

Original Article

Impact of Designing Transitional Spaces on Enhancing the User's Aesthetic Experience in Circulation Corridors: A Case Study

Anas Mohammad Bataineh

Department of Islamic Arts, Faculty of Islamic Arts and Architecture, The World Islamic Sciences and Education University, Amman, Jordan.

¹Corresponding Author : Anas.Bataineh@wise.edu.jo

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Abstract - This study is an academic attempt aimed at shedding light on the impact of design elements of internal circulation corridors (transitional spaces) on the level of user satisfaction. The study represents an exploratory research into users' opinions towards the design of closed interior corridors in the University's National College of Technology building. The design of the circulation corridors in the building includes a set of elements, namely: visual composition, color harmony, visual rhythm, aesthetic lighting, architectural details, integration with works of art, transparency, visual Porosity, and visual identity. These elements were considered independent variables, while user satisfaction was considered the dependent variable in the study. To achieve the research objectives, an electronic questionnaire was developed that included four main exploratory axes distributed over nine dimensions, and it was then distributed to the study sample. The sample consisted of 113 users within the college, including students, employees, and visitors, who were selected randomly. All responses were analyzed using appropriate statistical methods, in particular, single-sample multiple regression analysis, based on SPSS. The main results of the study showed that there was a noticeable impact on the design of circulation paths in enhancing the level of user satisfaction, as the quality of spatial organization and visual treatments contributed to improving the circulation experience within the building. Dimensions such as color harmony, aesthetic lighting, and visual cohesion also received high ratings compared to other dimensions, while elements such as visual rhythm and artistic integration received average ratings. In light of these results, the study concluded with a set of recommendations that emphasize the importance of developing some design aspects in a way that contributes to raising the efficiency of movement and improving the quality of the spatial experience inside the building.

Keywords - Circulation design elements, Circulation elements, National University College of Technology, Transitional spaces.

1. Introduction

Transitional spaces are architectural spaces used as intermediaries between two or more different functional spaces. They are characterized by design features that influence the user's psychological and sensory perception as they move from one space to another. These features can be physical (such as lighting, materials, and colors) or conceptual (such as a sense of anticipation, openness, or orientation) [1].

Examples include corridors, lobbies, entrances, courtyards, staircases, and visual buffers (such as partial partitions) [2]. These spaces can constitute between 10% and 40% of the total volume in various types of buildings [3] and are considered alternative means of improving building performance. Due to their significant impact on the occupier experience, transitional spaces have been the focus of numerous recent research studies examining their conditions and characteristics.

Transitional spaces within the built environment serve multiple functions, including: functional linking (architectural identity and architectural drama), psychological preparation (preparing the user for a change in character or function between spaces), spatial gradation (organizing levels of privacy and openness within the design), lighting and ventilation control (acting as a mediator that allows the regulation of natural light and airflow [4]), and architectural identity and architectural drama (enhancing the user experience and adding a sensory dimension through the interplay of materials and scale). Aesthetics play a fundamental role in the emotional satisfaction of users and residents with regard to architecture and interior architectural design. It is directly linked to human pleasure and spirituality [5, 6].

The success of interior designers in achieving aesthetic appeal depends on their understanding of human sensitivity



towards beauty and their expressive perception. A deep understanding of facility corridors is essential for crafting high-quality designs that shape fundamental perceptions of the built environment. This design process requires a creative mix of technology and aesthetics, supported by scientific considerations, to ensure the effectiveness and aesthetic appeal of the corridors. Interior designers play an essential role in shaping people's experience within built environments.

The design of interior spaces, including hallways, can directly influence users' perception and way of interacting with their surroundings. These aspects are increasingly important in educational institutions, as the efficiency and aesthetics of corridors contribute to influencing the general atmosphere and comfort level of users. Design considerations are not limited to functional and structural aspects only, but extend to how the design is perceived visually and sensory by humans [7].

Interior circulation is an essential element that affects human comfort within architectural spaces and is a crucial factor in shaping the quality of architectural design. Movement is defined as the space dedicated to the movement of people, which contributes to the effective connection between the different parts of the building. [8].

In this context, Kocabaş stated that horizontal circulation elements, including parking lots, driveways, main entrances, and interior doors, play an essential role in facilitating movement and enhancing spatial flow within buildings. The quality of the design of these elements directly affects users' perception of place and the level of comfort they feel while moving [9].

The importance of this research lies in its attempt to employ accumulated architectural expertise in interior design and the design of circulation paths to improve the nature of enclosed transitional spaces, especially internal corridors, and thus achieve a balance between functional and aesthetic requirements, which positively affects the satisfaction of the end user. While previous studies have mostly focused on the theoretical aspects of analyzing internal movement paths within architectural designs [10], studies that address the impact of design elements of these corridors on user satisfaction and flow of movement in practical application are still limited. Furthermore, this relationship has not been adequately explored in university college buildings, including the National University College of Technology building as a case study.

Accordingly, this research adopts an exploratory approach by studying the actual perceptions of users regarding the designs of closed internal corridors. The problem of the study is the lack of clarity regarding the extent to which the design characteristics of the internal movement corridors in the Technical College building at the National University

affect user satisfaction and the flow of movement, which calls for analyzing this relationship within the realistic context of the building to identify the strengths and weaknesses of the current design.

1.1. Research Questions

This study addresses the following questions:

1. How does the design of internal circulation corridors affect user satisfaction within the building of the Faculty of Technology of the National University? Does the design of the aisles have any impact on user satisfaction?
2. What is the most attractive element from the users' point of view in the design of the interior driveway? And what is the least attractive element?
3. What design factors do users prefer that may affect circulation within these corridors?

1.2. Research Objectives

This study aims to analyze the impact of the design features associated with the internal circulation corridors in the building of the National Technical College on the level of user satisfaction, including students, employees and visitors. This is achieved by evaluating the elements of interior design, identifying the most attractive and the least efficient, as well as studying the preferences of users that contribute to enhancing their experience within these transitional spaces.

This objective is part of the research questions aimed at investigating the relationship between the design of internal circulation corridors and the level of user satisfaction, as well as identifying design factors influencing their experience within these spaces.

1.3. Research Problem

Despite the growing interest in the development of the learning environment in terms of infrastructure and Interior Design care, transitional spaces, especially internal circulation corridors, still face deep challenges related to their efficiency and quality of user experience. The circulation corridors in the National University College of Technology building show varying levels of user satisfaction, which reflects a difference in the efficiency of their design elements, whether in terms of spatial organization or visual treatments.

The problem that this study addresses is the limited clarity of the impact of the design characteristics of internal circulation corridors on the level of user satisfaction and the flow of circulation within the building. Hence, the need to analyze this relationship within the framework of the current case study, with the aim of identifying the strengths and shortcomings of the existing design.

1.4. Research Importance

The importance of this study stems from its focus on an aspect that is often ignored when evaluating the quality of university buildings, which is the visual and aesthetic design

of closed corridors, because of their influential role in shaping users' daily impressions. The importance of the study is that it seeks to evaluate the impact of movement corridor design elements on the user experience within these transitional spaces. It is expected that the results of the study will contribute to providing practical recommendations that benefit designers of educational environments and decision-makers in universities, in a way that supports improving the functional and aesthetic performance of buildings, raises the level of user satisfaction, and enhances the sense of belonging and visual identity of the place.

2. Research Methodology

This study is based on field research aimed at analyzing the interior design elements associated with the closed central corridors in the National College of Technology building. The descriptive analytical approach was adopted in data collection and analysis, due to its suitability for the nature and objectives of the study.

Statistical analysis software (SPSS version 26) was also used to process the data and extract accurate and reliable results that support the analysis and interpretation process.

The study methodology includes defining the study case, describing the sample of participants, and applying a mechanism to collect data through an electronic questionnaire. The following sections will also present the procedures used to verify the validity and reliability of the research tool.

The validity of the study tool was verified by presenting it to a group of specialized arbitrators, and the internal consistency of its items was confirmed using Pearson correlation coefficients. Cronbach's alpha coefficient was also used to measure the stability of the tool and verify the consistency of its items, which enhances its reliability and suitability for use in statistical analysis.

2.1. Case Study

This study is based on a field analysis of the ground floor of the Technical College building at the National University, located in the Abu Alanda area, east of Amman, the capital of Jordan. The building was chosen as a case study because it contains various academic and administrative facilities within a unified architectural composition. These facilities are connected through closed central horizontal corridors, which constitute the main axis of movement of students, employees and visitors within the college.

This floor was chosen due to its high traffic density and multiple usage patterns, which make it a suitable environment to study the relationship between interior corridor design and user satisfaction levels. The study also relied on the opinions of a sample of students, employees, and visitors with the aim of evaluating the effectiveness of the design elements of internal circulation corridors.

The ground floor of the building contains a number of administrative and service units that provide various services to users, the most prominent of which are the admission and registration unit, the financial unit, and the student affairs unit, in addition to the computer department, educational laboratories, and the health clinic.

This functional diversity confirms the importance of transitional corridors in achieving interconnection between these facilities, both functionally and visually. For further clarification about the distribution of the different units and the locations of the central corridors that formed the focus of analysis in this study, one can refer to the approved plans and details of the building:

Figure 1 shows the ground floor plan of the National College of Technology building, showing the distribution of administrative and academic units, along with the main entrances to the building indicated by arrows, and the main movement corridors that connect the various facilities of the building. This plan is used as a visual reference for analyzing internal movement and studying its relationship to the functional and organizational composition of the floor.

Figure 2 shows the main entrance to the National University College of Technology building from the inside, including its direct connection to the waiting area and the reception.

Figure 3 (a), and (b) shows the circulation corridor branching from the reception area (in red), leading to the following areas in a sequential order: student services, the admissions and registration unit, elevators to the floors, and a separate corridor to the IT unit and medical laboratories.

Figure 4 shows the circulation corridor branching from the reception area (in yellow). This leads to the following areas, arranged sequentially: University Security; Supplies Department; Finance Department; Elevators to the floors; a separate corridor to the theater; and the medical clinic.

Figure 5 (a), (b), and (c) illustrates the circulation corridor branching from the reception area (in green), which leads to the college laboratories distributed on both sides and divided into (4) laboratories. It also includes a classroom at the end of the corridor.

Figures (2-5) show detailed views of the internal sub-corridors in the National College of Technology building, as currently designed. These images highlight several design points and elements that form the focus of this study, including: visual composition, color harmony, visual and temporal rhythm, aesthetic lighting, architectural details, integration with artistic elements, visual transparency, the visual identity of the corridors, and their impact on the user experience within these transitional spaces.

3. Literature Review

3.1. Building Circulation

The function of circulation within a building is of paramount importance in all types of buildings, including educational institutions, offices, residential complexes and other architectural structures. These spaces act as functional and visual corridors that facilitate the movement and comfort of users, and connect the different spaces within the building in a way that achieves smooth movement and ease of navigation [11]. The function of these spaces is not limited to communication, but also extends to influencing the user's sensory and perceptual experience through elements such as lighting, materials, dimensions, and visual rhythm [12].

The design of transitional spaces requires achieving a thoughtful balance between functional and aesthetic aspects by ensuring their harmony with the surrounding architectural elements, providing an appropriate level of visual comfort, in addition to enhancing users' spatial perception and awareness, which contributes to creating educational environments that are stimulating and supportive of interaction. [13].

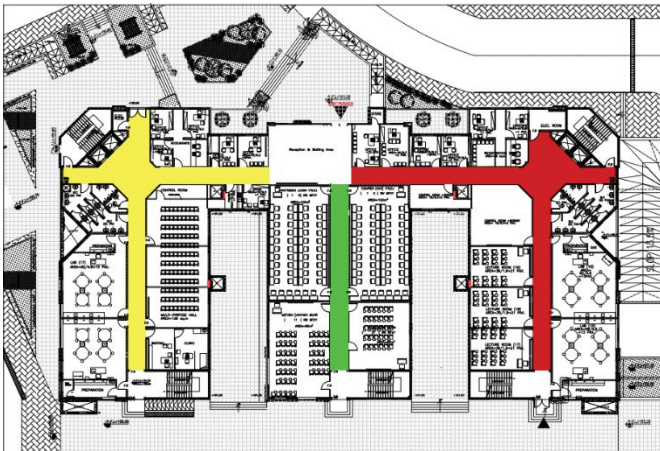


Fig. 1 Ground floor plan of the National University College of Technology building as documented during the field study

Corridors often play the role of a mediator that connects various spaces within a building, and their design is directly affected by the characteristics of the surrounding spaces, which contribute to creating an interconnected and integrated spatial experience. At the same time, corridors can be viewed as independent spaces that have their own design elements that contribute to supporting and enhancing the general architectural idea [14]. Understanding this dual role of corridors, as both connecting elements and stand-alone spaces, is essential in designing environments that are not only functional but also provide a positive visual and spatial experience for users. From this perspective, movement does not merely represent a physical transition between two points, but rather a living experience of the place that leaves deep-seated images and impressions in the memory, whose importance may be comparable to what the user acquires inside study halls and lectures.

Circulation spaces on campus are characterized by the integration of their design elements and their functional interconnectedness. These spaces start from the main entrance, which constitutes a symbolic gateway to knowledge and education, and then extend through a system of diverse corridors that connect various academic and service facilities, such as teaching halls, laboratories, and support areas. The design of these corridors is based on a set of studied architectural standards, including the dimensions and shapes of the corridors and their harmony with the distribution of the surrounding architectural elements, in addition to the visual and physical characteristics that contribute to shaping their spatial identity. This configuration helps achieve visual clarity that facilitates the process of orientation and movement, and also enhances the efficiency of movement and flow between the various buildings and spaces within the university campus [15].

The circulation spaces in architecture are figuratively similar to the arteries of the heart, supporting the functional and experimental vitality of the building. They are an essential element of architectural design and play a decisive role in the success of projects in general [16]. In architectural discourse, circulation refers to the network of paths that permeate floor plans and regulate movement within the built environment. These paths form the spatial user experience, and their composition can largely determine the effectiveness or shortcomings of the design.

Therefore, circulation spaces should be considered as basic architectural elements, and not just transitional zones. Their design contributes to the achievement of spatial hierarchy, empirical sequencing, functional coherence. Within buildings, circulation systems consist of multiple interrelated components whose form and organization vary according to functional approach, entrance articulation, spatial configuration, path typology, spatial relationships, and route composition [17].



Fig. 2 Main entrance to the National University College of Technology building from the inside, including its direct connection to the waiting area and reception

Onugha et al., and Büyüksahin pointed out that there are two main types of architectural movement patterns within buildings: horizontal movement (Horizontal Circulation), which takes place within one level, and vertical movement (Vertical Circulation), which connects different floors [18, 19]. Based on this classification, the US General Services Authority (GSA, 2016) identified two types of movement areas within a building: primary movement, which represents the main paths connecting the building's core and common public areas, and secondary movement, which is used to connect sub-units and support spaces [20].



Fig. 3 (a, and b) Divided circulation corridor from the reception area leading to the following areas in a sequential order (student services, admissions and registration unit; elevators to the floors; separate corridor to the IT unit and medical laboratories).

On the other hand, Natapov et al., proposed a three-part classification of movement patterns that includes: Linear Movement, Curvilinear Movement, and Grid Movement [21]. These movement systems are central organizational components in architectural composition, as they act as a guidance mechanism that organizes spatial transition and connects the external and internal spaces, thus contributing to guiding building occupants and enhancing their perception of the functional spatial sequence.

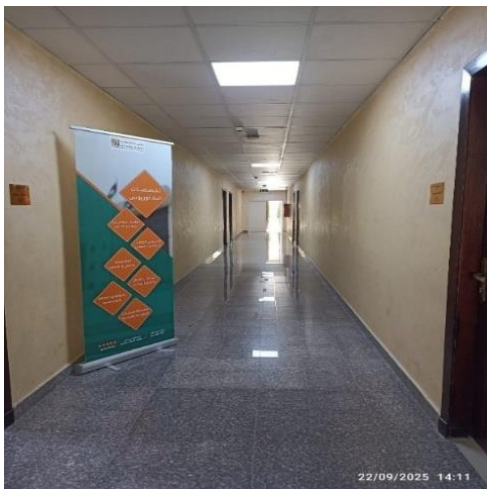


Fig. 4 Circulation corridor leading to the college laboratories, which are distributed on both sides and divided into (4) laboratories; it also includes a classroom at the end of the corridor

Internal movement encompasses all walkways within a single floor, regardless of its location in the building, enabling physical access to the spaces that comprise that floor, whether or not these spaces are defined by partitions.

Each floor includes horizontal and vertical corridors connecting its constituent spaces, and comprises various elements such as main and secondary circulation corridors, lobbies, elevators, stairs, and ramps [22].

According to Ogunyemi et al., [23], who discussed the work of Sargent (2016), the development of contemporary work environments is associated with several factors, including flexibility, freedom of choice, and achieving a balance between work and personal life. This perspective emphasizes the importance of designing integrated environments that support the relationship between work, life, and leisure.

In educational institutions, these principles can be applied by designing university campuses in ways that enhance the quality of both horizontal and vertical circulation, as movement systems play a significant role in improving user comfort, increasing productivity, and encouraging social interaction.

Furthermore, Ogunyemi et al., [23] noted, based on Sargent's observations, that future environments should be flexible, dynamic, and capable of adapting to rapid changes, while also supporting users' well-being and mental health.

When applying the principles of spatial design to closed horizontal corridors in academic buildings, movement should not be considered only as a means of connection; otherwise, the areas of movement will turn into endless corridors. Therefore, the importance of these spaces lies in the fact that they are more than just pathways; These are cognitive spaces that form an essential part of the user's daily experience within the building. The movement system at the building level is evaluated according to three main factors, which are listed below [24]:

- Physical factors: proportion, size, lighting, texture, color, and composition.
- Socio-cultural factors: privacy, hierarchy, traditions, and culture.
- Psychological factors: perception, orientation, movement, and intersection.

The carefully considered design of these corridors (through the proposed study elements) provides a functional and aesthetic environment by employing visual composition in ways that enhance directional clarity and the flow of movement. Furthermore, color harmony is a crucial factor in setting the rhythm of the architectural design and providing either a calming or stimulating atmosphere, depending on the nature of the use.



Fig. 5 (a, b, and c) shows the divided circulation corridor from the reception area leading to the following areas in a sequential order: (University Security; Supplies Department; Finance Department; Elevators to the floors; a separate corridor to the theater; and the medical clinic).

Rules of creating rhythm in architecture design contribute to organizing the user's perception of movement within space by employing the principles of repetition and gradation in architectural elements and materials along the path, thus enhancing the sense of continuity and establishing clarity of direction. This rhythm is based on fixed patterns that dominate the overall scene and highlight specific points or objectives, forming a balanced relationship between mass and void within the movement corridors. This is manifested in the surfaces that define the masses, the framing columns, doors, openings, and other elements that regulate the rhythm of the composition. In contrast, surface effects appear that harmonize with these patterns and support the design concept, forming a background that highlights another type of rhythm based on change and diversity. This is represented in the changing patterns on surfaces, such as variations in color, gradations of shadow and light, interior finishes, and the diversity of materials and textures, as well as the subtle architectural details, which deepen the perceptual experience and enrich the sensory dimension of the architectural space [25]. Transparency and visual spaces are elements that contribute to creating a visual connection with the outside world or with

other internal spaces, thus reducing the feeling of isolation in enclosed corridors. Transparency is defined as a pattern of architectural organization, and one of its most prominent features is the ability to simultaneously perceive different spatial locations, thereby ensuring easy access for individuals within the building without difficulty [26].

Finally, the integration of architecture and visual arts, including murals and wall treatments, contributes to establishing the visual identity of the space, enhancing the sense of belonging, and enriching the circulation environment, giving it a deeper perceptual and aesthetic dimension [27]. Therefore, this study focuses on investigating the impact of these factors on the circulation corridors within the college building, as elements capable of enhancing user satisfaction and providing them with implicit spatial cues that facilitate mobility and highlight architectural excellence.

3.2. Users' Satisfaction with the Quality of Internal Circulation in Educational Corridors

According to the methodology of the study, the target audience is limited to three main categories: students, employees, and visitors. University students are defined as individuals enrolled in institutions of higher education, whether they are undergraduate or graduate students, regardless of how they are enrolled, whether full-time or part-time, on campus or by distance learning [28]. The university staff consists of individuals who occupy a variety of roles within higher education institutions, including administrative, student services, financial, and technical roles, as well as other functions that support the organizational processes of the organization. [29]. Campus visitors are individuals who come to the University for a variety of purposes, such as educational or cultural activities, whether they are from within or outside the University. This includes local community visitors and cultural tourists, both locally and internationally. It is worth noting that these visitors are different from students and staff, as their presence on campus does not necessarily mean that they are permanently involved in the academic or career activities of the institution [30].

User satisfaction is one of the basic indicators in evaluating the quality of architectural performance, especially in educational environments where design decisions are shaped by the nature of the daily interaction between the user and the place. In this context, user-centered design has emerged as one of the modern architectural trends in evaluating the efficiency of interior spaces, as the user is seen as the main element in judging the effectiveness and success of the design [31].

Student satisfaction is a multidimensional construct influenced by numerous factors, which can be broadly categorized into two main groups: personal factors and institutional factors. Student satisfaction can be defined as an attitude resulting from their assessment of their educational

experience, services and facilities provided by the institution. Students are the most important internal judges of the institution's performance [32].

This definition emphasizes that student satisfaction is a subjective and multidimensional issue, as it depends on comparing students' expectations with their actual experiences. This research focuses on measuring student satisfaction with circulation corridors as part of the physical facilities at the college [33].

In the context of user-centered educational institutions, the satisfaction of students, faculty and visitors with the characteristics of circulation corridors reveals the extent to which human-centered design criteria are met, such as comfort, clarity and a sense of spatial belonging.

Moreover, the study of user opinions makes it possible to identify the strengths and weaknesses of the interior configuration, which makes it an extremely important exploratory tool for improving the architectural environment and enhancing its functional and aesthetic experience. This, in turn, helps to make these lanes suitable for as many users as possible and usable in the widest possible range of tracks [34].

Therefore, in an architectural context, the environment is defined as the spatial framework that combines physical elements (such as lighting, color, dimensions, ventilation, and organization) and psychological elements (such as a sense of security, privacy, and ease of interaction), which are integrated to directly impact the user experience within educational spaces. Studies indicate that humans are naturally inclined to associate with places that meet their sensory and cognitive needs, while this association weakens in environments that lack responsiveness [35].

In light of the principle of environmental feedback, the value of space in a user's consciousness increases as it responds to their needs. Studies in environmental psychology have shown that the architectural environment directly affects the psychological and functional health of users through what is known as architectural stimulation. This refers to the quantity and type of visual and spatial information that spaces convey to the user during their interaction with them. Research indicates that humans respond optimally to moderate levels of stimulation; low levels lead to sensory deprivation and a feeling of stagnation, while excessive levels can lead to distraction and cognitive fatigue [36].

To achieve this stimulating balance, the interior design of corridors should take into account several elements, including: the distribution of space, ease of movement, spatial organization, the level of privacy, the presence of symbolic and visual elements that enhance the perception of the place and its interaction with its users [37]. Together, these factors form an architectural basis for moderate cognitive stimulation

that provides support for the well-being of users inside educational buildings [5].

From this perspective, horizontal motion design is not only limited to functional aspects, but also to the social and behavioral dimensions of users. Corridors can go beyond their traditional role as transit spaces and become environments that support interaction and enhance the sense of belonging, as long as their design is based on principles that take into account spatial perception and the nature of the collective behavior of users.

Recent studies have discovered the relationship between the design of educational buildings and the user experience from multiple angles. Arafat et al., (2024) emphasized the importance of user-centered design in achieving a balance between functionality and aesthetics, highlighting its role in enhancing user satisfaction [38].

Conversely, Shareef et al., (2023) demonstrated that the efficiency of movement systems within buildings significantly impacts the spatial user experience, underscoring the crucial role of movement design in evaluating built environments [39]. Furthermore, Zewar (2024) focused on assessing corridor conditions in educational buildings, demonstrating that the quality of transitional spaces directly affects usability and the daily user experience [40].

At the local level, Alhmoud et al., (2025) explained that users' perception of the functions of spatial elements, particularly in terms of accessibility and spatial organization, plays a significant role in shaping their evaluation of university environments in Jordan [15].

Despite the importance of these contributions, most previous studies have addressed design elements in isolation, without providing a comprehensive analytical framework that links the design of internal circulation corridors with user satisfaction and flow of movement within a real-world application in educational buildings. Therefore, this research aims to bridge this gap by adopting a holistic, user-centered approach to evaluating the design of internal circulation corridors through a case study of the College of Technology building at the National University.

Based on the above, this study aims to explore the impact of eight key design elements on user satisfaction, which are detailed later in the data collection tool.

4. Data Collection, Analysis, and Findings

The study population comprises all users of the ground floor of the College of Technology building at the National University in Amman, Jordan, serving as a case study reflecting the actual use of internal circulation corridors in educational buildings. The study population consists of multiple categories of users, including students, employees,

and visitors, providing a diversity of usage patterns and methods of interaction with the transitional spaces.

The study adopted the descriptive analytical approach, where data were collected through an electronic questionnaire designed to measure the dimensions of the design of internal movement corridors across four main axes: the quality of the movement elements, the attractiveness of the design, user preferences, and spatial attractiveness, which reflects the functional and perceptual dimensions of the spatial experience.

Data were collected between October and November 2025 using an available sample method, resulting in 113 responses suitable for analysis. The participants were classified into three main categories representing the actual users of the building, namely: students (74.3%), employees (17.7%), and visitors (8%), as shown in Figure 6, which contributed to enhancing the representation of the diverse usage patterns within the studied space.

Participants were informed of the aims and nature of the study before participating, and their participation was voluntary, with assurances of data confidentiality, that no identifying information would be collected, and that all responses would be used for scientific research purposes only, in accordance with the principles of scientific research ethics.

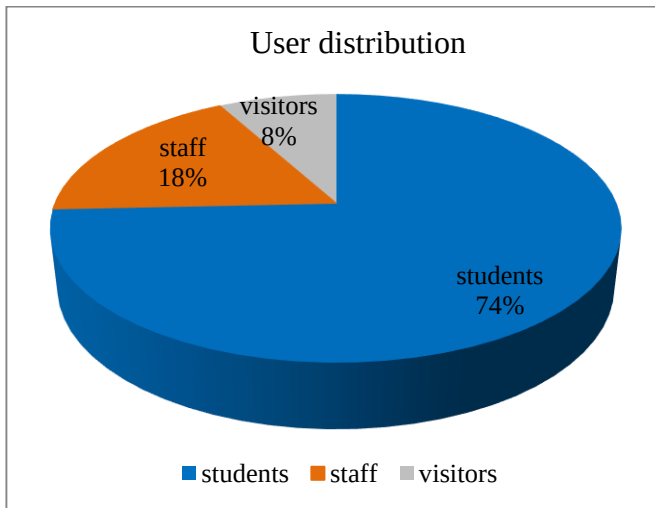


Fig. 6 Illustrates the categories of survey participants and the percentage of each category

4.1. Data Collection Tool

The study tool, a scale designed to collect data on evaluating the interior design elements of movement corridors within a building, was developed. The scale items were formulated by reviewing existing theoretical literature in the field of interior design. The researcher also utilized previous studies to examine user satisfaction with the design elements of these movement corridors. The study covered the following main axes and their sub-dimensions:

The first main axis: Covers the quality of interior movement elements, which includes the following three sub-dimensions:

- Dimension 1: Visual Composition, measured by three items.
- Dimension 2: Color Harmony, measured by three items.
- Dimension 3: Visual Rhythm, measured by three items.

The second main axis: Covers the attractiveness of the design elements, which includes the following three sub-dimensions:

- Dimension 1: Aesthetic Lighting, measured by three items.
- Dimension 2: Architectural Details, measured by three items.
- Dimension 3: Integration with Art, measured by three items.

The third main axis covers user preferences and includes the following two sub-dimensions:

- Dimension 1: transparency and visual Porosity, measured by three (3) items.
- Dimension 2: Visual identity, measured by three (3) items.

The fourth main axis covers attractive and unattractive elements, measured by five (5) items.

4.2. Participant Response Levels

All items on the study scale are answered using a five-point Likert scale: (Strongly Disagree, 1; Disagree, 2; Neutral, 3; Agree, 4; Strongly Agree, 5). The scale is used to determine response levels for each Item as follows: (1.00–2.33) Low response level; (2.34–3.67) Moderate response level; (3.68–5.00) High response level.

4.3. Validity of the Data Collection Instrument

For the purposes of this study, the validity of the data collection instrument was measured in two ways:

4.3.1. First: Expert Validity

The study scale was presented to a group of experts and faculty members in the field of interior design to obtain their feedback on the content of the instrument and the relevance of the items to their respective dimensions. The experts expressed their opinions on the scale through several suggestions, including modifying some of the language and deleting some items that were unsuitable or did not fit their dimensions. A criterion of (0.80) was adopted to indicate the validity of each Item. Based on the experts' opinions, some items were modified in terms of wording to increase their clarity, some items were deleted due to their similarity or close meaning to other items, and some were deleted because they were unsuitable for the purposes of the study or because they did not fit the dimension to which they belonged. As a result, the scale now consists of (four main axes and 29 items).

4.3.2. Second: Internal Construct Validity

The construct validity indicators of the scale were calculated by determining the correlation between the item

score and the dimension to which it belongs, among the study sample. Table 1 shows these results:

Table 1. Correlation coefficients of the Item with the total score of the dimension to which it belongs, using the Pearson Correlation test to determine the construct validity of the study scale

Quality of internal circulation elements					
Visual Composition		Color Harmony		Visual and temporal rhythm	
#	correlation coefficient	#	correlation coefficient	#	correlation coefficient
1	.715**	1	.867**	1	.793**
2	.656**	2	.888**	2	.740**
3	.679**	3	.837**	3	.807**
the attractiveness of the design elements					
Aesthetic Lighting		Architectural Details		Integration with Art	
1	.877**	1	.829**	1	.825**
2	.800**	2	.812**	2	.870**
3	.839**	3	.821**	3	.910**
Users' preferred elements					
transparency and visual Porosity		Visual identity		attractive and unattractive elements	
1	.843**	1	.862**	1	.822**
2	.811**	2	.904**	2	.750**
3	.696**	3	.849**	3	.873**
				4	.873**
				5	.825**

Notes: ** Significant at the 0.01 level ($p < 0.01$).

After computing the Pearson correlation coefficients, the results revealed that all correlation values were statistically significant at the 0.01 level ($p < 0.01$). This indicates that all items contributed to the total score of the study scale.

Furthermore, all correlation coefficients exceeded the acceptable threshold value of 0.30, suggesting that the items were adequately discriminative and measured the same underlying construct within their respective dimensions. Accordingly, the final scale consisted of 29 items.

4.3.3. Reliability of the Study Tool

Reliability of the study tool refers to the degree of consistency in the responses of the study sample across the items and dimensions of the tool. Reliability values are generally considered acceptable when they exceed 0.60 and approach 1.00. For the purposes of this study, Cronbach's alpha coefficient was used to assess the reliability of the study instrument. The results are shown in Table 2.

The reliability coefficients were found to be high, approaching 1.00 in all major dimensions of the study. The reliability values of the study's scale ranged from 0.819 to 0.905, all exceeding the acceptable standard value of 0.60. These values are considered satisfactory for the purposes of the study, indicating that the instrument possesses a high level of reliability.

Table 2. Reliability coefficients for the items of the study instrument using Cronbach's alpha test

Study variables	Items	Reliability coefficient using Cronbach's alpha
Quality of internal circulation elements	9	0.819
the attractiveness of the design elements	9	0.905
transparency and visual Porosity	6	0.863
attractive elements	5	0.887

4.3.4. Statistical Procedures Used

Descriptive statistical methods were used using the Statistical Package for the Social Sciences (SPSS), version 27, to address the research questions, as follows:

- Frequencies and percentages were calculated to describe the characteristics of the study sample.
- Pearson correlation analysis and Cronbach's alpha coefficient were used to examine the validity and reliability of the study instruments.
- Means and standard deviations were calculated to answer the research questions.

5. Results and Discussion

This section of the study presents the results of the statistical analysis, which reflects participants' opinions on the

evaluation of interior design elements of movement corridors within the building. Below are the results:

5.1. The First Research Question

Results were calculated for the first research question, which explored how interior circulation corridor design elements influence user satisfaction within the National College of Technology building, and whether corridor design

has any impact on user satisfaction. Arithmetic means and standard deviations were calculated to answer the first research question, which revealed the effect of interior circulation corridor design elements (visual composition, color harmony, and visual and temporal rhythm) on user satisfaction inside the National College of Technology building at the University. The results are presented below in Table 3.

Table 3. "The impact of internal circulation corridor design elements on user satisfaction within the National University College of Technology building" is arranged in descending order

Items	Effect of Internal Circulation Corridor Design Elements on User Satisfaction	Mean	Standard Deviation	Rank	Level
2	Color Harmony	3.72	0.86	1	High
1	Visual Composition	3.50	0.78	2	Average
3	Visual and temporal rhythm	3.46	0.75	3	Average
	Total	3.56	0.66		Average

The results of the analysis of the first question indicated that the design elements of the internal circulation corridors had a moderate effect on user satisfaction within the National University College of Technology building. The elements were ranked in descending order as follows:

Satisfaction with color harmony came in first place with a mean of (3.72) and a standard deviation of (0.86), indicating

a high level. Satisfaction with visual composition came in second place with a mean of (3.50) and a standard deviation of (0.78), indicating a moderate level. Third place was satisfaction with the visual and temporal rhythm, with a mean of (3.46) and a standard deviation of (0.75), indicating a moderate level. To determine whether the corridor design had an impact on user satisfaction, a One-Sample T-test was used, the results of which are shown in Table 4 below.

Table 4. The impact of corridor design on user satisfaction

Source	Mean	Standard Deviation	t-value (tabulated)	t-value (calculated)	Statistical Significance
The impact of corridor design on user satisfaction	3.56	0.66	1.96	8.949	*0.00

Notes: * Significant at the 0.05 level ($p < 0.05$).

The results of the one-sample t-test revealed that the arithmetic mean score of user satisfaction with corridor design within the building of the National University College of Technology was 3.56, which exceeds the hypothetical mean value of 3.00. The calculated t-value (8.949) was greater than the critical value (1.96) and was statistically significant at the

0.05 level ($p < 0.05$). This indicates that corridor design within the college building has a positive effect on user satisfaction. Arithmetic means and standard deviations were calculated for each Item within the dimensions of internal circulation elements quality, as follows (The results are presented below in Table 5):

Table 5. Description of the level of item dimensions of quality of internal movement elements within the National University College of Technology building

Items	Dimension	Mean	Standard Deviation	Rank	Level
	Visual Composition				
3	Visual coordination within the corridor makes the experience more comfortable and seamless.	3.73	1.09	1	High
2	Furniture and functional elements do not obstruct users' movement within the corridors.	3.40	1.15	2	Average
1	The distribution of elements such as furniture, lighting, signage, structural components, doors, and seating areas within circulation corridors appears coherent and facilitates smooth movement.	3.38	1.19	3	Average
	Total	3.50	0.78		Average

Color Harmony					
1	The colors of the walls and floors in the corridors are harmonious and visually comfortable.	3.81	0.97	1	High
3	The selected color gradations reflect the identity and character of the overall institutional environment.	3.74	0.96	2	High
2	The colors used create a sense of spaciousness within the corridors.	3.60	1.05	3	High
Total		3.72	0.86		High
Visual and temporal rhythm					
3	The sequence of design elements (floors, ceilings, and walls) reflects a clear organization of movement.	3.73	0.94	1	High
1	There is a coherent and recurring visual pattern within the corridors that assists in guiding movement.	3.43	0.99	2	Average
2	Elements of visual rhythm reduce the sense of monotony during movement.	3.20	0.97	3	Average
Total		3.46	0.75		Average

The participants' responses were assessed as having a medium level of visual composition, with an arithmetic mean of (3.50). The items of this dimension were ranked in descending order, with Item (3) coming first with an arithmetic mean of (3.73), a standard deviation of (1.09) and a high level, and it stated that "visual coordination within the corridor makes the experience more comfortable. In last place came Item (1) with an arithmetic mean of (3.38), a standard deviation of (1.19), and a medium level, as the Item stated that "the distribution of elements such as (furniture, lighting, directional signs, structural elements, doors, and seating areas) within the movement corridors appears harmonious and facilitates passage.

The participants' responses regarding color harmony within the building were also assessed as being of a high standard, achieving a mean score of 3.72. Item (1) ranked first with a mean score of 3.81 and a standard deviation of 0.97, indicating a high level of satisfaction. This Item stated that "the colors of the walls and floors in the corridors are harmonious and visually pleasing." Conversely, Item (2) ranked last with a mean score of 3.60 and a standard deviation of 1.05, also indicating a high level of satisfaction. This Item stated that "the colors used give a feeling of spaciousness within the corridors."

The participants' assessment of visual and temporal rhythm within the building was moderate, achieving a mean score of 3.46. Item (3) ranked first with a mean score of 3.73 and a standard deviation of 0.94, indicating a high level of satisfaction. This Item stated that "the sequence of design elements (floors, ceilings, and walls) reflects a clear organization of movement." In last place came paragraph number (2) with an arithmetic mean of (3.20) and a standard deviation of (0.97), and at an average level. The Paragraph stated that (the elements of visual rhythm reduce the feeling of monotony while walking).

5.2. The Second Research Question

The results of the second question, which explores: What is the most attractive element in the design of the internal circulation corridors within the National College building, and what is the least attractive element from the users' point of view?

The arithmetic means and standard deviations were calculated to answer the second research question, revealing the most attractive element in the design of the internal circulation corridors within the National College building, and the least attractive element from the users' perspective. The results are presented below.

Table 6. "The most attractive and least attractive element in the design of the internal circulation corridors within the National College building" is arranged in descending order

No.	Design elements	Mean	Standard Deviation	Rank	Level
1	Aesthetic Lighting	3.68	0.88	1	High
2	Architectural Details	3.60	0.83	2	Average
3	Integration with Art	3.53	0.99	3	Average
Total		3.60	0.81		Average

Table 6 above shows that the most attractive element in the design of the internal circulation corridors within the National College building is (aesthetic lighting), which received a mean of (3.68) and a standard deviation of (0.88), indicating a high level. This was followed by the element

(architectural details), with a mean of (3.60) and a standard deviation of (0.83), indicating a medium level. The least attractive element in the design of the internal circulation corridors within the National College building was (integration with art), which received a mean of (3.53) and a

standard deviation of (0.99), indicating a medium level. The means and standard deviations for each Item in the dimensions

of attractiveness of the design elements were calculated as follows (The results are presented below in Table 7):

Table 7. Description of the level of attractiveness of design elements within the National University College of Technology building

Items	Dimension	Mean	Standard Deviation	Rank	Level
Aesthetic Lighting					
3	The distribution of lighting enhances the clarity of movement within the corridors.	3.88	0.92	1	High
2	The integration of natural and artificial lighting creates a comfortable and attractive atmosphere.	3.73	0.98	2	High
1	The lighting used within the corridors highlights the aesthetic qualities of the space.	3.43	1.24	3	Average
	Total	3.68	0.88		High
Architectural Details					
2	Fine details add aesthetic value to the corridors.	3.73	0.98	1	High
3	The flooring design is harmonious with the other corridor elements and enhances its visual appeal.	3.60	1.00	2	Average
1	The architectural finishes in the corridors (such as walls and ceilings) demonstrate a clear attention to quality.	3.48	1.08	3	Average
	Total	3.60	0.83		Average
Integration with Art					
1	The presence of paintings or murals within the corridors enhances the users' visual experience.	3.64	1.17	1	Average
3	The artwork incorporated within the corridors gives the space a distinctive artistic character.	3.50	1.20	2	Average
2	The artworks are integrated in a manner that is harmonious with the overall spatial composition.	3.45	1.06	3	Average
	Total	3.53	0.99		Average

Participants' responses were assessed as indicating a high level of aesthetic lighting within the National University College of Technology building, with a mean score of 3.68.

The items within this dimension were ranked in descending order, with Item (3) ranking highest at a high level, indicating a mean of 3.88 and a standard deviation of 0.92.

This Item stated that "the lighting distribution enhances the visibility of movement within the corridors." Item (1) ranked last at a moderate level, indicating a mean of 3.43 and a standard deviation of 1.24. This Item stated that "the lighting used within the corridors highlights the aesthetic aspects of the space."

Participants' responses regarding architectural details were assessed as being of an average level, with a mean score of 3.60. Item (2) ranked first with a mean score of 3.73 and a standard deviation of 0.98, indicating a high level of attention to detail.

This Item stated that "meticulous details add aesthetic value to the corridors." Item (1) ranked last with a mean score of 3.48 and a standard deviation of 1.08, indicating an average level of attention to detail. This Item stated that "architectural finishes in the corridors, such as walls and ceilings, demonstrate a clear attention to quality."

Participants' responses regarding the integration of art within the building were also assessed as being of an average level, with a mean score of 3.53. Item (1) ranked first with a mean score of 3.64 and a standard deviation of 1.17, indicating an average level of attention to detail. This Item stated that "the presence of paintings or murals within the corridors enhances the user's visual experience." In contrast, Paragraph (2) came in last place, with an arithmetic mean of (3.45) and a standard deviation of (1.06) and at an average level. This Paragraph stated that (the artworks are integrated in a way that is consistent with the general composition of the place).

5.3. The Third Research Question

Results of the third research question, which explores: What design factors do users prefer that might influence traffic flow within these corridors?

The arithmetic means and standard deviations were calculated to answer the third research question, which reveals the design factors preferred by users that might influence traffic flow within the National College building. The results are presented below.

Table 8. "Users' favorite items" sorted in descending order

No.	Design elements	Mean	Standard Deviation	Rank	Level
1	Transparency and visual Porosity	3.65	0.76	1	Average
2	Visual identity	3.63	0.86	2	Average
	Total	3.64	0.64		Average

Table 8 above shows that the user-preferred elements that influence traffic flow within the National College building had a mean of (3.64) and a standard deviation of (0.64), indicating a moderate level. Transparency and visual spaces ranked first with a mean of (3.65) and a standard deviation of (0.76), while

visual identity came in second with a mean of (3.63) and a standard deviation of (0.86), also indicating a moderate level. To confirm that design factors influence traffic flow within the corridors, an independent sample; One Sample T-test was used, the results of which are shown in Table 9 below:

Table 9. The impact of user-preferred design factors on traffic flow within these corridors

Source	Mean	Standard Deviation	t-value (tabulated)	t-value (calculated)	Statistical Significance
The impact of user-preferred design elements on circulation flow within these corridors.	3.64	0.64	1.96	6.278	*0.00

* Significant at the 0.05 level ($p < 0.05$).

The results of the one-sample t-test indicated that the mean score for user satisfaction with the preferred design factors affecting circulation flow within the corridors was 3.64, which exceeds the hypothetical mean value of 3.00. The calculated t-value (6.278) was greater than the critical value (1.96) and was statistically significant at the 0.05 level ($p <$

0.05). This finding suggests that users' preferred design factors have a statistically significant effect on circulation flow within these corridors. The arithmetic means and standard deviations for each Item in the user-preferred item dimensions were calculated as follows (The results are presented below in Table 10):

Table 10. Description of the level of items of dimensions of user-preferred elements that affect traffic within the National University College of Technology building

Items	Dimension	Mean	Standard Deviation	Rank	Level
	transparency and visual Porosity				
2	Visual connectivity between corridors and adjacent spaces creates a sense of openness.	3.70	0.98	1	High
1	Visual openings and transparency within the corridors reduce the perception of enclosure.	3.65	0.97	2	Average
3	The use of glass or transparent materials enhances the quality of movement within the corridor.	3.61	0.95	3	Average
	Total	3.65	0.76		Average
	Visual identity				
3	The visual identity makes the circulation experience within the corridors more distinctive and memorable.	3.73	0.96	1	High
2	The colors and symbols used reflect the institutional character of the place.	3.60	1.02	2	Average
1	The corridor design clearly expresses the identity of the institution.	3.55	0.97	3	Average
	Total	3.63	0.86		Average

Participants' responses were assessed as indicating that transparency and visual spaces within the National University College of Technology building were at a moderate level, with a mean score of 3.65. The items related to this dimension were ranked in descending order of importance. Item (2) ranked highest with a mean of 3.70 and a standard deviation of 0.98, indicating a high level of engagement. This Item stated that "visual connectivity between corridors and other spaces creates a sense of openness." Item (3) ranked last with a mean of 3.61 and a standard deviation of 0.95, indicating a moderate level of engagement. This Item stated that "the use of glass or transparent materials improves the quality of movement within the corridor." The participants' responses were assessed as having a medium level of visual identity, with an arithmetic mean of (3.63).

Item (3) came in first place with an arithmetic mean of (3.73) and a standard deviation of (0.96), and at a high level, and it stated that (visual identity makes the experience of movement within the corridors more distinctive and memorable). Item (1) came in last place with an arithmetic mean of (3.55) and a standard deviation of (0.97), and at a medium level, as the Item stated that (the design of the corridors clearly reflects the identity of the institution).

5.4. Results Related to Attractive and Unattractive Elements in the Circulation Corridors

Arithmetic means and standard deviations were calculated to identify attractive and unattractive elements in the circulation corridors within the National University College of Technology building, and Table 11 illustrates this.

Table 11. Description of the level of attractive and unattractive elements in the movement corridors within the National University College of Technology building

Items	Items	Mean	Standard Deviation	Rank	Level
1	Main Entrance	3.55	1.30	1	Average
2	Public Corridors	3.12	1.20	2	Average
5	Door Design	3.12	1.33	2	Average
3	Waiting Area	3.10	1.44	4	Average
4	Waiting Area Seating	3.09	1.35	5	Average

The results of the study showed that the attractive elements in the movement corridors inside the National University College of Technology building were highest for the main entrance, which came in first place with an arithmetic mean of (3.55) and an average level. In second and third place came the public corridors and the door design, with an

arithmetic mean of (3.12) and an average level. It was followed by the waiting area in fourth place with an arithmetic mean of (3.10) and an average level. In fifth and last place came the waiting area seats with an arithmetic mean of (3.09) and an average level, as illustrated in Figure 7.

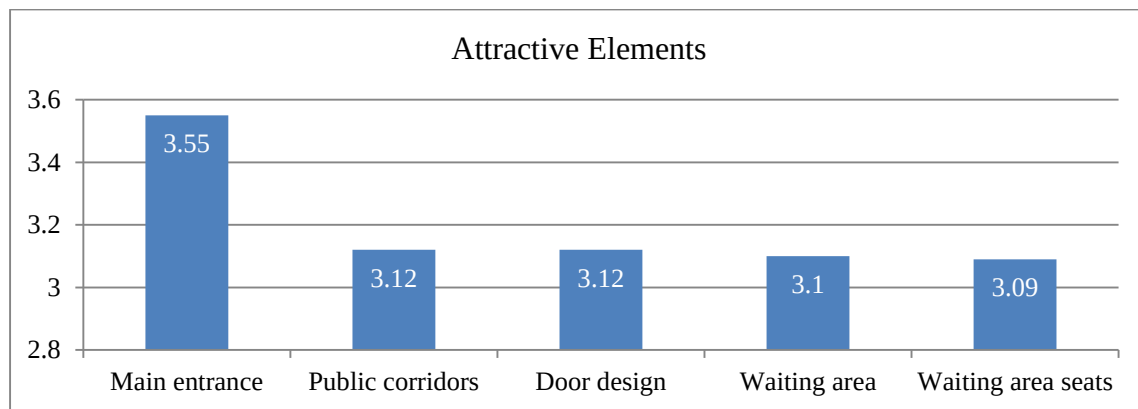


Fig. 7 Analysis of the sample's responses regarding the attractions in the movement corridors

The study results show that visual design elements, particularly visual composition and color harmony, have the greatest impact on user satisfaction within movement corridors. This is consistent with the results of studies by Arafat et al., and Sherif et al., who emphasized the importance of visual processing in improving user experience. In contrast, the effect of visual rhythm was found to be moderate, indicating its limited application compared to visitors' results

regarding its role in improving the quality of corridors. The results also showed the importance of aesthetic lighting in enhancing the clarity of movement, consistent with the results of Zawar's study. Elements such as architectural details and integration with art were found to have a mediocre effect, reflecting untapped potential in enhancing visual identity. At the local level, these results are consistent with the results of the study of Alhmoud et al., who confirmed that the corridors

of the University affect the perception of users and the quality of their experience. The current study highlights the importance of integrating visual and functional dimensions to improve the movement experience within the context of a realistic application.

6. Conclusion

This research was conducted to highlight the impact of the design elements of enclosed circulation corridors within the ground floor of the National University College of Technology building on user satisfaction. Based on the analysis of the data and the results obtained, the study reached the following conclusions:

1. The design elements of the circulation corridors positively impact user satisfaction on the ground floor of the National University College of Technology building. The statistical significance of the design elements' impact is as follows:
 - The results showed that the visual composition dimension of the circulation corridors had a mean score of 3.50. The visual coordination within the corridor received the highest mean score (3.73), while the harmony of the design elements' distribution within the corridors ranked lowest with a mean score of 3.38.
 - Color harmony received the highest rating among the dimensions with a mean score of 3.72. The wall and floor color harmony item recorded the highest mean score (3.81), reflecting the quality of the color treatment within the circulation corridors.
 - Visual and temporal rhythm had a moderate level of 3.46. The sequence of design elements enhanced the clarity of movement (3.73), but the effect of rhythm elements in reducing the feeling of monotony was moderate (3.20).

The visual and temporal rhythm was moderate (3.46). Overall, color harmony is the most powerful dimension in the movement experience, followed by visual composition and then visual and temporal rhythm within the assessment of the quality of internal movement paths.

2. There is a difference in user perception of the visual environment quality in the ground-floor circulation areas of the National University College of Technology building. The significance of these differences can be summarized as follows:
 - The results showed that after aesthetic lighting, he was highly rated in the building of the National College of Technology, with an average of 3.68. The item "lighting distribution improves visibility of movement within the corridors" received the highest average (3.88), which indicates the role of lighting in improving the clarity of movement paths. In turn, the

item "highlighting aesthetic aspects" received the lowest rating, with an average of 3.34.

- The results indicated that the architectural details were of an average level, with an average score of 3.60. The item "aesthetic value of fine details" received the highest average score (3.73), while the item "quality of architectural finishes" received an average score of 3.48.
- As for integration with art, it came at an average level (3.53), where the presence of paintings and murals enhanced the visual experience (3.64), but the level of integration of artworks with the overall composition came at an average level (3.45).

Overall, aesthetic lighting is considered the most influential dimension among the studied aesthetic dimensions, followed by architectural details, and then integration with art in assessing the quality of the visual environment for internal movement pathways.

3. Users have personal preferences regarding design factors affecting traffic flow on the ground floor of the National University College of Technology building. The significance of these preferences is as follows:
 - The results showed that the transparency and visual spaces dimension was at a moderate level within the building, with a mean score of 3.65. The visual connection between corridors and other spaces recorded the highest mean score (3.70), reflecting the role of visual connection in enhancing the sense of openness. The use of transparent materials to improve the quality of movement had a mean score of 3.61.
 - The results also showed that the visual identity dimension was at a moderate level, with a mean score of 3.63. The item "distinguishing the experience of movement through visual identity" received the highest average score (3.73), while the item "reflecting corporate identity in Corridor design" received an average score of 3.55.

In general, transparency and visual space received higher ratings than visual identity. Both dimensions contribute to improving the quality of the movement experience within the movement paths, although their effect was average.

4. The results indicate an overall positive evaluation by users of the interior movement elements, as the main entrance design received the highest average rating, which reflects its visual and functional importance in forming the overall impression of the place. In contrast, the waiting area recorded the lowest average rating, which highlights the need to pay more attention to the design treatments in this area.

This study contributes to clarifying the relationship between the design elements of internal movement corridors and the level of user satisfaction within a realistic application context, stressing the importance of integration between visual and functional dimensions in improving the movement experience within internal spaces. However, the study is limited to one applied case, which limits the generalizability of its results, and calls for future studies to be conducted in more diverse contexts to reach a more comprehensive understanding of this field. The study recommends working to improve the quality of movement paths by enhancing visual composition, rhythm, and color harmony, as these elements have a direct role in raising the level of movement clarity, reducing the feeling of monotony, and enhancing the user's overall experience inside the building.

The study also confirms the importance of strategic use of aesthetic lighting, transparency, and visual cohesion in supporting the process of spatial orientation and enhancing the sense of openness and comfort, in addition to contributing to the formation of a visual identity that reflects the institutional character and gives the spatial experience a distinctive character.

Finally, the study recommends adopting Post-Occupancy Evaluation (POE) mechanisms and conducting future studies that employ advanced analytical tools, such as spatial syntax analysis, with the aim of measuring the efficiency of motion design with a higher degree of accuracy and objectivity and linking it to user satisfaction indicators.

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