provided that they are used strategically and effectively. The particularities of the educational environment are taken into account.

Hernandez et al.[6], in their research titled "Technological Tools to Support Skills Training for Students with Intellectual Disabilities in Pinar del Río, Cuba," employed a mixed-methods approach, incorporating theoretical methods such as analysis and synthesis, to investigate how technological tools can support the teaching of students with intellectual disabilities. The results showed that these tools facilitate the development of cognitive skills, which demonstrates the positive impact of technology in inclusive environments when designed intentionally.

Herrera et al.[7], in their article entitled "Impact of ICT as Support for Students with Intellectual Disabilities in Ibarra, Ecuador," employed a qualitative, descriptive, and field-based approach. In this study, interviews were conducted with students to assess the extent of their technological skills and with teachers to evaluate the digital tools they used in their teaching strategies during learning sessions. The results revealed that various barriers limit the use of ICT; however, students possess competent knowledge regarding the handling and manipulation of mobile and computer devices, which enables them to achieve this competence according to their level of cognition. This demonstrates the challenges and opportunities in integrating technology, which can harness the potential of students through the use of technological tools and generate meaningful learning.

Hernandez et al.[8] in their journal article, "Use of Technology in People with Intellectual Disabilities in Times of Crisis during the Pandemic in Xalapa, Mexico," employed a quantitative approach involving 257 people with disabilities and developed a survey instrument. The results affirm that the lack of adapted digital tools and specialized pedagogical training in computer skills restricts and limits the development of technological skills in students with such disabilities. This is why it is essential to implement digital training programs from the outset in education to ensure more interactive learning.

Rivoir et al.[9], in their article "Digital Technologies: Critical Perspectives," sought to critically analyze the appropriation of digital technologies in various Latin American contexts. The methodology compiles various chapters by authors who use qualitative methods and case studies to examine the acceptance and effects of digital technologies. The results present diverse perspectives on how digital technologies are adopted and adapted in the region, highlighting both opportunities and challenges. The appropriation of digital technologies in Latin America is a complex and multifaceted process that requires critical analysis to understand its social, cultural, and political implications.

A recent study by ECLAC[10], published in its magazine entitled "Digital Technologies for a Renewed Future" in Santiago, Chile, aimed to explore how the implementation of digital technologies can help countries in the region advance in Latin America. The research methodology employed a mixed approach, combining research, statistical analysis, and documentary case studies. The results highlight both the opportunities and challenges involved in the digitization process, including closing access gaps, emphasizing the urgency of moving towards a more inclusive, equitable, and sustainable digital transformation through the efficient and beneficial use of digital technologies.

Herrera[11], in the research entitled: Analysis of technological accessibility for people with disabilities from a user perspective in Ibarra- Ecuador, developed a qualitative descriptive study applied in a real context, to design and validate a training program for the teaching community on the use of ICTs with students with intellectual disabilities. The results of the studies revealed that most students demonstrated a basic familiarity with the use of software and computer equipment. However, regarding teachers, barriers to access and limitations to the use of ICT in the classroom were identified.

Lemús et al.[12], in their study entitled "Use of technology during virtual classes in times of pandemic,"

analyzed the experience of primary school students with disabilities in southern Tamaulipas, Mexico. They conducted a descriptive quantitative study to describe the characteristics and problems regarding access to and mastery of digital tools in a distance learning context. A survey was conducted among 93 caregivers of primary school children with disabilities, and the results show that most students did not have access to these tools because there was no prior planning focused on these children. This highlights that these technological tools did not meet their cognitive needs and that schools made less use of them, which limited their learning. Therefore, they emphasize the importance of training educators and promoting the more intensive use of these tools to enhance student education.

Castillo et al.[13] conducted a study entitled "Educational Technology as a Support for Teaching Strategies in Students with Intellectual Disabilities." This research employed a quantitative approach and utilized a descriptive design with a sample of 28 students with intellectual disabilities at the Sor Teresa Beltran educational center in Azuay. Ecuador. The objective was to investigate the existing relationship between teaching strategies and the learning process in children with intellectual disabilities. The results showed that how the teaching strategies were applied affected the learning of schoolchildren with intellectual disabilities. Therefore, they emphasize that applying teaching strategies supported by digital resources contributes to the optimization and learning of students with intellectual disabilities by facilitating their understanding and adaptation of educational content.

UNESCO[14] in its global report, "Equal Access to Technology in Education," Paris, France, covered 200 countries to assess inequalities in access to technology in educational contexts in low-income countries. The methodology was comparative and documentary. The results reveal that the lack of connectivity and devices affects performance and also has an impact on student continuity within education systems. In conclusion, it argues that policies on technological integration are needed to guarantee the right to inclusive, high-quality education.

Cruz et al.[15], in their study titled "Use of digital platforms for inclusive education," conducted qualitative, documentary research in Bogotá, Colombia, with a descriptive bibliographic design. The study aimed to analyze the role of technology as an essential element in promoting educational inclusion for students with intellectual disabilities. To this end, theories and studies were reviewed, and the results identified that the use of technologies in school environments facilitates a more inclusive and participatory learning process. In conclusion, implementing inclusive strategies based on technology has contributed to more students with diverse disabilities achieving active and effective participation in the school environment, thus responding to one of the current challenges of truly inclusive education.

According to the Inter-American Development Bank[16], in its report entitled "Digital Transformation and Education: Washington, United States," it presents a mixed-methodology approach combining statistical analysis in 15 Latin American countries and a review of public policies on digital transformation to investigate how digitization can close educational gaps in the region. The results indicate that the strategic use of technologies improves learning, reduces school dropout rates, and promotes equity. As a result, they emphasize that governments must invest in educational innovation and provide teachers with training in the use of ICTs to achieve a sustainable digital transformation.

The national background is as follows:

Gamarra et al.[17] in their study: educational needs in Peru: an analysis based on the last decades, developed by the National Council for the Integration of Persons with Disabilities - Lima, Peru, used a descriptive qualitative methodology, as it sought to examine and condense data on disability in Peru, based on multiple sources collected over the last ten years, through a documentary review and analysis of data from official sources. The results revealed social, educational, and health barriers faced by people with disabilities in Peru. The elements included in the analysis highlight the need for inclusive policies and practical actions to improve the well-being of people with disabilities in the country.

SODIS et al.[18] in their report, "The Economic and Social Impact of Inequality in Equal Participation of Persons with Disabilities," Lima, Peru, employed a mixed-methods approach, analyzing data on economic, social, and physical barriers. The objective was to identify and examine the costs faced by individuals with disabilities in Peru, contributing to equal conditions. The results highlight the financial, access, and social barriers that restrict the full inclusion of persons with disabilities, emphasizing the importance of developing policies and programs aimed at addressing these costs and promoting equal opportunities for persons with disabilities in Peru.

Quispe[19], in his journal article entitled "Critical Thinking in People with Disabilities," Lima, Peru, employed a qualitative methodology to investigate whether it is possible to develop critical thinking in people with disabilities to enhance their autonomy. To this end, a narrative review of 37 research papers in databases was conducted. The results showed that critical thinking can be developed through appropriate educational strategies, thereby improving personal autonomy, which is essential for promoting this skill in students with disabilities. It is therefore crucial to train teachers with inclusive approaches.

Huamán et al.[20], in their article entitled "Inclusive education using ICT," conducted quantitative descriptive

research in Lima, Peru, applying surveys to 520 teachers across different educational levels and several regions of the country. The results showed that although teachers have general knowledge of ICT, its use is limited in inclusive contexts due to a lack of training and a shortage of accessible resources for students with intellectual disabilities. This study, therefore, highlights the need to train teachers and provide adapted technological resources to ensure truly inclusive education through the use of ICT.

Ramos et al.[21] in their research entitled: adapted technologies for children with intellectual disabilities during the pandemic, Lima- Peru, used a mixed methodology, focusing their analysis on surveys of students between the ages of 6 and 13, to examine school closures and the implementation of digital tools in distance learning for children with intellectual disabilities. The results showed that access to personalized technologies was limited, but highlighted that access to customized technologies can reduce learning barriers for students with such disabilities. As observed, tools such as tablets with educational apps improve attention and comprehension.

Chura et al.[22] in their article entitled: reality of Inclusive Education in Lima, Peru, carried out documentary and descriptive research to demonstrate how these technological tools enable inclusion in the use of such fundamental tools, where, when teachers are instructed to participate more actively, which is why they emphasize that teachers must encourage the active participation of all their children, since well-applied technologies can create more accessible and effective environments when accompanied by teacher training.

The Ministry of Education[23], in its document Guidelines on the inclusion of ICT in schools with students with intellectual disabilities, Lima, Peru, a descriptive documentary review aimed at providing pedagogical guidance to teachers to promote the teaching-learning process, highlighted the importance of adapting digital content with simple language and visual elements. It was identified that, although technological tools are available, their actual impact depends on the accessibility of materials and the quality of teacher training. They also emphasize the importance of strengthening technological infrastructure in rural areas, involving families as strategic allies. This underlines that digital inclusion will only be effective if accessibility, teacher training, and family participation are guaranteed.

Peréz et al.[24], in their article entitled "The Gaps in Inclusive Education," Huánuco, Peru, developed a systematic and theoretical design to analyze the factors that affect the digital divide. They implemented an educational proposal with ICT support to improve communication among students with intellectual disabilities. Their strategy focused on the playful use of technological tools, which strengthened the communication skills of primary school students, demonstrating that the appropriate use of these resources can create more inclusive and effective learning environments.

Melgarejo[25] in his article entitled: learning through the use of ICT in children with extraordinary abilities in the 2nd grade of primary school, Lima-Peru, used a qualitatively focused methodology based on case study design, where the population was composed of 4 teachers and four parents of 4 different students with signs of intellectual disabilities. The results indicated that ICTs make teaching more dynamic and promote student motivation when the teacher accompanies them in this process, as they help to improve active participation, concentration, and school performance. To this end, accessible content should be selected according to their needs.

Cotrina[26], in her thesis entitled Educational Technologies for Children with Disabilities in an Educational Institution in Peca Amazonas, Peru, used a non-experimental methodological approach with a descriptive cross-sectional design, presenting a population of six teachers from a CEBE (Basic Education Center), using instruments such as surveys, diagnostic tests, and observation. The results showed that the appropriate use of digital tools adapted with guides for teachers facilitates the teaching of skills such as reading, phonetics, and communication. To this end, personalized attention should be promoted according to each child's needs.

Sanchez[27], in his article entitled: technologies as an inclusive tool in Lima, Peru, aimed to analyze the principles of Universal Design (UD) applied to ICT. The methodology used was a theoretical review

of 113 documents published in the last decade. The results demonstrate that UDL models are essential for supporting students. They also mention that despite the incorporation of ICT, many lack follow-up and continuity. Although progress has been made in the use of ICT for inclusive education, challenges persist in achieving effective inclusion.

Calsina[28], in his research entitled "Children with Intellectual Disabilities and Inclusion in the Classroom," conducted a documentary study in Lima, Peru, with a descriptive approach. The study aimed to investigate and understand how the inclusion of students with intellectual disabilities develops through the use of technologies. The results revealed the need to focus on student diversity to promote inclusive environments, since inclusion requires not only equal access but also a differentiated educational response that takes into account individual strengths and needs. In conclusion, it highlights that inclusion enhanced by technology must become an academic community where equity and inclusion prevail.

METHOD

To collect data, a survey was conducted with 52 participants, comprising teachers and parents of students with intellectual disabilities from a primary school in northern Lima in 2025. Within the framework of this research, the primary tool used to collect the necessary data was a survey. This technique enables us, as researchers, to directly ask the study population, which in this case consists of teachers and parents, about their opinions and experiences regarding the topic of interest. By applying a structured questionnaire, we obtain data in an organized and transparent manner, which facilitates analysis and better understanding of what they think and feel. This approach allows us to gather the perceptions and experiences of teachers and parents effectively.

A survey questionnaire was mainly used for data collection. This questionnaire features a 5-level Likert scale for evaluation, enabling a qualitative assessment of the variables under study. The instrument consists of 20 questions that seek to obtain information on aspects related to these variables. It is essential to note that the instrument was designed based on the contributions of an instrument, which refers to any tool, technique, or resource used in research to collect, measure, or analyze data.

Research instruments

Técnica	Instrumento
Encuesta	Cuestionario de encuesta

Figure 1. Main Research Instrumentation Techniques

RESULTS AND DISCUSSION

The research findings answer the central question: How is access to technological tools for primary school children with intellectual disabilities that cause learning difficulties related to their academic performance? Los Olivos, 2025? To this end, Cronbach's alpha coefficient was used to evaluate the reliability of the instrument on a sample of 52 participants, consisting of parents and teachers from a private educational institution in Los Olivos, to determine the reliability of the questionnaire used as a data collection instrument. To obtain the result, both variables were evaluated: Technological Tools and Intellectual Disability. This made it possible to determine whether these items were consistent with each other.

After examining and evaluating the conclusions obtained based on the descriptive and inferential analyses, a comparative analysis of the findings obtained in the studies and theories cited above in Chapter I was carried out, referring to Technological Tools and Intellectual Disability, considering the dimensions addressed, as well as the objectives and hypotheses established in the context of the research.

Comparative interpretation

Speaking specifically about the general objective of "explaining the relationship between access to technological tools for primary school children with intellectual learning disabilities and the 2025 goals," By Jonassen's Theory of Technology Effects on Cognition, he mentions that technology should not be understood only as a means of transmitting information, but as an active element that intervenes in the formation of knowledge. Furthermore, Luckasson's Three Dimensions of Intellectual Disability Theory suggests that intellectual disability extends beyond a simple level of intelligence, also encompassing how a person functions in their daily life and the support they require to function more effectively. It also notes that it is not a fixed condition, as it can be significantly improved if the right tools are provided, according to the general hypothesis: There is a statistically significant association between technological tools and primary school children with intellectual disabilities who experience learning difficulties.[29,30,31] Since the level of significance obtained is 0,000, which is lower than the established criterion of 0,05, the alternative hypothesis (H1) is confirmed. Likewise, a moderately positive correlation of 0,652 was found, indicating that greater availability of technological tools has a favorable impact on addressing learning difficulties linked to intellectual disabilities.[32,33,34,35] This result highlights the fundamental role of technology as a key resource for promoting educational inclusion and enhancing the academic performance of this student group. In line with García's[5] research results, it highlights the revolutionary potential of technologies applied to education. Their bibliographic analysis reveals that strategically integrating these technologies leads to a more interactive and efficient educational process, tailored to the contemporary demands of students.[36,37,38,39] This underscores the importance of considering

the conscious and adapted application of these tools, not only as a complement, but as a pillar for enriching pedagogical practices and thus optimizing the educational experience. Rivoir et al.[9] offer a critique and warning about the appropriation of digital technologies in Latin America, pointing out that the integration of these tools is complex and multifaceted. They emphasize that, while significant opportunities exist, important social, cultural, and political challenges also arise.[40,41,42,43] They therefore emphasize the need for an in-depth and contextualized analysis to truly understand the implications of technology adoption in the region, beyond simple implementation. Similarly, Herrera[11] presents a concerning picture of the reality of technological accessibility for people with disabilities, highlighting significant gaps that hinder the independent living, participation, and digital integration of students. The findings highlight not only the lack of effective digital accessibility but also the urgent need to develop more accurate indicators to measure and combat technological exclusion, emphasizing the crucial role of the social environment in this process. For their part, Castillo et al.[13] demonstrated the effectiveness of adapted teaching strategies and the use of educational technology in the learning of students with intellectual disabilities. Their study confirms that implementing specific teaching methods and appropriate technological resources leads to significant improvements in both the comprehension and involvement of these students. This highlights that technology, integrated into well-designed pedagogical strategies, acts as a key facilitator in adapting and making educational content accessible, thus optimizing the learning process for this population. Gamarra et al.[17] also take a critical look at the educational needs and the situation of people with disabilities in the country. Their research identifies the persistent social, educational, and health barriers faced by people with disabilities in Peru. This emphasizes the urgent need to implement more inclusive policies and concrete actions to ensure the well-being and full integration of this population, setting a clear path for the formulation of future interventions. Finally, Quispe[19] highlights the feasibility and positive impact of developing critical thinking in individuals with disabilities, concluding that the implementation of relevant educational strategies makes it possible not only to foster this cognitive skill but also to enhance personal autonomy significantly. Thus, underscoring the importance of integrating and strengthening adapted conventional methodological processes to ensure that students with disabilities have access to the tools necessary for robust critical thinking. Research in Los Olivos (2025) found a statistically significant positive association (p=0,000; correlation 0,652) between access to technological tools and improvement in learning difficulties among primary school children with intellectual disabilities. This validates the hypothesis, suggesting that greater availability and use of technology correlate with a positive impact. Taken together, these studies demonstrate that technological tools serve as an engine that drives learning for children with intellectual disabilities, making it easier and more enjoyable, confirming that technology has a positive impact, helping them improve and think for themselves. However, although technology is invaluable, these studies show that barriers still exist, as not everyone has access to it, and sometimes its implementation is not ideal. They therefore emphasize the importance of ensuring that these tools reach everyone without exception, thereby guaranteeing a more equitable and inclusive education.[44,45,46,47]

In line with specific objective 1: "Analyze the relationship between technological accessibility in a private school for primary school children with intellectual learning disabilities, Los Olivos 2025." By Salomón's theory of technology-mediated learning, educational environments should be designed to be accessible to all, taking into account the cognitive, physical, and sensory diversity of students. This implies using flexible technologies that adapt to different needs, as they help restructure mental processes, acting as intermediaries in the learning process. Regarding intellectual disability, the humanistic theory of learning, developed by Rogers[29], posits that the deepest learning occurs when the student is meaningfully engaged, a principle that is even more crucial for children with intellectual disabilities. Therefore, providing them with an empathetic environment based on respect and acceptance influences their overall development. According to specific hypothesis 1: "There is a significant relationship between technological accessibility for primary school children with intellectual learning disabilities in Olivos 2025." A correlation coefficient of $\rho = 0,795$ and a significance level of $p = 0,000$ were determined, which allowed us to reject the null hypothesis (H0) and accept the alternative hypothesis (H1).[48,49,50,51] This validates that greater technological accessibility significantly reduces learning difficulties related to intellectual disabilities. In line with these findings, Herrera et al.[7] identified that technological gaps directly affect educational inclusion, especially for students with disabilities, who face limitations in accessing digital platforms and school content. Huamán et al.[20] highlight that in Peru, there are fundamental obstacles that prevent students with disabilities from accessing technologies that make their lives easier, such as adapted information programs or tools with visual or auditory options. For their part, Hernandez et al.[6] indicate that technological tools are a fundamental support in the development of cognitive skills. Various studies have demonstrated their positive influence in creating inclusive educational environments, offering valuable support to educators and strengthening the skills of students with intellectual disabilities. Ramoscet al.[21] argue that modifications to the curriculum and teaching strategies, enhanced by technology, promote participation and learning in the classroom, especially for students with cognitive challenges. Cotrina[26] argues that the use of technological platforms designed for the needs of these students can improve their attention

span and academic performance. Finally, Chura et al.[22] demonstrate that digital tools are a key driver for the inclusion of children with disabilities in school, provided that educators receive the necessary training. In conclusion, the findings reveal that optimizing access to technology in educational institutions is crucial for enhancing the positive impact on the learning of students with intellectual disabilities. This measure not only increases their participation and motivation but also strengthens individualized teaching processes, aligning with the principles of Connectivism Theory. Likewise, from an inclusive perspective, technology becomes a fundamental component rather than a complement, becoming a necessity. Its strategic implementation enables the elimination of barriers, promotes equity, and supports the fulfillment of SDG 4, which seeks quality, inclusive, and transformative education.[52,53,54,55]

Similarly, specific objective 2: "Examine the pedagogical adaptation of the technologies used, focusing on the application of inclusive methodologies such as Universal Design for Learning (UDL) and teacher training in the use of these tools." Salomon's Theory of Technology-Mediated Learning argues that technological tools do more than make things easier; they also act as a bridge connecting students with knowledge, making them key to interactive learning.[56,57,58,59] In contrast to Piaget's theory on cognitive development, he argues that the pedagogical use of technology cannot be neutral; instead, it must be adapted to the context and profile of each student, as digital resources act as mediators that transform the learning experience. According to Hypothesis 2, "There is a significant relationship between intellectual disability and the pedagogical adaptation of technologies in primary school students with learning difficulties in Los Olivos, 2025," a high positive correlation ($\rho = 0{,}785$) was found, with a significance level of $p = 0{,}000$.[60,61,62,63,64] This allowed us to reject H_0 and accept H1, showing that the greater the need for support due to intellectual disability, the more intensive the pedagogical adaptation of technological resources in the classroom. In support of this statement, Lemús et al.[12] demonstrated that the lack of access to and adaptation of technology in classrooms without prior planning according to students' needs creates an urgent need to train teachers and promote more intensive use of technology. Hernandez et al.[8] concluded that the lack of adapted digital tools severely limits the development of digital skills in students with intellectual disabilities, highlighting the importance of implementing digital platforms. Melgarejo[25] emphasizes that when content is adapted using interactive technology, it promotes greater involvement and sustained attention in students with cognitive limitations. Regarding teacher training, SODIS et al.[18] emphasized that the success of technology-mediated inclusive education depends on the technical and pedagogical preparation of teachers. The Ministry of Education[23] found that training in the use of inclusive digital platforms enables teachers to design more effective teaching proposals, tailored to the learning rhythms of students with disabilities. Finally, UNESCO[14] noted that without teachers' reflective appropriation of technology, its inclusive potential remains limited, recommending contextualized and continuous training to ensure inclusive education. In conclusion, the analysis revealed that the use of technological resources in the classroom, through the application of pedagogical adjustments based on the principles of Universal Design for Learning (UDL) and accompanied by adequate teacher training, becomes an effective means of promoting student learning for those with intellectual disabilities.[65,66,67,68,69] The high positive correlation ($\rho = 0{,}744$; $p = 0{,}000$) supports the hypothesis of a significant relationship between educational impact and this school population. These findings reaffirm the importance of promoting inclusive educational environments, in line with Connectivist Theory and SDG 4, which emphasizes the importance of quality and inclusive education.[70,71,72,73,74]

Speaking specifically about objective 3: "Analyze the educational impact of the use of technological tools on primary school children with intellectual disabilities, Los Olivos 2025," by Siemens[30] Theory of Connectivism, it is considered that knowledge is constructed through digital networks, where access to technology allows students to interact with information, facilitating personalized learning. Likewise, Watson[31] Behavioral Theory states that learning occurs through stimulus and response, which is why the use of inclusive technologies in the classroom enhances participation, equity, and academic achievement, especially in students with intellectual disabilities. About specific hypothesis 3, a significant association was found between educational impact and learning among primary school students with intellectual disabilities. The results of the study revealed a high positive correlation ($\rho = 0{,}744$; $p < 0{,}05$), supporting the validity of the alternative hypothesis (H1) and confirming the existence of a significant correlation between educational impact and intellectual disability in students with intellectual disabilities.[79,80,81,82] These results are consistent with Calsina[28], who showed that the pedagogical use of technology improves motivation and comprehension in students with disabilities. For their part, Sanchez[32] highlighted that technological mediation increases autonomous learning in inclusive environments. In the Peruvian context, Perez et al.[24] found that digital educational platforms increase content retention in students with special educational needs. According to data presented by ECLAC[10], the use of educational apps reduces academic frustration, highlighting both opportunities and challenges in closing access gaps. In turn, according to the IDB[16] report, personalized virtual environments improve the participation of students with intellectual disabilities, which is why investment in technological innovation and teacher training is necessary. Finally, Cruz et al.[15] noted that gamification with ICT enhances the development of cognitive

abilities in students with mild disabilities, thereby facilitating more inclusive and participatory learning processes. In conclusion, the analysis showed that the use of technological tools has a significant educational impact on primary school children with intellectual disabilities in Los Olivos, 2025. The high positive correlation found supports the hypothesis, demonstrating that technology not only facilitates access to information but also actively contributes to more personalized, motivating, and inclusive learning.[83,84,85] These findings align with the theories of Connectivism and Educational Inclusion, as well as recent studies that emphasize the effectiveness of ICT in enhancing participation, retention, and cognitive skill development in inclusive school settings.

CONCLUSIONS

General conclusion: the research aimed to analyze the relationship between technological tools and intellectual disabilities in primary school children in Los Olivos in 2025, concluding that there is evidence of a moderate positive association between the two variables. The descriptive result revealed that the majority of respondents (17,3 % agreed and 15,4 % strongly agreed, out of a total of 52 people) perceive a correlation between the variables technological tools and intellectual disability. This is reinforced by inferential results, giving us a p-value of 0,000, below 0,05, and a correlation coefficient of 0,652, supporting hypothesis H1. This affirms that the relationship manifested itself through dimensions of technological accessibility, pedagogical adaptation, educational impact, academic support, and educational intervention, although cognitive barriers were also identified. In practical terms, these findings indicated an urgent need to design and deploy technological solutions specifically tailored to the affected population, ensuring accessibility and adaptability from a pedagogical standpoint. In theoretical terms, the study helps identify the fundamental role that technology plays in reducing cognitive difficulties experienced by students with intellectual disabilities. From a methodological perspective, the research establishes a stable base of information for future studies that delve deeper into the effectiveness of these specific tools and the reduction of cognitive difficulties in an academic setting.

General recommendation: methodologically, it is recommended that future studies be strengthened by using more specific instruments adapted to the variables related to the cognitive abilities of children with intellectual disabilities, such as scales and rubrics applied in real classroom environments. While the survey helped to capture the general perception, the applicability could be broader by including the perspectives of teachers and parents related to the research topic. In addition, we suggest combining quantitative and qualitative methods, such as interviews or case studies, to gain a rich understanding of the variables and more accurately measure the real impact of technological tools. This approach enables a more in-depth assessment of the identified dimensions: accessibility, pedagogical adaptation, and educational implications.

Regarding specific conclusion 1: the applied research, designed as a non-experimental, correlational, cross-sectional, and descriptive study, analyzes the correlation between the dimension of Technological Accessibility and the variable Intellectual Disability in 52 primary school students in Los Olivos (2025) using a validated questionnaire (α = 0,944). The descriptive results revealed that no one disagreed, 1,9 % remained neutral, 21,2 % agreed, and 25,0 % strongly agreed with the use of technological devices in terms of stable internet connection and adapted technological resources. Inferentially, Spearman yielded a correlation coefficient of ρ = 0,795 (p = 0,000 < 0,05), confirming the alternative hypothesis (H1) of a high positive correlation between Technological Accessibility and the variable Intellectual Disability, which causes cognitive difficulties. This correlation directly suggests that an increase in the use of accessible technological devices, stable internet access, and adapted digital resources enhances educational impact, Academic Support, and Educational Intervention, while reducing cognitive barriers. In this regard, these findings reinforce the foundations of the Universal Learning Approach and socioconstructivist theories, highlighting the importance of accessibility in inclusive environments. From a methodological perspective, we validated the application of correlational designs and non-parametric tests with high reliability in inclusive studies. In practical terms, this will guide the planning of technological infrastructure investment policies, ongoing training for the teaching community, and the development of digital platforms and resources adapted to optimize learning for students with intellectual disabilities.

Specific recommendation 1: we recommend adopting a mixed design that complements the validated questionnaire (α = 0,944) with semi-structured interviews targeting specific and focused groups, allowing for a deeper exploration of perceptions of the Technological Accessibility dimension to ensure data triangulation. The use of the Likert scale, combined with reliability tests, facilitates the replication of research with larger samples, while the incorporation of direct observation records the use of devices, thereby reinforcing applicability. In addition, it is advisable to apply additional, more robust and rigorous non-parametric analyses to explore differences between subgroups by evaluating the effectiveness of pilot interventions, thus optimizing the internal and external validation of future research and studies on school inclusion.

Regarding specific conclusion 2: the findings of this research, which sought to examine the pedagogical

adaptation of technologies, specifically through the application of the Universal Design for Learning (UDL) approach, for primary school children with intellectual disabilities in Los Olivos in 2025, reveal a positive and statistically significant link between intellectual disability and the need for pedagogical adaptation. The descriptive result, where 48,1 % of respondents (16 people, 30,8 % strongly agree and nine people, 17,3 % agree) agree on the correlation between both variables and resignation, already suggests a connection and correlation. More conclusively, the inferential result, with a Spearman correlation coefficient of p = 0,785 and a p-value < 0,05, confirmed the presence of a high correlation and statistical significance, thus validating the hypothesis (H1) that the greater the intellectual disability, the greater the demand for pedagogical adaptation. This highlights the critical importance of indicators such as Educational Impact, Academic Support, Educational Intervention, and the need to overcome Cognitive Barriers by promoting the use of Adapted Materials, Adjustments to Academic Content, Flexibility in Teaching Strategies, and Integrative Multisensory Approaches. The practical implications of the findings highlight the urgent need to implement inclusive and personalized teaching methodologies, such as the DUA, to enable equitable education. From a theoretical perspective, the results strengthen conceptual frameworks linking the variable of intellectual disability with the need for specific teaching strategies. From a methodological perspective, this validates the relevance of focusing on the relationship and dynamics to understand them, laying the foundations for future studies that delve deeper into the effectiveness of pedagogical adaptations implemented in educational materials.

Specific recommendation 2: considering the positive and significant correlation between intellectual disability and pedagogical adaptation, it is recommended that future research delve deeper into the implementation of a mixed methodological design. This should combine the quantification of pedagogical adaptation, through observational scales or standardized assessments of IEP implementation, with qualitative methods such as case studies or focus groups. This will help to gain a better understanding of the “hows” and “whys” of successful adaptations, as well as identify specific barriers and facilitators. The application of instruments will facilitate a more comprehensive understanding of inclusive pedagogical practices in a student academic environment and their actual impact on learning, yielding findings that enrich current correlations with valuable, contextualized, and experiential data.

Regarding specific conclusion 3: the findings of this research, which aimed to explain the link between the use of educational technologies and their effects on academic performance for primary school children with intellectual disabilities in Los Olivos in 2025, reveal a significant connection. The descriptive result shows that 48,1 % of respondents (16 people, 30,8 % strongly agree and nine people, 17,3 % agree) perceive a correlation between the intellectual disability variable and the Educational Support variable. Apart from this perception, the inferential results are conclusive: there is a positive and high correlation (ρ = 0,744) between the Educational Impact dimension and the Intellectual Disability variable. With a p-value of 0,000 < 0,05, this validates the hypothesis of a direct and statistically significant connection (H1), which implies that the greater the intellectual disability, the greater the Educational Impact necessary and achieved through the use of technological tools. This highlights the importance of dimensions such as Academic Support and indicators such as Educational Intervention, Overcoming Cognitive Barriers, Improving School Performance, Innovation, Collaborative Participation, and the Cognitive Impact generated by these tools. From a more practical perspective, the findings demonstrate the urgent need to invest in inclusive educational technologies in teacher training to achieve optimal student learning outcomes for those with signs of intellectual disability. Theoretically, the findings reinforce frameworks that posit technology as a key facilitator for broader inclusion in the academic sector. In terms of methodology, the effectiveness of a correlational approach in analyzing these relationships is confirmed, providing a starting point for further research that explores the efficacy and specificity of technological interventions in the educational environment.

Specific recommendation 3: considering the positive correlation between the Educational Impact dimension and the intellectual disability variable, mediated by technological tools, it is recommended that future research employ a longitudinal and quasi-experimental approach. This will enable the evaluation of the effectiveness of technological interventions in a real-world environment over an extended period, utilizing standardized assessment tools to measure improvements in school performance and cognitive impact. Similarly, direct classroom observations and interviews could be included to gain a deeper insight into the perspectives of teachers and parents, thereby better understanding the qualitative experiences of collaborative participation and pedagogical innovation. This combination of current findings would be enriching and would provide more concrete evidence on the applicability and impact of these tools.

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