Research Article

Sarah Shakir* and Ameera Jaleel

The temporal rhythm of scenes and the safety in educational space

Abstract: The visual scene represents the scope of vision or what the eyes see (image or an appearance) and is perceived by the senses, as well as it is the place of the event and natural and physical design elements. So, the relationship between the design scenes and the user is important because it has psychological and physiological effects to achieve human needs such as the safety, which is one of the human needs. Scenes' design plays a role in stimulating a sense (safety or fear) and is reflected during the person's performance of various activities in the space. Recently, a phenomenon of insafety and fear has spread in children's schools, and many studies have recorded that this phenomenon is common in 2–5% of children and adolescents, and 4–5% of children in the primary stage suffer from anxiety disorders that prevent them from practicing their studies normally. Through a pilot study of the Iraq schools, it was found that 55% of them suffer from insafety and fear. This research is an attempt to study the relationship between the scene temporal rhythm to stimulate children's (safety and fear) feelings. To achieve the aim of this research, a descriptive and analytical methodology was adopted with two theoretical and practical axes. Finally, the results and conclusion show that there is a relationship between the temporal rhythm characteristics and the type of scene that affects the behavior patterns and diversity activities (it means that it stimulates a sense of safety for children in the educational space).

1 Introduction

The importance of the primary stage lies in the real beginning of the intellectual process development of the student's perceptions at this age, and the students acquire a variety of skills and knowledge that they learned and acquired from the previous environment. So, the student needs a good environment that instills in them a love for education and school. Recently, a phenomenon of unsafety and fear has spread in children's schools, and many studies have recorded that this phenomenon is common in 2–5% of children and adolescents. And that 4–5% of children in the primary stage suffer from anxiety disorders that prevent them from practicing their studies normally. Through a pilot study of the Iraq schools, it was found that 55% of them suffer from insafety and fear [17]. A survey conducted on a random sample of 100 women shows that 55% of their children suffer from insafety and fear in schools, and that 39% of children feel afraid when they enter the school, also, 51% of them show signs of fear in terms of screaming and crying. In an attempt to reveal the relationship of the temporal rhythm of the visual scenes that the child sees when he enters school, and this relationship is important and has psychological effects, so the design of the visual scene aims to achieve human needs such as safety and security. On the other hand, the rhythm is an important aspect of the visual scene. So, the research focuses on this feature or the relationship between the temporal rhythm in a scene designed to stimulate children's feelings (safety and/or fear). The problem was the lack of clarity in the relationship between the temporal rhythm in the visual scene and the feeling of safety in the educational space. The research hypothesized that there is a relationship between the temporal rhythm of the visual scene and the feeling of safety in the educational space, which is reflected through the diversity of activities. The goal of

* **Corresponding author: Sarah Shakir,** Architectural Department, College of Engineering, University of Babylon, International Postal PO Box: 4, Hilla, Babylon, Iraq,
e-mail: sarah.fadhel.engh284@student.uobabylon.edu.iq,
tel: +964-780-1006256, +964-781-6153361
Ameera Jaleel: Architectural Department, College of Engineering, University of Babylon, International Postal PO Box: 4, Hilla, Babylon, Iraq, e-mail: ameerajaleel@yahoo.com, tel: +964-780-1006256, +964-781-9776351

the study is to identify this relationship and give a basic intellectual basis for the design of educational settings. A descriptive and analytical methodology had been used to achieve the research goals, with two theoretical dimensions and a practical dimension as follows.

a) Excerpted the knowledge from the literature review about the research factors (independent and dependent), and define the idiomatic and procedural for these factors.

b) Extracting the indicators of the theoretical framework, and building a theoretical framework for research (major, minor, and possible values).

c) Five global samples were selected and analyzed based on the theoretical framework of the research and conclusions were drawn. Five types of visual scenes were analyzed (view, perspective, panorama, aspect, and vista scenes) for these schools. Scenes were classified (A1–A3), (B1–B3), (C1–C3), (D1–D3), and (E1–E3) (Figure 1).

Finally, the research found that scene (view, panorama, and vista) achieved the highest safety values, so scene (panorama) achieved the highest physical safety, while scene (vista) achieved the highest psychological safety and scene (view) achieved the highest functional and social safety. Interactivity achieved in scene (panorama) is higher than the rest of the patterns and this is reflected in achieving psychological safety and safety in general in scene (panorama).

2 Scene concept

The visual scene: It was mentioned in the contemporary Arabic dictionary (place, scene and sight) and it was mentioned in Al-Ghani Dictionary: Landscape or Perspective [7]. "General scene": The place of the event; in the intermediate dictionary, it means "what the audience and the community see from the people and the shrine." In English dictionaries, the meaning of the word "scene" appears in the Oxford Dictionary as "the place of the event, life, or situation and in Al-Maweid Dictionary (Al-Maweid), it means part of a theatrical chapter, movie scene, , image, place of event, emotional explosion, or situation, and the scene may be isometric, perspective, sequential, or clip scene. The scope of vision and what the eye sees and is perceived by the senses may fall into five modes (panorama, vista, view, aspect, perspective) and that the field of vision or the visual field is all the points in the physical environment that can be seen by the stable (fixed) eyes in an instant. Al-Haidar et al., 2015) explained

that the visual scene is the scope of vision and what the eyes see in the form of an image or scene and is perceived by the senses, and it is the place of the event and includes natural and physical elements and human activities, and there are several types of scene as follows [8]:

a) Panorama: A continuous (uninterrupted) view of the entire surrounding area, meaning a picture or series of pictures that represent a continuous scene, a continuous series of pictures, a wide panorama, a complete view from every direction.

b) Vista: It is the narrow metaphor through which the scene is seen, a framed view or a distant horizon, that is, looking through a certain opening, or between the rows of buildings or between the rows of trees.

c) View: It is a view of a single image, a view, a very small scene, a preview, but it is magnified (with a large drawing scale) to clarify the small details as in the facades of the buildings accompanying the design process.

d) Aspect: Facade, appearance, view as in front or side facades, meaning a specific facade such as the water front of the two sides of a river.

e) Perspective: A three-dimensional image that provides an expanded view, a perspective image of a building or perhaps a group of buildings and it has types such as the bird's eye (view from the top) and the ant's eye (view from the ground).

Ben Cullen in his books "Townscape" and "The Concise Townscape" mentions that man builds his perceptions and memories in the environment through his vision. The aim is to manipulate physical elements to achieve visual effect and drama. And that people understand the environment through everyday movement, and this relationship is the basis of design and the environment must be designed from the point of view of the moving person. Focus on the visual effectsthrough perspective scene. Colin was interested with a sense of place, which he put theoretically through the concept of sequential scenes in space so as to achieve a sense of perfection through diversity within an agreed common visual framework. The Colin principles for creating a sense of place can be extracted from three ways to generate excitement in the urban space:

1. Optics: The sequential scene achieved through the juxtaposition and contradiction between the adjacent areas and developed the concept of sequential vision, which supposes that the viewer makes a series of discoveries through the position of the observer in the place (here *versus* there).

2. Place: The sense of place that results from the presence of scale, containment, the concept of enclosure

versus openness, creating distinct edges and boundaries, providing a network of landmarks, using topography or topography and vegetation to create drama, and providing a series of fences or sequential bands to create a sense of drama.

3. Content: As characteristics (color, scale, style, character, privacy, and uniqueness) [12].

3 The temporal rhythm

3.1 Rhythm in language

It came with the meaning of melody and singing that affects the feeling [1] it came with the meaning of music and organization between the distribution of tones [2], and (Organizing the intervals) Between the units of the artwork, between colors or sizes, or the separations between the elements of the artwork Ibrahim [3]. As for Ford's terminology of nature, meaning rotation, running, change associated with time, diversity, and numerical sequence, as in "Fibonacci numbers" [4].

3.2 Rhythm in architecture

There were many theories that deal with rhythm. A study by Al-Ani *et al.* clarified that the rhythm concept is one of the design principles that are invested in the architectural production through repetition of similar elements, and the study classified its patterns, which are simple, regular, or multi-period rhythm as well as the hidden or implicit rhythm and includes a repetition of the relationships of integrated systems, [10]. Thabet studied the concept of rhythm as it represents the temporal ratios of the artistic production as one of the main characteristics to achieve the element of beauty in various types of arts, and this characteristic is present in music as an expression of the relationship between the tones – the breaks and the basic clicks in the melody, and it includes the length of the tone and the length of the break between the tones and how to calculate the relationship of tone and rest with the click of the melody [11]. Abbas Mustafa showed that there are two types of rhythm, the first is the audible rhythm, which is the audible rhythmic pulse that constitutes the important component of the formation of the language of music and vocal arts based on the lyrical rhythm associated with poetry. The second is the visual rhythm, which is the type that concerns us in the current research. In this type of rhythm, the artist relies on a large number of elements and vocabulary that achieve harmony between them, which results in a continuous movement that forms the essence of the structural rhythm of the artwork. Visual rhythm does not take a single form with fixed or specific scales. It is the fabric between a group of components consisting of elements "line, color, material, and shape" driven by rhythm as a basis to create a kind of aesthetic relationship that enriches the artwork when it is seen. The visual rhythm is divided into linear and chromatic rhythms, as the eye sees the artwork as lines and colors [6]. Idrees studied rhythm concept associated with several variables, including addition, insertion, deletion, accumulation, repetition, antagonism, abstraction, unity and diversity, displacement, *etc.* Also, the rhythm purposes are communicative purposes (symbolic, communicative, impactful, and interactive), and functional purposes consist of several variables (a specific functional pattern, several functional patterns, and other patterns). He also defined the rhythm directionality in three basic variables, the first variable is vertical and includes gradual, repetitive, continuous, regular, and irregular, while the second variable is horizontal, including minute, wide, and sequential, finally the third variable is multi-directional including several secondary variables (on two directions, three directions, four directions, five directions, more than five directions, others, *etc.*), and defined the clarity of rhythm that included two variables, the first clarity degree (high, medium, weak, and non-existent) and the second variable is the degree of ambiguity (high, medium, weak, non-existent) [16].

Also, many theories deal with rhythm, but it was unanimously agreed that rhythm depends on repetition, restarting, and change, and this repetition does not have to be similar, as it may be:

1. A linear rhythm that comes from social practice (human activity: the monotony of actions, movements, and behavioral rhythm).
2. A periodic rhythm that arises in the cosmic nature: the days, nights, seasons, waves, and tides in the sea [5]. It is the process of repeating the elements in a way that raises the feeling of the recipient and helps him to find a sense of vitality and excitement and to understand the idea quickly and smoothly [6].

From here we conclude that rhythm is a concept that depends on the idea of repetition, change (time), and alternation, and it leaves a visual and auditory impact on the recipient and gives a sense of comfort, continuity, and speed periodically in the elements and their properties.

3.3 Define rhythm idiomatically

It is a concept that depends on the idea of repetition, change (time), and alternation, and it leaves a visual and audio impact on the recipient and gives a feeling of comfort, continuity, and speed, so any rhythmic pattern is temporal.

3.4 The procedural definition of rhythm

It is a repetition of basic variables and elements that are based on measuring the research samples and testing the results, which are rhythm purposes, rhythm strategies, clarity, and directional rhythm.

4 Safety concept

Safety in language is the opposite of fear and anxiety, and it means tranquility and stability, and safety means providing protection, reassurance, and safety for the members of the society from danger that may be realized or expected to occur, and safety from the point of view of psychologists is to meet the individual needs. In the heart, there are also a number of other definitions of safety, such as the situation in which a person is protected or away from a danger threatening him or a feeling possesses a person to be free from fear. And another definition defines safety as the individual's feeling of reassurance due to the absence of dangers that threaten his existence, or his possession of the means to confront those threats that threaten him, [9]. The importance of safety stems from the fact that safety has a great value, in which the human being is to unleash his capabilities and use the data of life to reconstruct the earth, and safety is essential for development. Intellectual creativity and practical perseverance, which represent the most important pillars of development, can only be achieved with the presence of safety and stability and safety is the goal of justice and justice is the way to safety and the absence of justice leads to the absence of safety.

4.1 Study by Al-Hajj Hassan

In "The importance and role of urban safety in reducing crime in Palestinian cities, an analytical study of the city of Nablus, two patterns were identified

i. Safety and moral safety: by feeling comfortable while using the space, providing all services and public utilities inside the space, and addressing safety and social issues that negatively affect the comfort in using the urban space.
ii. Physical safety and safety: It is to provide protection from any physical danger while using urban space by all available means [13].

4.2 Study by Salah

The impact of workplace design on employee performance (an empirical study on the administration building at the Islamic University): The thesis studied how to increase productivity and improve the performance of employees in the administrative buildings, especially in the administration building of the Islamic University, where the results of the study showed the existence of a relationship between the design of the workplace and the performance of employees, and that the design of the Islamic University administration building did not reach the level required to meet the needs of employees, and the thesis concluded with a number of recommendations urging attention to the design of administrative buildings and to bridge the gap between the development of the administration and the design to provide a comfortable and stimulating workplace to enhance the performance of employees [14].

4.3 Study by Al-Haddad

Planning and design considerations for housing projects to achieve safety and safety standards in the face of disasters (case study of war disasters, the Tal Al-hawa housing project):The message sheds light on housing projects and stands on the shortcomings in the planning and design safety and safety standards in housing projects in the governorates of Gaza in the face of disasters. The study explored the opinions of the residents of the Tal Al-hawa housing project about the efficiency of the project in achieving safety and safety standards, especially after the 2008 aggression on the Gaza Strip. The study came with a conclusion emphasizing the shortcomings of housing projects in terms of safety and safety in terms of planning and design, and recommended the need to provide them to face disasters. The research comes as a continuation of the previous study of another type of building in achieving safety [15].

So, the concept of safety in the terminology: It is the psychological motive to achieve functional, material, and social needs. And procedural definition: It is the extent of the feeling of comfort during the use of space and the presence of various patterns of behavior and social spaces.

5 Frame work

After presenting the previous literature on the topics of temporal rhythm and safety in educational spaces in general and primary schools in particular, the researchers reached the following theoretical framework.

5.1 Rhythm

The basic variables of the elements of rhythm in the visual scene are rhythm purposes including secondary variables (communicative purposes and functional purposes), rhythm strategies including secondary variables (insertion, diversity, deletion, accumulation, antonym, addition, abstraction, and unity), direction of the rhythm including secondary variables (vertical, horizontal, and multi-directional), and clarity of rhythm including secondary variables (clarity degree and degree of ambiguity).

5.2 Safety

The basic variables of the components of safety are psychological safety including secondary variables (psychological motives to fulfill a need and the level of perception of the elements of space), physical safety including secondary variables (provide protection from any physical danger, design safety, and schematic safety), functional safety including secondary variables (increase productivity and improve employee performance), and the social safety including secondary variables (places for meetings and social gatherings).

6 Case study and results

6.1 Case study

Different scenes were selected from several primary schools in the United States, China and other countries, which were agreed as schools of the highest international standards that meet human needs, including the element of safety. Five different and varied scenes were tested from different samples (appearance, panorama, perspective, view, and vista) and analyzed according to the safety indicators and temporal indicators (Figure 1). Then the local samples were tested in Iraq according to the scenes as shown in Figure 2.

6.2 Results

The researchers used the Likert measurement method, where the weights were distributed, giving 3 for the total presence of the variable, 1 for the partial presence of the variable, and 0 for the absence of the variable, then the Excel and the SPSS program were used to examine the variables and extract the results.

1. Scene (E), (B), and (D) achieved the highest safety values, scene (B) achieved the highest physical safety, while scene (D) achieved the highest psychological safety and scene (E) achieved the highest functional and social safety. Interactivity achieved in scene (B) is higher than the rest of the patterns and this is reflected in achieving psychological safety and safety in general in scene (B), as shown in Figure 3 and Table 1.
2. Through analyzing the Pearson correlation and linear regression, the results show that there are weak correlations with statistical significance between safety in the educational space and the characteristics of rhythm in general, while there is a statistically significant correlation between social safety and rhythm strategies, functional safety, clarity of rhythm, psychological safety, and the purposes of functional rhythm, but in general, most of the Pearson coefficient correlations were more than (0.05%), which are not statistically significant, as shown in Figure 2.
3. The results of linear regressions showed that there are varying relationships between safety and rhythm characteristics, and safety in the educational space was associated with communicative purposes (-0.8174) and rhythm strategies (-0.176) with inverse relationships, while the directionality characteristic of rhythm achieved a weak positive relationship (0.2269), and the rest of the characteristics were characterized by very weak relationships, as shown in Figure 3.
4. The linear regressions of the characteristic of clarity of rhythm are weak with safety and its patterns in general, which indicates that it is an ineffective characteristic.
5. The linear regressions of the characteristic of functional rhythm objectives are weak in most of their
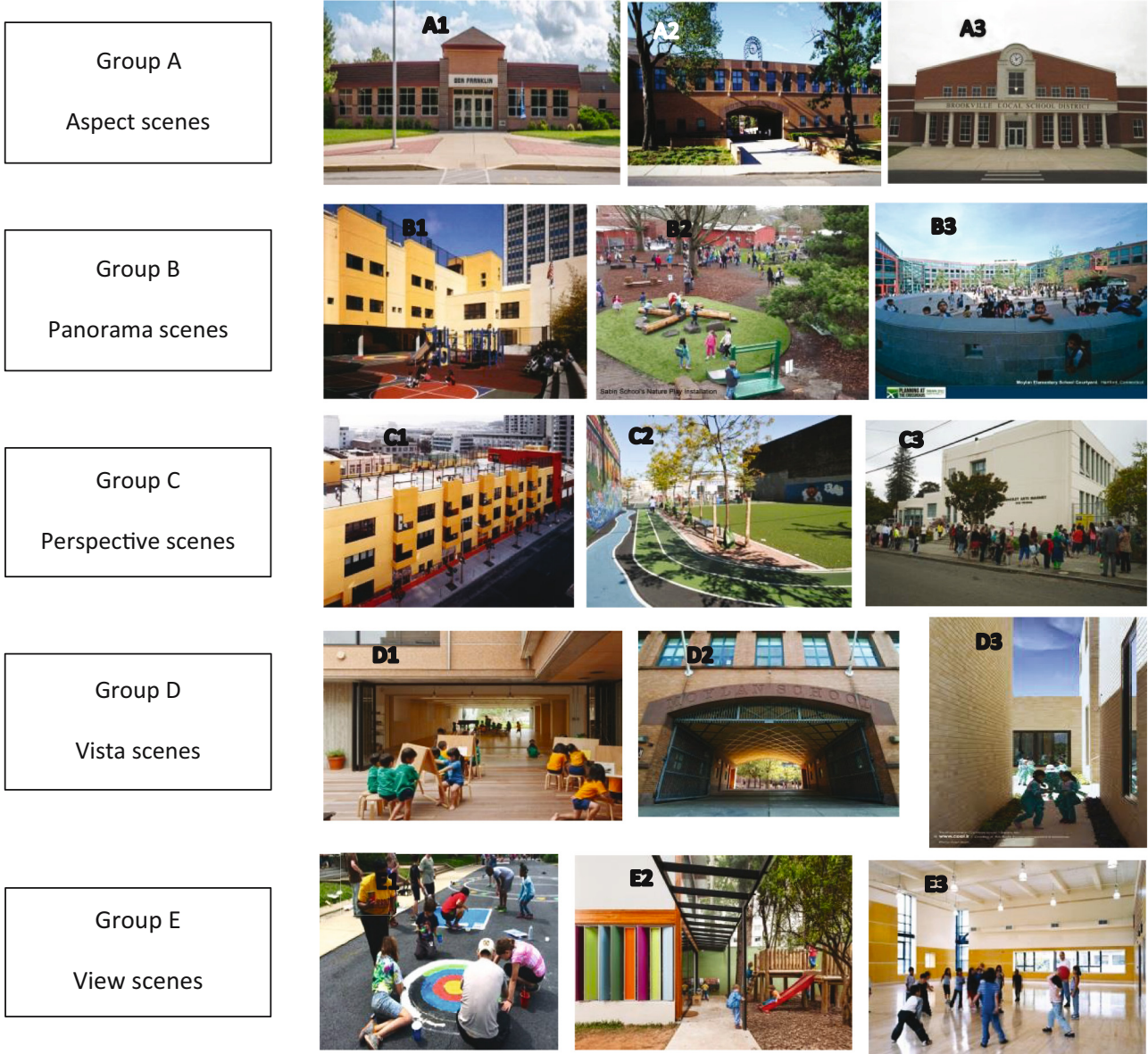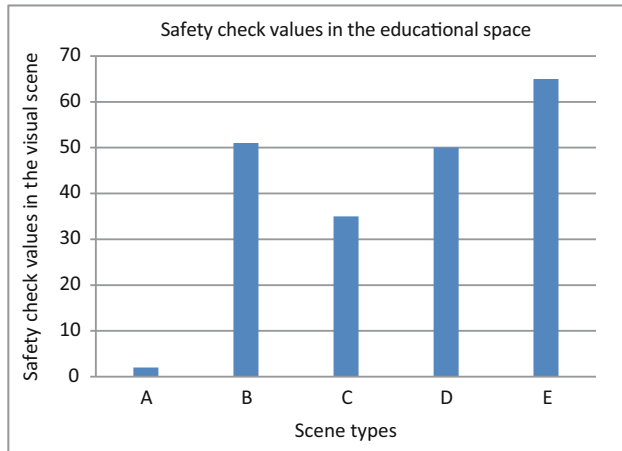
| Group A
Aspect scenes | | |

Figure 1: Scenes from global schools.

Figure 2: Scenes from local schools.

Table 1: The results of checking independent and dependent search variables

Safety check values in the educational space	Social safety check values	Functional safety check values	Physical safety check values	Psychological safety check values	Other styles	Several functional styles	Specific functional style	Values that fulfill the main functional rhythm purposes	Symbolic	Interactive	Ethereal	Delivery	Values that fulfill the main communicative purposes of rhythm	The scene
2	0	0	2	0	0	9	2	11	9	0	0	0	9	A
51	9	10	14	18	9	9	9	27	7	9	7	9	32	B
35	5	10	10	10	4	5	5	14	5	7	5	5	22	C
50	7	10	10	23	0	6	3	9	5	7	5	7	24	D
65	23	18	6	18	0	0	3	3	9	9	0	9	27	E

Rhythm clarity check values	Multi	Horizontal	Vertical	Repetition directionality of rhythm check values	Additio-n	Diversity	Unity	Abstractio-n	Antonym	Deletion	Accumulatio-n	Insertio-n	Rhythm strategies check values	The scene
9	9	14	27	59	3	0	3	0	0	3	0	0	9	A
9	21	12	24	78	6	9	0	6	0	9	3	0	39	B
5	13	10	24	60	3	6	3	6	0	6	0	0	27	C
5	9	11	11	40	6	1	0	7	0	3	1	0	18	D
9	3	0	4	10	2	5	0	5	0	2	2	0	16	E

Figure 3: Shows the safety check values in the five visual scene.

cases, and only a medium positive relationship with physical safety was recorded (0.4524), as shown in Figure 3.

6. The linear regressions of the characteristic of rhythm strategies were weak, negative to very weak, with safety and its patterns in contrast to a very strong negative relationship (−0.8493) with physical safety, which means that the space in which multiple strategies are used loses the child's sense of physical safety and this characteristic is very influential in safety, as shown in Figure 3.

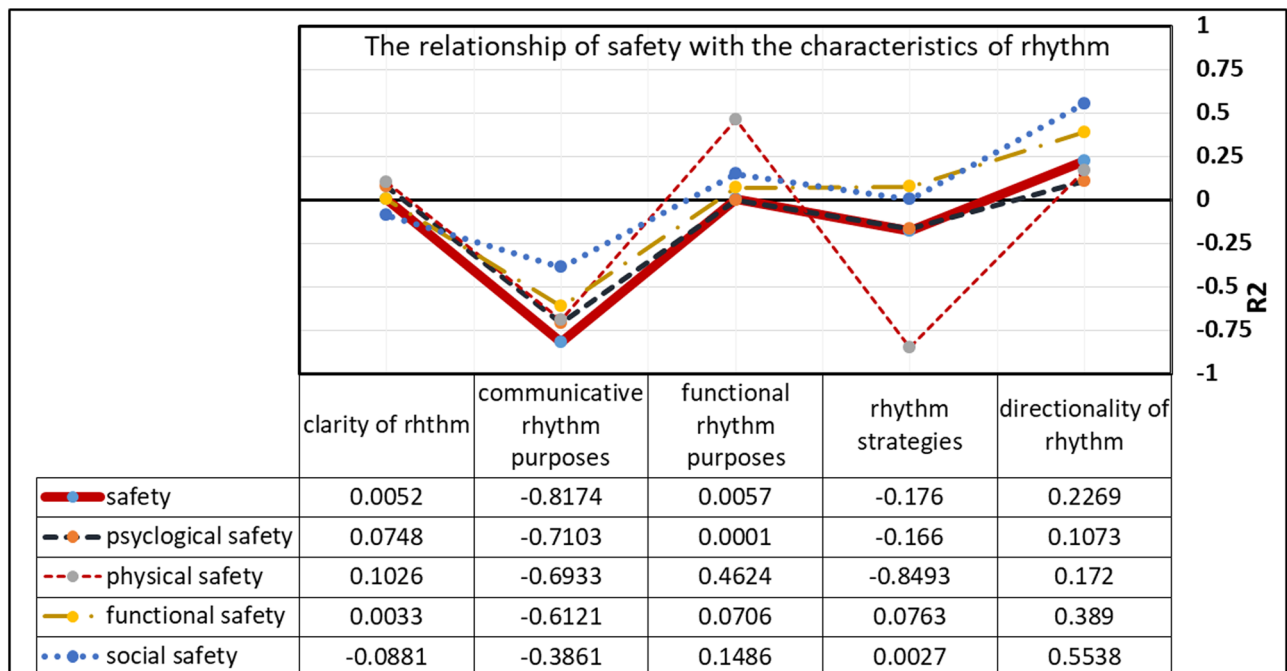7. Linear regressions for the characteristic of communicative purposes of rhythm were strong with psychological safety (−0.7103), physical (−0.6933), and occupational (−0.6121), while social safety achieved a weak inverse relationship with the same characteristic. These purposes have increased, leading to a loss of a sense of safety in general, and psychological, physical, and functional safety, as shown in Figure 3.

8. Linear regressions of the directionality characteristic of rhythm had a weak to medium positive relationship, a characteristic that had the most impact on social safety (0.5538) and functional safety (0.389), as shown in Figure 3.

9. The local research samples were analyzed and it was found that they do not contain safe scenes (view, panorama, and vista) and also contain signs and symbols and many rhythm strategies that cause fear and unsafety in the educational space, in addition to not using the functional and communicative rhythm purposes that support functional and social safety, as shown in Figures 4 and 5.

7 Conclusion and recommendations

7.1 Conclusion

1. Scenes (view, panorama, and vista) represent the best scenes that achieve safety in the educational space.

	clarity of rhthm	communicative rhythm purposes	functional rhythm purposes	rhythm strategies	directionality of rhythm
safety	0.0052	-0.8174	0.0057	-0.176	0.2269
psyclogical safety	0.0748	-0.7103	0.0001	-0.166	0.1073
physical safety	0.1026	-0.6933	0.4624	-0.8493	0.172
functional safety	0.0033	-0.6121	0.0706	0.0763	0.389
social safety	-0.0881	-0.3861	0.1486	0.0027	0.5538

Figure 4: Shows the Pearson correlation coefficient between the research variables.
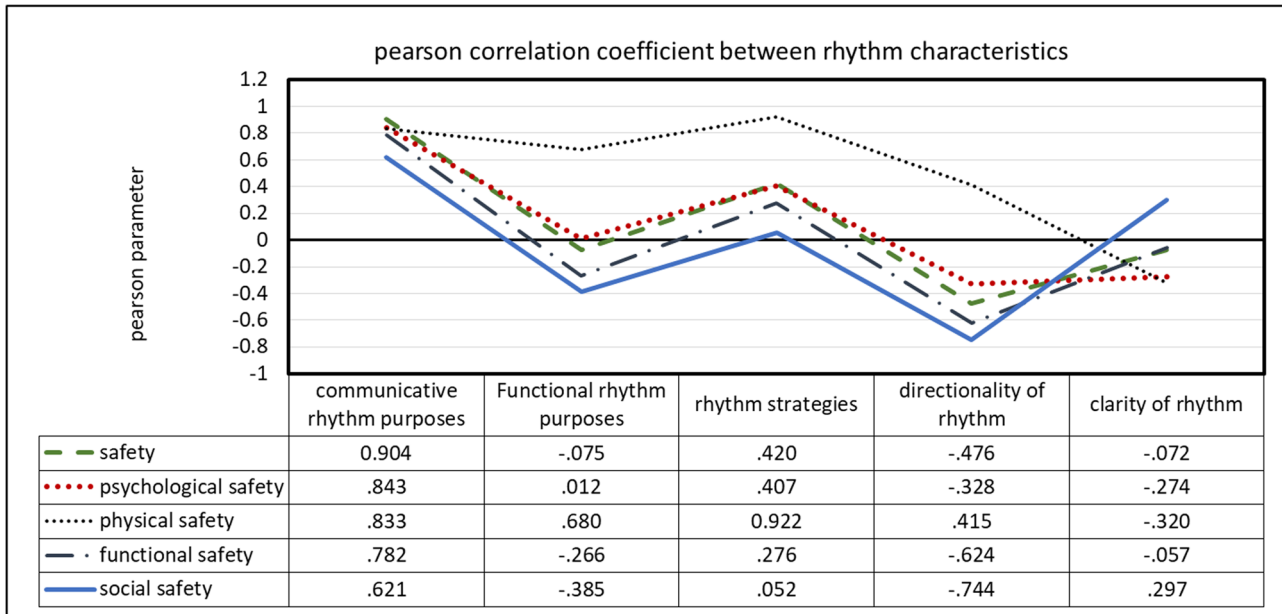
Figure 5: Shows linear regression of the relationship between safety and rhythm characteristics.

2. The safety in the educational space is lacking by increasing rhythm strategies and its communicative purposes, and by increasing the signals, physical, psychological, functional and social safety is also lost.

3. The characteristics of rhythm affect the feeling of safety in the educational space at different levels. The characteristic of clarity of rhythm is weak with safety and its patterns and is ineffective. As for the characteristic of functional rhythm purposes, it affects physical safety, while the characteristic of the directionality of rhythm is a property that has more impact on social safety and functional safety.

7.2 Recommendations

1. Investing in types of scenes (view, panorama, and (vista) as they are the most patterns that achieve safety in the educational space.

2. Reducing the signs, symbols, and rhythm strategies adopted in the design of the educational space, as they lead to a loss of a sense of safety.

3. Employing rhythm for functional purposes to support functional and social safety.

References

[1]   Manzoor B, Al-Arab L. Introduction to the magnificent, foundation for Arab history. Vol. 15, Issue 1, 3rd ed. Beirut, Lebanon: 1993. p. 200–75.

[2]   Zakaria F. Musical expression, dar Misr for printing, Faggala. 1, Egypt: Dr. T; 1956. p. 78–9.

[3]   Ibrahim AA. Foundations and design elements used in ancient Egyptian paintings. J SER. 2009;15:473–88.

[4]   Thapa R. Rhythm in architecture: An aesthetic appeal. JER. 2017;13(1):206–14.

[5]   Horton D. Book review: Henri Lefebvre, rhythmanalysis: Space, time and everyday life. Time Soc. 2005 Mar;14(1):157–9.

[6]   Abdullah M. The importance of movement and rhythm in emphasizing the nationalism of the event in animated films of an ideological nature. JER. 2014 Apr;18(2):45.

[7]   Omar AM. The dictionary of contemporary Arabic language. With a help of Al-nnas team. Beirut, Lebanon: The world of books; 2008 Jan. p. 75–6.

[8]   Abbas SS, Kawther KK. The visual image quality for the future city. JET. 2015;33(1):20–7.

[9]   Issa B, Al-Ajmi MB. Safety and development; 2012. p. 17–30.

[10]   Al-Ani TI, Al-Boutani H. The rhythm in the traditional facades of alleys in the old city of Mosul. IQ JAP. 2020;57:19–21.

[11]   Karama THS. Aesthetics. JSER. 2020 Jan 1;2020(57):39–82.

[12]   Cullen G. The concise townscape. JSER. 1977;1971:13–195.

[13]   Hassan H, Muhammad MT. The importance and role of urban safety in reducing crime in Palestinian cities [dissertation]. Gaza: An-Najah National University; 2007. p. 17–40.

[14]   Shanti ASA. Architectural design as an entrance to achieve safety and safety in administrative buildings: Administrative

buildings in Gaza City as a case study [dissertation]. Gaza: Islamic University; 2014. p. 26–7.

[15] Al-Haddad M. Planning and design considerations for housing projects to achieve safety and safety standards in facing disasters case study war disasters – Tal Al-hawa housing project [dissertation]. Gaza: Islamic University; 2012. p. 25–6.

[16] Idrees ES. Rhythm as creative system in houses architecture comparative application study between heritage and contemporary houses. J Eng. 2013;19:12.

[17] Wimmer MA. School refusal: Information for educators. Helping children at home and school III: Handouts for educators. Bethesda, MD Natl Assoc Sch Psychologists. 2010;1:1–3.