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ORIGINAL

Relationship between inclusive architecture and urban design in Andean environments

Relación entre arquitectura inclusiva y diseño urbano en entornos andinos

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ABSTRACT

Inclusivity in urban design not only improves the quality of life of people with disabilities, but also benefits the general population, such as the elderly and families with young children, by creating safer and more comfortable spaces. Under this premise, the objective of the present study was to determine the relationship between inclusive architecture and urban design in the city of Juliaca, 2024; for this purpose, a basic, correlational, non-experimental, cross-sectional study was used. The sample consisted of 119 people, to whom an instrument was applied whose reliability established by Cronbach's Alpha was 0,761. The results were a coefficient Rho=0,700 and a p-value=0,001, this correlation suggests that as one aspect of inclusive architecture improves, there is a significant tendency for another aspect of urban design to improve as well, and vice versa. It is concluded that fostering greater awareness of the importance of inclusive architecture and urban design among planners, architects, and the community at large can lead to more significant and lasting change in how cities develop. The significant and strong correlation between these aspects reinforces the idea that a truly inclusive city requires a holistic approach that transcends traditional disciplines and embraces an integrated view of the built environment. This is essential not only to comply with legal regulations but to foster a more inclusive and equitable society.

Keywords: Inclusive Architecture; Urban Design; Aesthetic Urban Design; Functional Urban Design; Sustainable Urban Design.

RESUMEN

La inclusividad en el diseño urbano no solo mejora la calidad de vida de las personas con discapacidades, sino que también beneficia a la población en general, como los ancianos y las familias con niños pequeños, al crear espacios más seguros y cómodos. Bajo esta premisa, el objetivo del presente estudio fue determinar la relación de la arquitectura inclusiva y el diseño urbano en la ciudad de Juliaca, 2024; para ello se utilizó un estudio de tipo básico, correlacional, no experimental y transversal. La muestra estuvo conformada por 119 personas, a las cuales se les aplicó un instrumento cuya confiabilidad establecida por el Alpha de Cronbach fue de 0,761. Los resultados fueron un coeficiente Rho=0,700 y un valor p=0,001, esta correlación sugiere que a medida que mejora uno de los aspectos de la arquitectura inclusiva, hay una tendencia significativa a que mejore también otro aspecto del diseño urbano, y viceversa. Se concluye que fomentar una mayor conciencia sobre la importancia de la arquitectura inclusiva y el diseño urbano entre los planificadores, arquitectos, y la comunidad en general puede llevar a un cambio más significativo y duradero en cómo se

desarrollan las ciudades. La correlación significativa y fuerte entre estos aspectos refuerza la idea de que una ciudad verdaderamente inclusiva requiere un enfoque holístico que trascienda las disciplinas tradicionales y abarque una visión integrada del entorno construido. Esto es fundamental no solo para cumplir con las normativas legales sino para fomentar una sociedad más inclusiva y equitativa.

Palabras clave: Arquitectura Inclusiva; Diseño Urbano; Diseño Urbano Estético; Diseño Urbano Funcional; Diseño Urbano Sostenible.

INTRODUCTION

The goal of inclusive architecture is to design cities with safe, comfortable, and accessible spaces for everyone. It seeks to improve the quality of life of citizens by promoting inclusive, equitable urban design that fosters equal opportunities for all. While there may be challenges in implementing inclusive urban planning, it is important to continue working to create cities and communities that are truly inclusive and accessible to all.[1,2,3]

For Grande[4], the design of accessible cities must be a fundamental priority in the field of architecture and urban planning. This implies ensuring that the built environment is adapted to the needs of all people, without exclusion. Accessibility in architecture goes beyond simply adapting the physical environment for wheelchair users. It encompasses the introduction of urban devices and elements that, beyond ramps and elevators, facilitate navigation in different environments. In this way, the goal is to create more inclusive and equitable cities for all inhabitants.

In this regard, in Asia, Chou et al.[5] concluded that there is a direct relationship between inclusive architecture and urban design, emphasizing the need to understand the experiences of these people in the context of their respective cultures and histories, which suggests a more holistic and culturally sensitive approach to the discussion on accessibility. Gu[6] refer to the importance of considering the needs of people with disabilities as this relates to urban design and public transport planning. This is essential for promoting inclusion and improving quality of life in urban environments. Gaurav et al.[7] conclude that there is a positive relationship between inclusive architectural design and the city, emphasizing the work of Indian architects who address physical disability when designing community schools in Mumbai, India.

In Europe, Cerdan and Darcy[8] concluded that there is a positive relationship between commercial services and spaces and accessibility for all customers, including people with disabilities. Najafi et al.[9] report that architectural design that provides inclusivity is directly related to the creation of urban policies that take into account the variety of needs and perspectives of the community. Brintang and Alenka[10] delve into the ways in which inclusively built urban heritage sites can improve the quality of life of residents throughout their lives.

In North America, Yang et al.[11] conclude that it is important to understand how physical barriers influence access to and participation in urban environments, and therefore it is important to include inclusive architecture for people with special physical needs in design. Uddin et al.[12] highlight the need to consider the accessibility needs of people with disabilities when designing urban infrastructure and spaces. Lee and Sener[13] propose the use of electric bicycles as a solution to promote inclusive mobility, specifically among people with disabilities and older adults. This innovative perspective not only addresses the transportation barriers faced by these demographic groups, but also suggests an approach that could improve urban design by promoting more accessible and friendly environments for all citizens.

In Central America, Castillo[14] examines how sustainable urban planning addresses key issues such as access to affordable housing, basic services, sustainable infrastructure, and citizen participation. By considering these successful practices, the aim is to adapt and apply lessons learned to the reality of the country, thus promoting more inclusive architecture and urban design that meets the needs of all citizens, regardless of their abilities or conditions. González and Gross[15] state that the education of people with visual disabilities in Costa Rica has made significant progress, driven by policies and actions aimed at inclusion and equity. However, significant challenges remain that require ongoing commitment from educational authorities and society as a whole. The path toward truly inclusive and accessible education for all people, regardless of their abilities, remains a priority in the Costa Rican context.

Martínez[16] highlights the importance of reducing inequality and promoting inclusive and sustainable cities. Using the Cartesian system, he visualizes the relationship between inclusive architecture, disability, and sustainability to interpret current conditions and define measures focused on human rights.

In South America Pereira and Silva[17] conclude that there is a relationship between urban design and inclusive architecture in the context of sustainable mobility initiatives that seek to promote a more equitable, accessible city with a stronger economy, thereby improving the quality of life of the population. Alave[18] argues that inclusive architecture is related to urban design in order to meet the needs of people with disabilities, who

face high levels of vulnerability in terms of their lives, finances, and mental health. The lack of participation of these people in the urban design and planning process results in environments that are neither accessible nor inclusive, limiting their mobility and access to services. Zaslascky et al.[19] highlight the relationship between urban design and inclusive architecture, which is essential for creating environments that promote equal opportunities and social integration. The inclusion of accessibility in the university education of architects and urban planners is a fundamental step in ensuring that future professionals are aware of the importance of designing accessible and functional spaces for all people, regardless of their abilities.

At the national level, Millones[20] concluded that inclusive architectural design in urban facilities in the district of Castilla is lacking; the absence of inclusive environments hinders access for people with disabilities. Huamani and Rojas[21] pointed out that inclusive architecture is related to urban design, focusing on how it can improve primary educational infrastructure for blind people in San Juan de Lurigancho. Cabrera[22] concluded that inclusive architecture and urban design are closely correlated, with the aim of improving infrastructure by implementing architectural criteria that facilitate access and stay, eliminating physical barriers, and considering spatial comfort. Vasquez and Vila[23] highlight the importance of considering not only physical accessibility but also sensory experiences in urban environments to ensure the inclusion and quality of life of people with visual impairments.

This suggests that architecture and urban design play a crucial role in improving people's quality of life. However, in many cities, including Juliaca in the department of Puno, these critical elements do not adequately meet the needs of all citizens, especially those with reduced mobility or disabilities. Although Peru's General Law on Persons with Disabilities (Law No. 29973) stipulates that infrastructure and services must be accessible to persons with disabilities, the implementation of these provisions faces numerous challenges in practice. In this context, Juliaca continues to experience significant problems with regard to accessibility and inclusion in its architectural design and urban planning. Deficiencies in both public and private infrastructure contribute to exclusion and create significant barriers for persons with disabilities, affecting their ability to move around and use public spaces and services. This situation highlights the urgent need to understand the relationship between urban design and inclusive and accessible architecture for all citizens, regardless of their physical abilities.

Consequently, this study aims to determine the relationship between inclusive architecture and urban design in the city of Juliaca in 2024. This is justified at a theoretical level because, through the scientific method, important results will be obtained that will contribute to the literature and regulations on inclusive architecture and its relationship with urban design, especially in developing urban contexts such as Juliaca.

On a practical level, this study is justified because its results can be replicated in other contexts, with the aim of providing guidelines for urban planners, architects, and policymakers to facilitate the creation of infrastructure and services that are accessible to all citizens, especially those with disabilities. Socially, this study is justified because it will promote inclusion and improve the quality of life of all Juliaca residents, especially people with disabilities, who often face barriers that limit their participation in the city's social and economic life.

METHOD

The proposed study focuses on basic research into inclusive architecture and urban design in Juliaca, without any immediate practical purpose. Its approach was quantitative, non-experimental, cross-sectional, and correlational. In this regard, Carbajal et al.[24] point out that the quantitative approach is characterized by the collection and analysis of numerical data, which is used to quantify attitudes, opinions, behaviors, and other defined variables and then generalize the results from a sample of the study population. For their part, Ñaupas et al.[25] argue that in a non-experimental design, the researcher does not manipulate the study variables, i.e., does not assign interventions to subjects in a controlled manner as in experiments, but instead observes the variables as they occur in a natural environment and collects data without altering the context or behavior of the subjects. This type of design is common when ethical or practical interventions are not possible.

According to Zayas y Sahuquillo[26], a cross-sectional study is one in which data are collected at a single point in time or over a short period. Baena[27] states that correlational studies are designed to seek and evaluate relationships between variables. In these studies, the researcher examines how variations in one variable are related to variations in another or other variables. However, it is important to note that correlation does not imply causation; these studies simply indicate whether there is a relationship and how strong it may be, but they cannot determine whether one variable causes changes in another.

The population consisted of people, residents, and natives of the city of Juliaca who have mild disabilities, whose number registered according to the National Council for the Integration of Persons with Disabilities (CONADIS) in the city of Juliaca is 171. The sample consisted of 119 people. In this regard, Carbajal et al.[24] state that the correct definition and selection of the population and sample are critical for the validity and reliability of any research; a well-chosen sample allows the results obtained to be inferred to the broader

population.

To collect data, a survey technique was used, and a questionnaire was used as an instrument, which was previously validated by three experts knowledgeable on the subject matter. This instrument contains 20 items, from item 1 to 10 for variable 1 and from item 11 to 20 for variable 2. Likewise, statistical reliability was established using Cronbach's alpha, with an index of 0,999, indicating that the instrument is highly reliable. The information was analyzed using SPSS v.26 statistical software.

RESULTS

Table 1. Descriptive results for inclusive architecture

	Freq.	%	% Val.	% Accum.
Basic	89	75	75	75
Intermediate	21	18	18	92
Advanced	9	8	8	100
Total	119	100	100	

Table 1 provides revealing data on the state of inclusive architecture in the unit of analysis, showing 75 % basic inclusive architecture, 18 % intermediate level, and only 8 % advanced level. These results offer a clear picture of the opportunities and challenges in improving the accessibility and functionality of urban spaces for all citizens.

The predominance of the basic level (75 %) indicates that most structures in Juliaca meet only the minimum accessibility requirements. This suggests that, although the structures may be accessible in fundamental terms, such as access ramps and wide doors, they probably lack more sophisticated features that would facilitate greater independence and comfort for people with various disabilities. There is a significant need for policies and practices that push design standards beyond basic compliance to address a wider range of needs, ensuring that all citizens can participate fully in urban life.

Eighteen percent of buildings at the intermediate level indicates that some efforts have been made to integrate more advanced design aspects. However, the relatively low percentage reflects that these practices are not yet the norm, making it necessary to expand the implementation of these features in more buildings. Doing so could significantly increase functionality and accessibility, making Juliaca a more inclusive model of urban design.

The 8 % at this advanced level highlights buildings that offer a highly inclusive experience, probably with universal accessibility and a variety of technologies and designs intended to facilitate maximum independence for all people. Although this is a small percentage, it represents an aspirational standard toward which the rest of the city can strive.

These results suggest the need for greater intervention and support from urban planners, local authorities, and the community at large to promote more inclusive architecture. In this context, requiring architectural work on inclusive design, increasing funding for the adaptation of existing buildings, and encouraging the adoption of assistive technologies are crucial steps toward creating an urban environment that is truly accessible to all. This approach not only improves the quality of life for people with disabilities, but also enriches the urban community as a whole, fostering greater equity and social cohesion.

Table 2. Descriptive results for urban design

	Freq.	%	% Val.	% Accum.
Deficient	4	40	40,3	40,3
Moderate	69	58	58,0	98,3
Advanced	2	2	1,7	100,0
Total	119	100	100	

Table 2 shows that 40 % of urban environments are rated as poor, 58 % as moderate, and only 2 % as advanced in terms of urban design. This distribution of results provides a critical reflection of the areas that require attention and the possibilities for improvement.

The significant proportion of areas with poor urban design (40 %) indicates that there are fundamental problems in the planning and execution of urban spaces. These can range from a lack of basic infrastructure to inadequate integration of green spaces, limited accessibility, and a lack of consideration for sustainability and social inclusion. There is an urgent need to review and improve urban design policies and practices in these

areas. Priority should be given to infrastructure rehabilitation, improved connectivity, and the implementation of measures to make these spaces more inclusive and livable.

Most areas are classified as having moderate urban design (58 %), suggesting that, while efforts have been made to develop and maintain urban infrastructure, elements that promote a high quality of life have yet to be effectively integrated. These areas may meet certain functional standards, but they do not maximize the design potential for community well-being or environmental resilience. Strengthening urban planning in these areas could include initiatives to integrate more green spaces, improve accessibility and mobility, and promote greater community participation in the urban design process.

A small percentage (2 %) of areas with advanced urban design indicate that there are examples of excellence that could serve as models for other areas of the city. These spaces likely exhibit superior integration of sustainability, accessibility, and aesthetics, providing a highly functional and enjoyable environment for all citizens. Analyzing and replicating the successful practices of these areas in other sectors of the city could be an effective strategy for improving the overall urban design of Juliaca. This includes the adoption of green technologies, inclusive design policies, and participatory planning strategies.

These findings suggest a significant opportunity to improve urban design in Juliaca. Increasing the proportion of areas with advanced urban and architectural design will not only improve residents' quality of life but also foster a more sustainable and resilient city. Investment in best design practices and the adoption of a more holistic and inclusive approach to urban planning are essential to achieving these goals.

Table 3. Contingency table for general hypothesis

			Urban design
Spearman's rho	Inclusive architecture	Correlation coefficient	0.700**
		Sig. (bilateral)	0,001
		N	11

Note: **. The correlation is significant at the 0,01 level (bilateral).

Table 3 shows a Rho coefficient of 0,700 and a p-value of 0,001. The interpretation of these results offers important insights into how architecture and urban design are interrelated in terms of inclusivity and accessibility. This correlation suggests that as one aspect of inclusive architecture improves, there is a significant tendency for another aspect of urban design to improve as well, and vice versa. This implies that efforts to make buildings and urban spaces more accessible and functional for all individuals are closely linked and mutually reinforcing.

These results suggest that fostering greater awareness of the importance of inclusive architecture and urban design among planners, architects, and the community at large can lead to more meaningful and lasting change in how cities are developed. The significant and strong correlation between these aspects reinforces the idea that a truly inclusive city requires a holistic approach that transcends traditional disciplines and encompasses an integrated vision of the built environment. This is essential not only to comply with legal regulations but also to foster a more inclusive and equitable society.

Table 4. Contingency table for specific hypotheses

			Aesthetics	**Functionality**	**Sustainability**
Spearman's rho	Inclusive architecture	CC	0,728**	0,806**	0,602**
		Sig. (bilateral)	0	0	0
		N	119	119	119

Note: **. The correlation is significant at the 0,01 level (bilateral).

Table 4 presents a series of significant correlations between different aspects of inclusive architecture and urban design, offering a broad and detailed perspective on how these elements interact in the urban environment.

With regard to inclusive architecture and urban design aesthetics, the Rho coefficient of 0,728 suggests a strong relationship between the inclusiveness of architecture and urban design aesthetics. This implies that the implementation of inclusive architecture principles is strongly linked to improvements in the visual appearance and overall attractiveness of urban spaces. Greater inclusivity can lead to more careful and considerate design, which improves the aesthetic perception of the urban environment. This result underscores the importance of integrating inclusivity considerations from the earliest stages of architectural and urban design, not only to comply with accessibility regulations but also to enhance the visual and aesthetic quality of urban environments.

With regard to inclusive architecture and urban design functionality, the coefficient Rho=0,806 indicates that inclusive architecture is highly related to urban design functionality. This means that design strategies that consider accessibility and inclusion tend to result in more functional and efficient urban environments for all users, regardless of their physical or sensory abilities. This finding reinforces the need to promote design policies that prioritize inclusivity as a key component in improving the overall functionality of urban space, potentially leading to greater satisfaction and a better quality of life for all citizens.

With regard to inclusive architecture and urban design sensitivity, the coefficient Rho=0,602 indicates a moderate positive correlation between inclusive architecture and urban design sensitivity. This reveals that environments designed with a high regard for inclusivity are also perceived as more sensitive to the specific needs of all users, including those with different disabilities or limitations. This result suggests that improving inclusivity in architecture and urban design can increase empathy and consideration for diverse user experiences and needs, fostering a more welcoming and understanding environment.

These results demonstrate that inclusivity is not only essential for meeting accessibility criteria, but also crucial for improving the aesthetics, functionality, and sensitivity of urban environments. These findings should motivate designers, planners, and policymakers to consider inclusive architecture as an essential pillar in creating more beautiful, functional, and empathetic cities.

DISCUSSION

The findings of this study are consistent with Chou et al.[5] because they demonstrate that inclusive architecture and urban design are interdependent and that improving one can significantly boost the other. This interrelationship offers a valuable opportunity for Juliaca to become a model of an inclusive, accessible, and functional city. Consistent with the position of Gu[6], urban planners and designers must consider this dynamic central to their work in order to create an urban environment that is truly enabling and welcoming for all its inhabitants.

Similar to Cerdan and Darcy[8], this study reinforces the idea that inclusive design should be an integral consideration and not an afterthought in urban and architectural development projects. Integrating accessibility from the outset of the design process ensures that functionality and aesthetics go hand in hand. As noted by Uddin et al.[12] local governments and planning agencies should consider reviewing and potentially strengthening policies that encourage the inclusion of accessibility considerations in all new urban developments and redevelopment, with the goal of improving aesthetics and functionality.

The results are similar to those of Castillo[14] in that it is essential that design and planning professionals receive ongoing training on the benefits and techniques of inclusive architecture, not only from a functional but also from an aesthetic perspective. Furthermore, involving the community in urban design, especially those with disabilities, can provide valuable practical insights that improve both the inclusivity and aesthetics of projects.

These results support the notion that a holistic approach to inclusivity not only improves the functionality of urban spaces for all users, but also enhances their aesthetic quality, creating more attractive and welcoming urban environments. Planners and designers should consider these findings to promote a deeper integration of inclusivity in all facets of urban design, thereby benefiting the entire community.

González y Gross[15] agree on the importance of promoting education and awareness of the benefits of inclusive architecture among architects, urban designers, and developers. Understanding the correlation between inclusivity and functionality can motivate these professionals to proactively adopt more inclusive design practices. Likewise, in agreement with Martínez[16], involving the community, especially people with disabilities, in the planning and design process can help identify and address specific needs that might be overlooked in a more traditional approach. This leads to more effective and customized design solutions.

The strong correlation found in this study between inclusive architecture and urban design functionality is consistent with Pereira y Silva[17], who highlight the importance of inclusivity as a central pillar of urban planning. Not only does it improve accessibility for people with disabilities, but it also enhances the quality and efficiency of urban spaces for all citizens. Juliaca has the opportunity to lead the way in developing an urban model that values functionality and inclusivity, setting an example for cities around the world.

The study's findings demonstrate that inclusivity in architecture and urban design contributes significantly to the sensitivity of the urban environment, affecting how spaces are perceived and experienced by all users. Similar to Zaslascky et al.[19] while the correlation is positive, the push toward a more integrated and comprehensive approach can further improve these results. Juliaca has the opportunity to lead the way in creating urban spaces that are not only accessible but also deeply resonant and welcoming to a diverse community, setting a model for future urban developments in other regions.

CONCLUSIONS

In relation to the overall objective, the statistically robust results underscore a strong correlation between

inclusive architecture and urban design, suggesting that improvements in one of these fields tend to coincide with advances in the other. This strong positive correlation implies that initiatives aimed at increasing the accessibility and functionality of buildings and urban spaces are not isolated in their impacts. On the contrary, these efforts are complementary and mutually reinforcing, contributing to a virtuous cycle of urban improvement. When buildings are designed or adapted to be more inclusive, they not only benefit people with disabilities, but also improve the overall quality of the urban environment, making spaces more welcoming and accessible for all users.

With regard to the first specific objective, the study has demonstrated a strong correlation between inclusive architecture and the aesthetic qualities of urban design. This indicates that the implementation of inclusive design principles not only meets functional accessibility needs but also contributes significantly to the beauty and visual appeal of urban spaces. The high coefficient obtained suggests that efforts to make architecture more accessible and welcoming are closely linked to improvements in the aesthetic appearance of the urban environment. This may be the result of more meticulous and detailed design, which considers a wide range of human experiences and needs. In practice, this means that when architects and urban planners adopt an inclusive approach, they are also improving the visual and aesthetic quality of the urban environment.

With regard to the second specific objective, the results determine that there is a significant correlation between inclusive architecture and the functional effectiveness of urban spaces. These findings indicate that measures to improve accessibility and inclusion not only benefit individuals with disabilities, but also improve the functionality of urban environments for the entire population. This implies that inclusion is not just a matter of regulatory or ethical compliance, but an integral component that positively impacts the usability and effectiveness of the built environment.

With regard to the third specific objective, a moderate positive correlation has been found. This result indicates that efforts to improve inclusivity in architecture and urban design not only facilitate physical access but also promote greater sensitivity to the needs and experiences of a diverse population, including people with various disabilities and limitations. This moderate correlation suggests that, although there is a positive relationship between inclusivity and sensitivity in urban design, there is still room to improve and strengthen this connection. Environments that actively consider inclusivity tend to be perceived as more empathetic and attentive to the varied needs of all users, implying planning and design that transcend mere compliance with accessibility regulations to embrace a more holistic and human approach.

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