



REVISTA

CÁTEDRA

The quality of the infrastructure of early childhood education centers in the city of Quito-Ecuador

La calidad de la infraestructura de los centros de educación inicial de la ciudad de Quito-Ecuador

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Abstract

The quality of infrastructure in early childhood education centers in the Metropolitan District of Quito, Ecuador (DMQ) has a significant impact on children's well-being and development. An adequate and safe physical environment is essential for learning and growth. Preschool-aged children are particularly sensitive to their environment. Therefore, the quality of infrastructure directly influences their ability to concentrate, participate in



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educational activities, and socialize effectively. The objective of this study was to analyze the quality of the infrastructure of early childhood education centers that serve children aged 3 to 5 years. To carry out this analysis, a mixed methodology was used, based on a sociocritical paradigm, with a descriptive-explanatory scope and a non-experimental design. The research instruments used were an interview and a survey. The study sample consisted of four key informants for the interview and 94 volunteer participants for the survey. These participants were representatives of various early childhood education institutions. The conclusion was that the infrastructure of early childhood education centers in the DMQ does not meet the conditions required by existing regulations and, therefore, it is imperative to invest in its improvement to achieve quality education at this important stage of child development.

Keywords

Early childhood education, quality standards, infrastructure

Resumen

La calidad de la infraestructura en los centros de educación inicial del Distrito Metropolitano de Quito-Ecuador (DMQ) tiene un impacto significativo en el bienestar y el desarrollo de los niños. Un entorno físico adecuado y seguro es esencial para el aprendizaje y el crecimiento. Los niños en edad preescolar son especialmente sensibles a su entorno. Por ello, la calidad de la infraestructura influye directamente en su capacidad para concentrarse, participar en actividades educativas y socializar de manera efectiva. El objetivo de este estudio fue analizar la calidad de la infraestructura de los centros de educación inicial, que brindan servicio a niños de 3 a 5 años. Para llevar a cabo este análisis se empleó una metodología mixta que partió de un paradigma sociocrítico, con un alcance descriptivo – explicativo y un diseño no experimental. Los instrumentos de investigación utilizados fueron una entrevista y una encuesta. La muestra del estudio estuvo conformada por 4 informantes clave para la entrevista y 94 participantes voluntarios para la encuesta. Estos participantes eran representantes de diversas instituciones de Educación Inicial. Se determinó como conclusión que la infraestructura de los centros de educación inicial del DMQ no cumple con las condiciones requeridas por las normativas existentes y, por lo tanto, es imperativo invertir en su mejora para lograr una educación de calidad en esta importante etapa de desarrollo de los infantes.

Palabras clave

Educación inicial, estándares de calidad, infraestructura.

1. Introduction

In Ecuador, improving educational infrastructure has been a key issue in government policy over the years, reflecting the importance attached to the learning environment. In this context, recent governments have designed various projects aimed at strengthening this important element of the teaching-learning process.

During Rafael Correa's term in office (2007-2017), the New Educational Infrastructure program was implemented with the aim of providing public educational institutions with adequate furniture and equipment. According to the Ministry of Education (2023), this program sought to “increase access to education and improve the quality of existing infrastructure” (para. 3). In addition, priority was given to the construction and



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maintenance of classrooms throughout the country, establishing partnerships with decentralized autonomous governments to carry out educational infrastructure works. During the administration of Lenín Moreno (2017-2021), the New Educational Infrastructure Program was continued; however, in response to financial and administrative challenges, efforts were made to optimize resources through rehabilitation rather than complete replacement of infrastructure (Ministry of Education of Ecuador, 2021).

Finally, under the administration of Guillermo Lasso (2021-2023), emphasis was placed on quality and equity in education. This administration reaffirmed its commitment to these areas, continuing to invest in infrastructure to improve school conditions. In addition, it maintained the New Infrastructure Program for the universalization of quality and equitable education, with the aim of providing educational institutions with adequate infrastructure. In retrospect, recent governments have made significant efforts to improve educational infrastructure in Ecuador through various initiatives and programs. These efforts have materialized in the proposals implemented by the different administrations, although the practical effectiveness of these improvements has been limited (Ministry of Education of Ecuador, 2023).

The present research aims to analyze the quality of the infrastructure of early childhood education centers that serve children aged 3 to 5 years. According to the Ecuadorian Ministry of Education (2016), the physical infrastructure of each educational institution must be established based on the needs and requirements stipulated for each educational level, specifically determined by minimum occupancy, space equipment, and the ages and sizes of the students, in order to provide spaces that are adequate for the general and specific needs of each group.

The Ministry of Education (2023), in Article 13 of the General Regulations to the Organic Law on Intercultural Education, establishes the standards and indicators of educational quality. These must be observed both by the National Education Authority in its processes and by the National Institute for Educational Evaluation in its evaluations. They include learning achievements, professional performance, school management, well-being and coexistence, as well as the necessary infrastructure and equipment (Ministry of Education, 2023).

This research focuses on the question: What is the state of the quality of infrastructure in early childhood education centers serving children aged 3 to 5 in the DMQ? This quality encompasses physical and material aspects such as safety, hygiene, accessibility, and furniture, as well as specific criteria within the classroom. These elements are crucial in early childhood education centers, significantly influencing children's cognitive, emotional, and social development. According to Sando (2019), "the indoor physical environment influences children's well-being and physical activity." (p. 514). "The physical learning environment should be considered a causal factor distinct from cognitive load, interacting with both the characteristics of the learner and those of the type of learning task" (Choi, van Merriënboer, and Paas, 2014, p. 226).

Inadequate infrastructure negatively affects performance, highlighting the need to reflect on this issue in order to motivate action by governments, institutional authorities, and teachers. Espinoza and Flores (2020) suggest that "Deficiencies in educational infrastructure directly affect students' academic performance, limiting optimal conditions



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for learning and generating a negative impact on school results” (p. 78).

The article's general structure consists of: 2) a review of the literature, with an exhaustive search for theoretical references to support the study; 3) methods and materials, which are systematically described in terms of the development of the research; 4) results, which are established on the basis of quantitative and qualitative analysis; 5) discussion of the results, relating them to previous studies; and 6) conclusions that summarize the content of the study.

2. Literature review

The review of the scientific literature reveals various studies in Latin America and Ecuador. Theoretically, this refers to the analysis of school infrastructure, highlighting its importance in the learning process of children in their early years.

2.1 Educational infrastructure in Latin America

Various studies have revealed that educational infrastructure in Latin America, especially at the early childhood level, presents significant gaps that impact educational quality. Brown-Ríos (2022) points out the need to overcome these disparities, prompting research such as that conducted by UNESCO (2017) to assess quality in this context. Despite recent improvements, many institutions still lack basic services such as electricity and drinking water, primarily affecting the most vulnerable sectors.

Quesada (2019) highlights that the organization of educational spaces continues to restrict collaborative learning, and the lack of maintenance affects the functionality of facilities. Furthermore, Pacheco-Martínez (2021) indicates that deficiencies in educational infrastructure directly affect academic performance, emphasizing the need to comply with basic regulations in preschool education institutions.

2.2 Educational infrastructure in Ecuador in recent governments

In Ecuador, Bermúdez (2019) highlights that, although classrooms meet safety requirements, improved community interaction is necessary for comprehensive development. Cuenca-Reyes, et al. (2020) observe that, although many institutions comply with technical standards, others do not meet the requirements due to their outdated design. Locally, Quiña (2018) found that infrastructure in Quito is deficient, with old buildings that affect children's safety and development. These institutions face problems such as a lack of recreational areas and poor resource management to meet established quality standards. School infrastructure in the region still faces significant challenges. Responsible agencies and educational specialists must continue working on solutions that address the specific needs of current educational contexts.

Projects such as the New Educational Infrastructure (Ministry of Education, 2021b) have been implemented in Quito. These projects are intended to improve facilities and foster a suitable learning environment. However, evaluation of these advances remains limited.

Over the past few decades, the budget allocated to the education sector in Ecuador has experienced a sustained increase, but each administration has allocated resources differently, as indicated in their respective Reports to the Nation of the National Secretariat of Planning and Development. (Correa, 2017; Moreno, 2018; Lasso, 2023).

Under Rafael Correa's administration (2007-2017), significant investment was made in educational infrastructure, focusing on the construction and rehabilitation of educational



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institutions, improving learning conditions and access to public education. Subsequently, during Lenín Moreno's administration (2017-2021), although some of the previous projects were continued, the strategy focused on public spending efficiency. Furthermore, attention was paid to reviewing existing infrastructure, in addition to promoting teacher training and raising educational standards. Next, Guillermo Lasso (2021-2023) promoted the modernization of educational infrastructure. He integrated technology into classrooms and improved facilities throughout the country. His focus has been on promoting education as an engine of economic growth and social mobility. Finally, Daniel Noboa, who begins his term in 2023 in his current government, has placed education at the center of his development vision. He has pledged to increase investment in educational infrastructure and quality education. Although each administration has followed different strategies, the budget allocated to the education sector has shown a tendency to permanently increase.

2.3 Early Childhood Education Infrastructure.

Early childhood education infrastructure is essential for the comprehensive development of children in their early years. It not only marks the beginning of their formal education but also fosters their cognitive, emotional, and social growth. Childcare centers and preschool programs provide a safe and stimulating environment for early learning. Despite their importance, there are limitations in their accessibility and equity that highlight the need for policies that guarantee quality preschool education.

Friedrich Froebel (1826/2003) introduced the concept of "kindergartens" as a physical educational space connected to nature, using this metaphor to illustrate the role of the educator as a gardener who cares for the child's development. This approach highlights the importance of an environment that fosters exploration and learning in children (Rivas, 2015).

2.3.1 Distribution of physical space

From the children's perspective, the ideal classroom should be calm, welcoming, and motivating, promoting their emotional well-being and learning. Educational institutions must meet these criteria to foster effective learning. Appropriate design of the physical environment influences children's learning, safety, and emotional well-being (Castro-Pérez & Morales-Ramírez, 2015), encouraging exploration, creative play, social interaction, and the development of motor skills. In addition, key aspects such as safety, accessibility, lighting, and ventilation must be considered. Preschool centers must meet observable criteria in the Infrastructure Quality Standards. The Ministry of Education (2012) includes:

- Land Regulations: Planning must ensure a safe and suitable environment, taking into account location, accessibility, and proximity to services.
- Classroom Dimensions: Classrooms must be spacious, with a minimum of 1.20 x 1.80 square meters per child, to facilitate movement and activities.
- Adequate Lighting: Optimal natural and artificial light is crucial for children's comfort and concentration.
- Signage: Signage must be clear and understandable to guide children and promote positive behavior.
- Learning Environments: These should foster independence, cognitive development, and social interaction, allowing children to progress at their own pace.
- Outdoor Areas: These provide opportunities for active play, contact with nature, and physical development.



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- Community Activity Spaces: These promote socialization and the development of motor and social skills through games and sports.
- Safe children's play areas: Recreational spaces must be safe and age-appropriate for children, promoting comprehensive development in a supervised environment.

2.3.2 Administrative management for obtaining resources

The management of an educational center involves the planning, coordination, and monitoring of activities aimed at obtaining public and private funding. These resources are used to cover operating expenses, infrastructure, educational materials, and personnel. This may include the search for grants, donations, government funding, and fundraising strategies, as well as the efficient management of available resources. The management staff is responsible for administrative management in schools, emphasizing the need to improve their performance through mechanisms that optimize their work. In private preschools, Esquivel and Huamaní (2016) conclude that there is a significant relationship between administrative planning and service quality. In the administration of an early childhood education institution, it is crucial to properly manage the following aspects:

- Furniture: The Ministry of Education (2023) establishes that institutions must have adequate classroom furniture, designed for each educational level. This includes ergonomic and safe furniture that facilitates educational and recreational activities, ensuring the comfort and safety of children.
- Updated inventory: Maintaining an up-to-date inventory is essential for the functionality and safety of the center. APPSGATE (2023) indicates that efficient inventory management saves time, reduces costs, and improves the functionality of the educational environment.
- Periodic maintenance: Periodic maintenance of furniture and equipment is essential to ensure a safe and functional learning environment.
- Equipment and teaching resources: These elements are essential in early childhood education institutions. They provide tools for learning and promote children's comprehensive development (Ministry of Education of Ecuador, 2021).
- Food area: According to Campos et al. (2003), cafeterias in educational centers are essential for children's health and nutrition. They must comply with space and safety regulations.
- Administrative area: The Ecuadorian Ministry of Education (2017) emphasizes that principals must focus on improving leadership and management to ensure quality learning.
- Teachers' lounge: Enríquez-López and Peña-Benítez (2020) indicate that furniture must adapt to the ergonomic needs of teachers. The goal will be to improve their comfort and work efficiency.

This comprehensive approach to resource and space management ensures an environment. Children develop appropriately alongside the effective teaching staff.

2.3.3 Hygiene and cleaning

Promoting healthy habits and the appropriate use of fun educational resources motivate children to acquire and strengthen their knowledge. This is demonstrated by building new skills and reinforcing existing ones (Vizhñay-Cajamarca, 2019). To meet health requirements in educational institutions, the following elements must be considered:



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- Sanitary facilities: They must have at least one toilet for every 25 students, one urinal for every 25 students, and one sink, all in optimal condition. Staff bathrooms must be gender-segregated.
- Basic services: It is essential that educational institutions have basic services such as water, electricity, sewage, garbage collection, telephone, and internet.
- Cleaning and disinfection: Maintaining an adequate level of cleanliness is crucial for children's health. McMichael (2019) emphasizes that infrastructure and resources for hand hygiene are key to promoting hygiene habits and reducing associated diseases.
- Waste management: Promoting environmental education through pedagogical strategies such as ESVI (Life Spaces), which include bio-garden and recycling projects. These activities, such as organic waste management and the reuse of materials, stimulate naturalistic intelligence in students as they interact with nature (Tiquillahuanca, 2019).

2.3.4 Safety

The right to safety in early childhood education centers is compromised by the lack of adequate mechanisms and the institutional incapacity to guarantee it. The absence of prevention programs in security and civil protection reveals a gap between education and prevention, leaving teachers and students without the necessary tools to face emergencies. It is crucial to demand that authorities implement a comprehensive security model that covers all educational levels and the specific needs of each community. Furthermore, it is necessary to improve teachers' preparation for emergencies, encouraging their training and participation in the creation of a sustainable safety culture (Reyes-Torres, 2023).

Key safety principles include:

- Accessibility. Educational institutions must comply with regulations that ensure the use of the environment for all people, regardless of their physical or sensory condition (Rojas and Santos, 2005).
- Doors with anti-panic locks. These locks are designed to facilitate quick and easy exit in the event of an emergency. The mechanism is activated by a bar that is pushed to open the door (Porlan-Soto, 2022).
- Effective security systems. Efficient management is essential in the construction of educational facilities. The various risks involved are considered to develop effective contingency plans (Pineda and Sotelo, 2013).
- Risk management plan. The Ecuadorian Ministry of Education has prioritized school safety through Public Policy 2018-2030. It seeks to reduce the risks of natural disasters and protect the continuity of education. The 2023-2024 risk management plan includes strategies to protect the life and safety of the educational community. It is important to ensure educational continuity in emergencies and develop a community resilient to disasters (Ministry of Education, 2023).

3. Methods and materials

This research adopts a sociocritical paradigm for evaluating the quality of infrastructure in early childhood education centers (public, private, and fiscomisional) in the DMQ, with the aim of identifying structural inequalities that affect the education of children aged 3 to 5. A mixed methodological approach is used, combining quantitative and qualitative methods. The study is descriptive and explanatory in scope, seeking to identify and



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characterize the physical and functional conditions of the infrastructure. The research design is non-experimental in its quantitative phase. For the qualitative phase, grounded theory is used. Finally, the study is field-based.

Structured surveys were used as techniques to collect quantitative data on the perception of these variables by teachers and administrators. They were also used to measure specific aspects such as safety, accessibility, and the condition of the facilities.

This analysis allows for the identification of patterns and trends, providing a solid empirical basis for understanding the inequalities and deficiencies that exist in educational centers. At the same time, in-depth interviews are conducted to collect qualitative data that delve into the experiences and perspectives of the participants. This qualitative component is essential in the socio-critical paradigm and allows us to capture the voices and experiences of those directly affected by poor infrastructure. Through these methodologies, it is possible to identify the physical problems of the centers, as well as their impact on children's learning and well-being. Exposing the dynamics of exclusion that perpetuate these conditions. The combination of these methods ensures a more holistic and nuanced understanding of the situation.

The population consists of teachers and administrators from various public, private, and public-mission early childhood education institutions in the city of Quito. The sample for the interview will consist of four participants who will serve as key informants for the study. For the survey, the sample consists of a total of 94 early childhood education teachers from various institutions in the city of Quito. Participants will be chosen intentionally, using a non-probabilistic sampling technique, and their characteristics are shown in Table 1.

		Frequency	Percentage
Respondent's position	Authority	6	6.4
	Teaching	83	88.3
	Assistant		
	1-5	5	5.3
Years of experience	6 to 10	31	33.0
	11 to 15	24	25.5
	Over 16 years	19	20.2
	old		
	Technologist	20	21.3
Academic qualifications	Bachelor's	5	5.3
	Degree		
	Master's	59	62.8
	Degree		
	Tax	30	31.9
Type of institution where they work or have worked	Tax	46	48.9
	Commission		
	Municipal	2	2.1
	Private	15	16.0
	Early	31	33.0
	Childhood		



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Level at which they work or have worked	Education (0 to 3 years)		
	Early Childhood Education (3 to 5 years)	25	26.6
	Authority	69	73.4
Have worked in institutions in the Quito District	Si	61	64.9
	No	33	35.1
	Total	94	100.0

Table 1. Sociodemographic characteristics of the participants

Within the qualitative approach, the interview technique is used, and the semi-structured interview is used as the data collection instrument. The interview was validated by three professionals with expertise in Early Childhood Education.

For the quantitative approach, a survey is used. The instrument is a questionnaire containing questions corresponding to the variable: infrastructure quality. Cronbach's alpha statistic was applied to the questionnaire, yielding an internal consistency coefficient of 0.91, as shown in Table 2.

	Cronbach's alpha	No of elements
Quality of infrastructure	0.917	11

Table 2. Reliability statistics

Qualitative data analysis is carried out using semantic networks that show the connections between concepts and their semantic relationships. Coding operations are used to analyze and categorize initial data and identify patterns, themes, and emerging concepts. For quantitative data analysis, SPSS statistical software is used, generating a contingency table for the respective frequency analysis.

4. Results

Table 3 presents the main results, thanks to the discourse analysis from which the following categories of analysis emerged: 1. Distribution of space, 2. Safety and inclusion, and 3. Influence on educational excellence. Within the category "Distribution of space" in the subcategory: current condition of the space, concern was found regarding the adequacy and quality of educational infrastructure. This was mainly in early childhood education classrooms. The lack of certain essential spaces, such as corner rooms and specific green areas for education at this level, was noted. In the subcategory: ideal condition of the space, the importance of having well-distributed and adequate spaces to promote learning and the comprehensive development of children was highlighted. The importance of well-designed and accessible play areas was emphasized. In addition, the need for multipurpose spaces that can be adapted for both daily learning and special events involving families is highlighted.

Within the category "Safety and inclusion" in the subcategory: safety measures in place,



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there is concern about the comprehensive safety of children in the educational institution. It expresses the need for adequate infrastructure to minimize accidents, emergency preparedness, and the importance of ensuring safe environments in both physical and psychological terms. In the subcategory: necessary adaptations for inclusion, the need to adapt educational facilities to ensure the effective inclusion of children with disabilities is emphasized. In addition, the importance of adjusting infrastructure to meet specific standards for children and not just for adults is highlighted.

Within the category “Influence on educational excellence” in the subcategory: relationship with teaching quality, the criteria are similar. The common criterion among participants is that the lack of adequate infrastructure negatively affects the quality of education at the early childhood level. Poor infrastructure can lead to children feeling uncomfortable, unmotivated, and insecure, which directly impacts their learning and academic performance.

Category	Subcategory	Common Meaning
Space Distribution	Current condition of the space	There is widespread concern about the quality and adequacy of infrastructure in early childhood education classrooms. The lack of specific spaces such as playrooms and green areas is highlighted, especially in new or marginalized institutions.
	Ideal condition of the space	Participants agree that a well-planned and adequate distribution of spaces is crucial to promoting learning and comprehensive development. They emphasize the importance of thematic and recreational areas that facilitate teaching and family interaction.
Safety and Inclusion	Present safety measures	The comprehensive safety of children is a shared concern, with an emphasis on constant supervision. The need for physical measures such as security cameras and the importance of having adequately equipped areas to prevent accidents is highlighted.
	Necessary adaptations for inclusion	Participants agree on the need for physical adaptations to ensure the effective inclusion of children with disabilities. This includes adequate ramps, handrails, and inclusive play spaces that meet specific standards for children.
Influence on Educational Excellence	Relationship with the quality of teaching	There is consensus that the lack of adequate infrastructure negatively impacts the quality of education at the early childhood level. This affects learning, emotional and social development, and generates demotivation in both children and teachers.

Table 3. Qualitative Analysis



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Regarding the descriptive quantitative analysis, the following measures of central tendency are obtained, outlined in Table 4. The sample size ($N = 94$) is equal in both periods. The means (39.56 and 39.28) are very similar, indicating that the average quality of the infrastructure has not changed significantly between the two periods. The average value is close to 39 in both cases. The median (41.00 and 40.00), which represents the midpoint of the data, is slightly higher in the first period (2008-2016) at 41, while in the second period it is 40. This shows that the distribution of the data is similar, but with a slight shift toward lower values in the second period. The mode (43 and 44) also varies slightly, with 43 in the first period and 44 in the second. This suggests that the most recurrent values are similar in both periods.

Regarding the standard deviation (8.781 and 8.837), the dispersion of the data is practically equal in both periods, indicating that the variability in infrastructure quality is consistent. The skewness is negative in both periods (-0.296 and -0.256), which means that the distributions are slightly skewed to the left.

	Total infrastructure quality 2008-2016	Total infrastructure quality 2017- 2021
N	94	94
Mean	39.56	39.28
Median	41.00	40.00
Mode	43	44
Standard Deviation	8.781	8.837
Skewness	-.296	-.256
Minimum	14	14
Maximum	55	55

Table 4. Comparative analysis between the measures of central tendency of the two periods

The minimum (14 in both cases) and maximum (55 in both cases) values for infrastructure quality are identical in both periods. This indicates that the observed quality ranges have not changed. For infrastructure quality from 2008 to 2016, the Kolmogorov-Smirnov test yields a value less than 0.05. This suggests that the null hypothesis is rejected, indicating that the data for this period do not follow a normal distribution. For infrastructure quality from 2017 to 2021, the Kolmogorov-Smirnov test yields a significance value greater than 0.05. The null hypothesis is rejected, suggesting that the data follow a normal distribution. See Table 5.

			Kolmogorov-Smirnov^a		
			Estadístico	gl	Sig.
Total	infrastructure	quality	.118	94	.002
2008_-					
Total	infrastructure	quality	.084	94	.102
2017-2021					

Table 5. Normality Test

In the case of the location of care units (item 1), the percentage of agreement and total agreement remains stable. Slightly lower in the most recent period, suggesting that the



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centers comply with regulations, but some areas for improvement remain. For functional and recreational spaces (item 2) and the layout of lockers (item 3), the results remain constant between both periods. This indicates a moderate level of satisfaction.

Item 4, which evaluates toilets and sinks, shows a slight improvement in the recent period, although there are still high levels of disagreement. Other items, such as space per student and classrooms (items 5 and 6), reflect small variations, remaining within similar margins in both periods. Finally, material resources (item 8) and trained staff (item 9) receive more positive evaluations in 2017-2021. However, concerns remain about the availability of financial resources (item 10) and infrastructure improvements (item 11).

When comparing the 2008-2016 and 2017-2021 periods, gradual improvements can be seen in some aspects, while others show stagnation or slight declines. With regard to the individual analysis of the frequency of response options: Strongly disagree (SD), Disagree (D), Undecided (U), Agree (A), and Strongly agree (SA), the results for each question are shown in Table 6.

Ítems	Períodos	Frecuencia en %					Total
		T D	D	I	D A	TA	
1. The location of the MIES and MINEDUC care units complied with the regulatory and planning standards, according to parameters established by the National Secretariat for Risk Management.	2008 - 2016	2.1	10.6	20.2	46.8	20.2	100
	2017- 2021	2.1	13.8	20.2	40.4	23.4	100
2. The Early Childhood Education Centers have functional educational spaces connected to the recreational spaces.	2008 - 2016	3.2	8.5	18.1	47.9	22.3	100
	2017- 2021	3.2	9.6	18.1	46.8	22.3	100
3. The Early Childhood Education Centers have lockers for students, interior shelves for teaching materials, and interior shelves for students and teachers.	2008 - 2016	2.1	13.8	8.5	51.1	24.5	100
	2017- 2021	2.1	11.7	11.7	48.9	25.5	100
4. The Early Childhood Education Centers have one toilet and one urinal for every 25 students, and one sink and one toilet for children with special educational needs.	2008 - 2016	6.4	21.3	22.3	35.1	14.9	100
	2017- 2021	7.4	21.3	19.1	37.2	14.9	100
5. The Early Childhood Education Centers have outdoor areas with	2008 - 2016	6.4	18.1	23.4	36.2	16	100



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1.50 square meters of space per student.	2017-2021	7.4	18.1	22.3	36.2	16	100
6. The Early Childhood Education Centers have classrooms of 1.20 square meters per child in a total area of 72 square meters.	2008 - 2016	5.3	21.3	24.5	34	14.9	100
	2017-2021	5.3	21.3	23.4	35.1	14.9	100
7. The institution's learning environments are ideal for the teaching-learning process.	2008 - 2016	1.1	11.7	19.1	47.9	20.2	100
	2017-2021	2.1	9.6	17	50	21.3	100
8. The amount of material resources (games, teaching materials, infrastructure, etc.) available in the MINEDUC services was adequate for the children's comprehensive development.	2008 - 2016	3.2	14.9	16	42.6	23.4	100
	2017-2021	2.1	12.8	16	46.8	22.3	100
9. The Early Childhood Education Center had sufficient trained staff (teachers, assistants, psychologists, etc.) to adequately meet the children's needs.	2008 - 2016	3.2	6.4	24.5	36.2	29.8	100
	2017-2021	3.2	6.4	25.5	40.4	24.5	100
10. The MIES and MINEDUC care units had financial resources allocated to the Early Childhood Education Center to cover operating and maintenance expenses.	2008 - 2016	9.6	8.5	26.6	35.1	20.2	100
	2017-2021	10.6	8.5	25.5	38.3	17	100
11. The infrastructure, equipment, and furniture were improved.	2008 - 2016	4.3	19.1	18.1	38.3	20.2	100
	2017-2021	8.5	21.3	18.1	38.3	13.8	100

Table 6. Descriptive analysis of the items in the educational infrastructure quality survey

5. Discussion of results

The trend reflected in Table 6 suggests that there has been a slight improvement in the perception of compliance with standards in early childhood education centers. However, significant concerns remain among respondents, as reflected in the decrease in the percentage of those who agree in general. In line with this criterion, Earthman (2004) mentions that “over the last three decades, numerous studies have shown that there is a relationship between student performance and the condition of school buildings” (p. 18).

The fact that the number of undecided people remains stable could indicate a lack of clarity in the communication of the results of the policies implemented. This result coincides with the statement by Crampton (2009), who mentions that “the number of undecided people



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remaining stable could indicate a lack of clarity in the communication of the results of the policies implemented” (p. 318). On the other hand, the perception of the availability of functional educational spaces shows stability with a slight increase in disagreement. In this regard, Berner (1993) states that “in those schools where a large number of parents participated through their membership in the parent-teacher association (PTA), the buildings were in better condition than those where parental involvement was lower” (p. 27).

The results of this research confirm its importance by showing both slight improvements in the perception of compliance with standards and persistent concerns about infrastructure in early childhood education. The analysis revealed three main categories: space distribution, safety and inclusion, and influence on educational excellence. The lack of adequate spaces such as playrooms and green areas stands out, as does the need for multipurpose spaces. The urgency of improving safety and adapting facilities for children with disabilities was also identified.

6. Conclusions

The data suggest that the condition of classroom equipment and furniture does not fully meet users' expectations. Although perceptions of the adequacy of these elements remain stable, the slight increase in total disagreement indicates growing dissatisfaction. This finding is concerning, considering that equipment and furniture are essential for an appropriate environment for children aged 3 to 5. In line with this, the qualitative analysis reveals that the infrastructure in early childhood education classrooms has significant deficiencies, especially in the availability of specific spaces such as corner rooms and green areas, which is more evident in new institutions or those located in marginalized areas. This finding allows for concrete actions to be taken, such as providing ergonomic furniture adapted to the age of the children, as well as implementing specific spaces for play and learning, such as corner rooms and green areas. In addition, the results provide valuable input for education authorities to prioritize investments aimed at ensuring adequate, safe, and stimulating physical environments that optimize the comprehensive development of children aged 3 to 5.

Perceptions of the adequacy of outdoor spaces in educational centers also reflect challenges; although the assessment of sufficiency remains unchanged, the increase in disagreement and the stability in the number of undecided respondents indicate that these spaces are progressively failing to meet users' expectations. This situation could stem from a lack of investment or maintenance in these areas, which is in line with a widespread concern about the quality of the educational environment identified qualitatively. This concern underscores how deficiencies in the environment directly affect children's learning and overall development. In this regard, the need for a well-planned distribution of spaces is highlighted, not only to facilitate the teaching-learning process, but also to promote interaction and participation of families in the educational environment.

On the other hand, the view on administrative management and the obtaining of financial resources shows mixed results. Some respondents acknowledge an improvement in the availability of resources. The percentage of those who totally agree decreases and disagreement increases, evidencing concern about the sufficiency and effectiveness of resource allocation. The interview reveals concern about the implementation of constant supervision measures. There is also an urgent need to make physical adaptations to ensure the effective inclusion of children with disabilities. This includes ensuring that facilities



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have adequate ramps, handrails, and inclusive play areas, complying with specific standards geared toward the needs of children.

The results reflect that the infrastructure in the DMQ's Early Education Centers faces considerable challenges that negatively impact educational quality. Dissatisfaction with infrastructure, equipment, and resource management highlights the need to improve these aspects to ensure that children receive a quality education. It is observed that inadequate infrastructure negatively impacts the quality of education at the early childhood level. This affects learning, emotional and social development, and generates demotivation in both children and teachers. Although efforts have been made to improve the infrastructure in the Early Childhood Education Centers of the Metropolitan District of Quito (DMQ), significant challenges remain. Although there has been a slight improvement in the perception of compliance with standards and the availability of educational spaces, overall dissatisfaction is evident. Limitations in equipment, furniture, and outdoor spaces underscore that users' expectations have not been fully met. This suggests that the quality of infrastructure, despite some progress, remains a critical area that requires ongoing attention and substantial improvements.

The main contribution of this research is to highlight, based on clear data, the deficiencies in the infrastructure of Quito's Early Childhood Education Centers that affect the development of children aged 3 to 5, proposing concrete improvements such as adequate classroom equipment, the creation of recreational and green spaces, the planning of outdoor areas that encourage family participation, adaptations for the inclusion of children with disabilities, and better resource management. Finally, the analysis of infrastructure must be addressed in the future from the perspective of its environmental and sustainability implications. Research into the context in which children learn in their early years should be of public interest and a priority for governments.

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