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The Impact of Architectural Containment on People with Special Needs' Adaptation

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Abstract : Architectural containment is considered Area to achieve interaction in group activities, and containment is limited to a distance of 1.20 meters of visual and auditory range , and the of distances in design for people with special needs, with the aim of creating an architectural environment that enhances collective human activity, . The research used three approaches: the first is an inductive theoretical approach to determine containment and the places that need it in educational buildings, the second is an inductive field research method based on observation using psychodrama, and the third is an analysis of a classroom with Dimensions of 4.12 m * 5 m and the share of each student in the class, and to evaluate the percentage of decrease in student density and the percentage of increase in the share of each student in the space after applying social containment. One of the most important results is that the Qatari position is the proportions in critical circumstances such as Covid-19 and for people with special needs, as this suggests a feeling of closeness and not a decrease in student density by applying the Egyptian code for people with disabilities in the direction of the smallest dimension of the room, and the density decreases by 33.33% and the student's share of the room space increases by 150% by applying the code in the direction of the largest side , and the density decreases by 50% and the student's share increases by 200% after applying architectural containment. Containment pattern .

Keywords: Architectural; Containment; Impact; Collective; Special Needs; Adaptation, Building's

1. Introduction

Hence, it has become necessary to provide rooms that integrate all categories, whether ordinary or special[12,13] and in normal and critical cases such as Covid 19, to break the psychological barrier resulting from distancing, By taking advantage of the trend towards multiple specializations and relying on the field of psychology to improve the quality and sustainability of design for the human aspect as a common language and considering the human being as a physical and psychological being To achieve this, the relationship between the body and architectural space was studied, and the places that should be contained in educational buildings were determined, human. behavior was linked to architecture, and field observation of human behavior in space and the situations it takes in the best state to interact with space were applied. The diameter position was applied to a classroom model with dimensions of 4.12*5 meters [14] and it was analyzed and the number of students and the share of each student in the space were

discussed in the percentages of decrease in the number of students and the percentages of increase in the share of each student in the space [3] and compared to the traditional design model [13,15] and the relationships between them were found, to confirm that the diameter position is optimal for all groups and critical conditions such as Covid-19 in places that require the person to interact with the space .

2. The relationship of the body to space in the state of rest and motion

A . The famous architecture Le Corbusier (1948) provided an interesting suggestion, that " the architectural shapes work physiologically and apply the golden ratio to the human body''illustrating pattern dimension in rest dimension and simple and movement positions [1] shown in Figures 1 and 2.

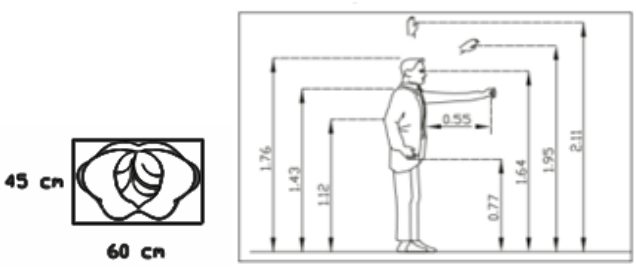
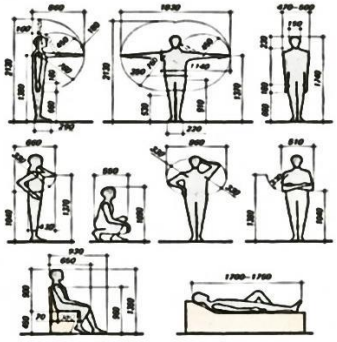


Figure 1: The golden ratio in the human body. illustrate pattern dimension in rest and simple movement positions [1] .



Fgure 2: The golden ratio in the human body illustrate pattern dimension in movement position. [1] .

B . That put a link between the space and Vitruvius' body, Then, space users were divided. Gold Smithstarted Nifret in 1981, his book, and added chair users. In 1981 the private human standards[2] shown in Figure 3.

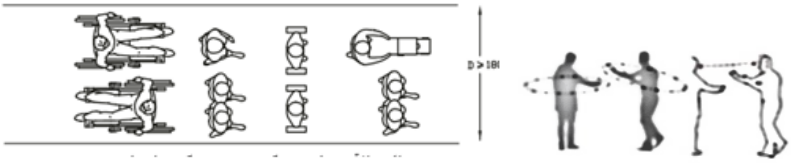


Figure3 : Changing Le Corbusier's idealized model and Linking between space and the human [2]body.

C . The sensory characteristics in our environment, for example indicators of the sensory integration of the [2]environment and the relative impact of surrounding signals on the perception of emotions and behavior[11] shown in Figure 4.

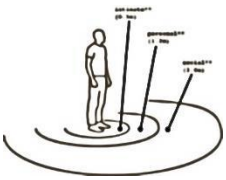


Figure 4 diagram showing the integration of the senses, neural synchrony and human circuits. [2]

D . The U.S Centers for disease control and Prevention (CDC) issued guidelines to reduce contact through social distancing to limit the spread of COVID-19, in addition to wearing masks as one of the best prevention strategies shown in Figure 5.

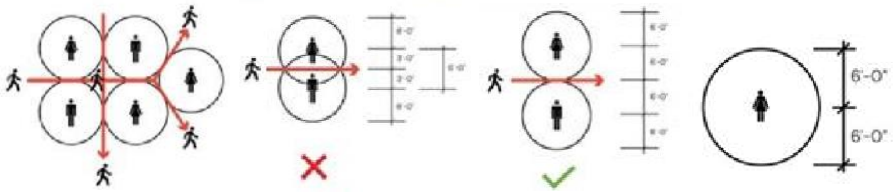


Figure 5: illustrates social distance among people as COVID-19's impact on space. [16]

Architectural containment is considered an Area to achieve interaction in group activities, and containment is limited to a distance of 1.20 meters of visual and auditory range.

3. Elements of architectural containment in educational buildings

3-1 . Schools' courtyards

The shape of the courtyards and playgrounds of the site affects the flexibility of the distribution of the blocks and buildings and their relationship with each other on the one hand and with the open spaces and areas on the other hand. [12] It also affects the flexibility of the future extension. This functional flexibility of the site requires that it be dealt with at a high level shown in Figure 6 .

Ignoring the visual and aesthetic aspects in dealing with both the site and the building, negatively affects students educationally and behaviorally . [16]

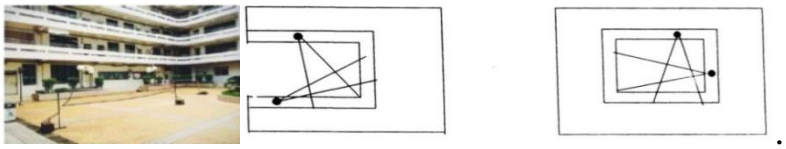


Figure 6: the building on internal courtyard or 'U' shape to illustrate it's containment .[17]

3-2. Playgrounds

Small or medium playground with running tracks to people with visual disabilities. [18]

Provide many playgrounds and open areas to people with hearing disabilities to release pent-up[19]energies and utilize it and avoid violence, and provide open areas theaters to movement disabilities shown in Figure 7.

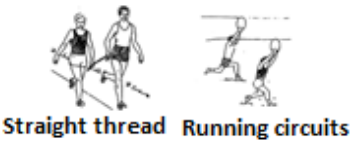


Figure 7 : people with visual disabilities' playground to illustrate it's containment. [20]

3-3 . Plants elements

Stressing those plants such as trees, shrubs, green spaces, ornamental plants, etc. are important elements in designing and coordinating the external environment of the site and are no longer just decoration, but play important roles in creating an environmentally friendly space, in addition to their participation with .

Trees with fragrant flowers are planted in the direction from which the wind blows, so the fragrance of flowers and the rustle of trees help create a beautiful rural atmosphere .

Selecting suitable plants to enhance accessibility and comfort for People with special needs[21] is shown in Figures 8,9.

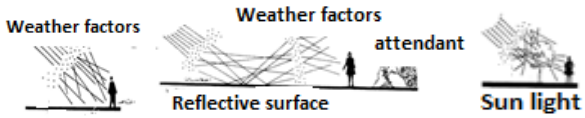
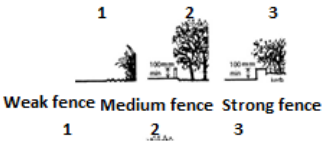


Figure 8 separates the green area from the walkway[22]



. Figure 9: plant's role in reducing the direct and in direct role [23]

3-4 . Windows shown in

The windowsill must allow for visibility outside the building, especially for wheelchair users. The height of the sill should not exceed 60 shown in the figure meters in the case of upper floors, so that it is easy for people with special needs to look down. Fall protection should be placed at a height of 85 meters from the floor. It is preferable for the window controls to be at a height that is easy for wheelchair users to reach, not exceeding 1.35 meters. Modern technology can be used to control the remote opening of windows that are difficult for wheelchair users to reach. The location of the window must be chosen well so that it is easy to reach to open and close it, and the curtains should depend on ro pes to open[23] shown in Figure 10 .

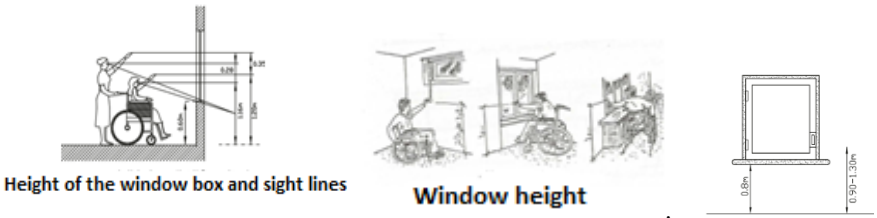


Figure 10: illustrate windows' relation with outside space[24]

3-5 . The classroom is shown in

Classrooms must have furniture arranged in a way that allows wheelchairs to pass easily, and there must be special signs for people with special needs[9] shown in Figure 11 .

Figure 11: illustrate the class furnishings' distribution. [9]

4 . The body's reaction is to prepare for containment

4-1. -Neuromuscular coordination

Coordination of the muscle with its counterpart in an inverse relationship in contraction and relaxation, and neural resistance of the body of perform one or more tasks in a direct mental relationship [25] shown in the Figure 12

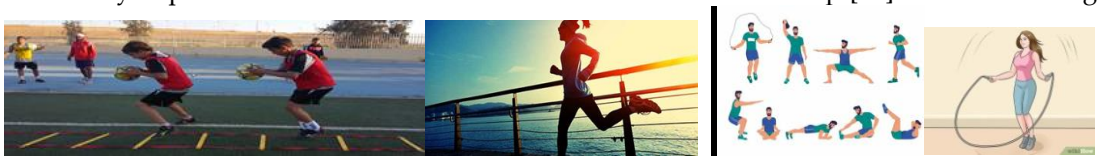


Figure12 showing neuromuscular coordination[25,26]

4-2. The ear's directional property

The ear's directional property: to determine sound direction in the limit of 15[27,28] degrees with the sensitivity of the ear in the range between 1000 to 5000 Hz and a time difference between successive sounds of 30 milliseconds, otherwise the second sound is perceived as a separate sound from the original one, which is known as 'Hass' impact. shown in Figure 13.

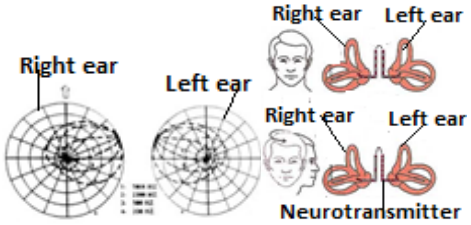


Figure13 showing the direction of the ear[29]

4-3. The eye level and visual angel

A . Eye level and visual angle in general. shown in the Figure 14.

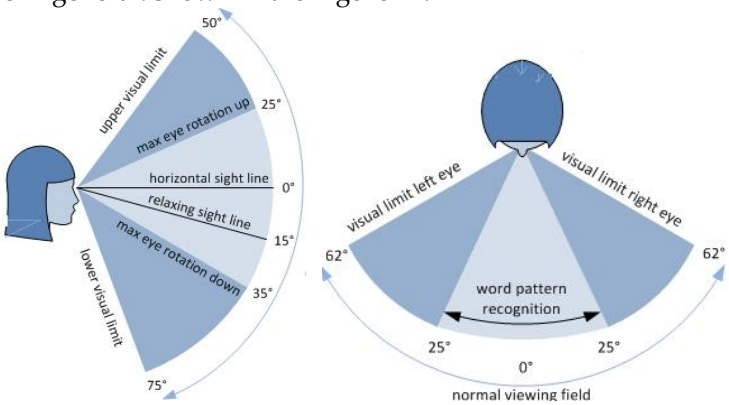


Figure 14: illustrate horizontal eye level to affirm it's diagonal and axial . [30]

B . Visual tunnel: the relationship between speed and visual angel is an inverse relationship shown in the Figure 15.

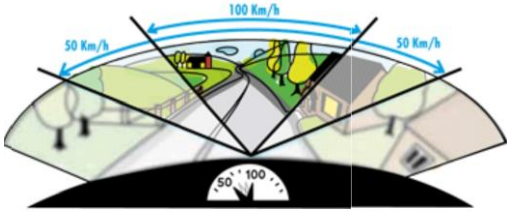


Figure 15 The visual tunnel to illustrate it's relation with speed. [30]

4-4.Head rotation angels

Vertical and Horizontal head rotation angels shown in the Figure 16.

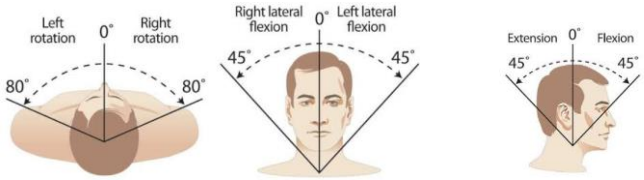


Figure 16: Head rotation angels to affirm it's relative containment. [30]

5. The body in space in the field.

Random samples of people with cognitive needs (cognitive impairment or autism) were selected because they are affected by their environment and their intelligence levels are similar. The psychodrama method was used as a method based on exploration influenced by performance through the surrounding and social environment, as the target group is people with special needs. They were placed in a familiar environment to establish the usual behavior for performing tasks, and to provide the opportunity to observe acquired behavior based on the environment, and the effect of the availability of containment and its effect on the performance of the individual and the group. Through performing three warm-up activities, an acting activity, and a singing activity.

A . Warm-up performance shown in the Table (1) .

Sorting containment	Neuromuscular synchronization –ear direction characteristics	Head position	Eye level	
Before test performance	Ear direction towards the trainer to get instructions.	Axial at the direction of receivers of red team.	Axial at the eye level of the red team.	
During test performance	Neuromuscular synchronization when listening to the trainer with music.	Diagonal in the trainer direction.	Diagonal in the trainer direction.	
After finishing		Axial and below the line of sight to the ground.	Assume the axial position.	
Notes on test performance	The impact of flexibility between adopting an axial position while receiving instructions, with the ear directed towards the coach, and neuromuscular coordination in adopting a diagonal position, had a significant impact on participants' acceptance and their engagement with the trainer during the exercise.			

Table 1 Warm-up performance . (researcher's work)

B . Performing a theatrical scene about inquiring about a difficult math problem shown in the Table (2) .

Sorting containment	Neuromuscular synchronization – ear direction characteristics	Head position	Eye level	
Before test performance. The first stage: is instructions directed to the person.	Ear direction towards the trainer.	Assume a forward-axial position.	Axial in the forward line of sight.	
Second stage: instructions directed to group.	Neuromuscular coordination is influenced by containment to assume a diagonal position.	The diagonal between the trainer and receivers.	The diagonal between the trainer and receivers.	
During test performance		Diagonal among receivers.	Diagonal among receivers.	
After finishing	Neuromuscular coordination transitioning to privacy and assuming an axial position.	Assume a forward-axial position.	Axial in the forward line of sight.	
Notes on test performance	Before performing in the first stage, assume an axial position to receive instructions, with the ear and gaze directed towards the trainer. Then, achieve neuromuscular coordination influenced by containment to adopt a diagonal position. After completion, align neuromuscular coordination, transition to privacy, and direct the gaze downward.			

Table 2 Performing a theatrical scene about inquiring about a difficult math problem . (researcher's work)

C . As a solo or a group of singing performance shown in the Table (3).

Sorting containment	Neuromuscular synchronization – ear direction characteristics	Head position	Eye level	
Before test performance		Axial towards the audience	Axial towards the audience	
Perform with the group	The characteristic of directing the ear tow ard the instruction	Diagonal towards the receivers	Diagonal towards the receivers.	

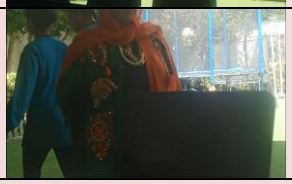
During test performance Solo performance		diagonal towards the audience.	Still diagonal towards the audience.	
Performance with the group	Neuromuscular coordination in assuming a diagonal position.	Diagonal towards the receivers.	Diagonal towards the receivers.	
After finishing solo		Axial towards the trainer.	Axial in the trainer's eye level.	
performance, the group performance.		Axial towards the audience.	Axial towards the audience.	
The trainers intervened in solo and group performance test	Continues to be influenced by the audience by positioning the head in the axial position and the eyes in the diagonal position before and during singing until the trainer intervenes to end the musical segment and the recipient returns to the axial position.			
	Being influenced by the group by positioning the head and eyes in a diagonal position towards them, and after the segment ends, maintaining the same position but towards the audience.			

Table 3 As a solo or a group singing performance . (researcher's work)

It is clear from the previous activity tables that the individual and group's national situation is affected when they are in a state of interaction and has an impact on the efficiency of activity performance.

6 . The impact of the application of containment on classrooms.

Analysis of a classroom [20] with dimensions of 4.12 m x 5 m=20.60 m2m=20.60 m^2. shown in Figure 17 .

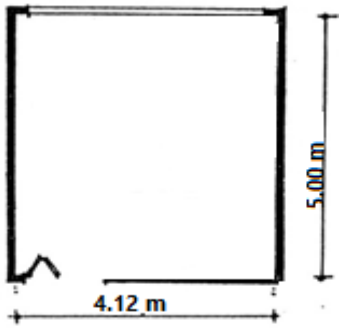


Figure 17 Analysis of a classroom with dimensions of 4.12 m x 5 m . [20]

As a model to determine the extent of the effect of the circular position on the arrangement of furniture in the classroom. The application was applied to three cases: the first case was arranging the furniture in the axial position in the direction of the smaller classroom, the second was arranging the furniture in the axial position in the

direction of the larger classroom, and the third was arranging the furniture in the circular position in the direction of the larger classroom shown in Figure 18.

the first case Classroom1 the second case Classroom 2 the third case Classroom 3 .

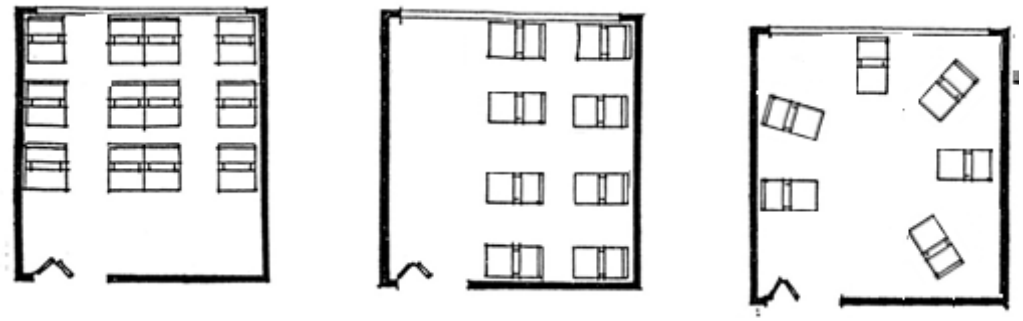


Figure18 18shows the three cases of analysis (researcher's work).

7 . Results

A . The number of students in the three cases is shown in Table (4) and Figure19 .

Classroom	Classroom1	Classroom2	Classroom3
Number of students	12	8	6

Table 4 shows the number of students in each case . (researcher's work).

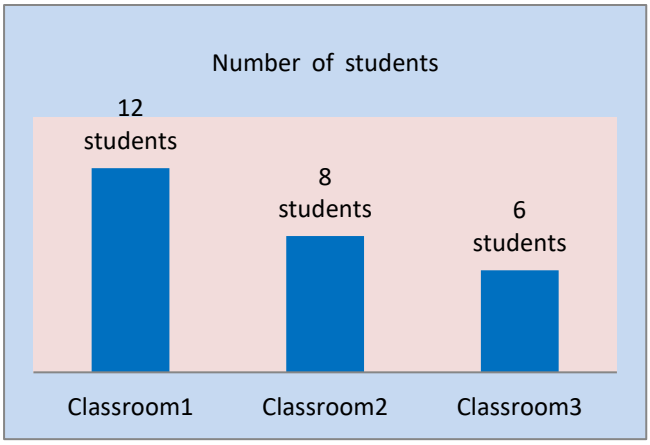


Figure 19 shows the number of students in each case . (researcher's work).

B . The share of each student in the area in square meters is shown in Table (5) and Figure 20 and Total area 20.60 / number of students= .

Classroom	Classroom1	Classroom2	Classroom3
Each student's share of the room m2	1.71	2.57	3.43

Table 5 : showing the share of each student in the area in square meters . (researcher's work).

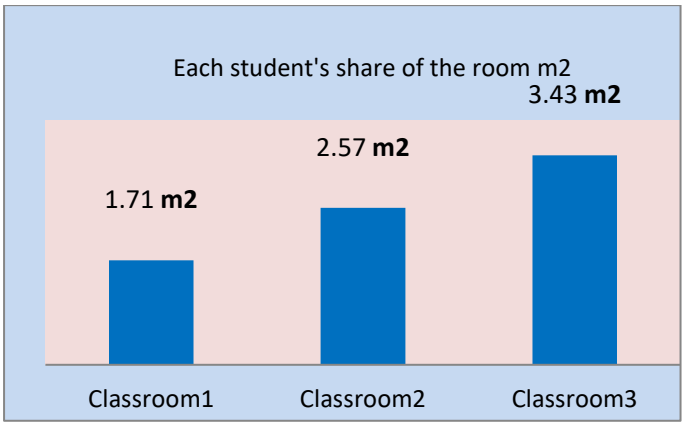


Figure 20 shows the share of each student in the area in square meters . (researcher's work).

C . The percentage of decrease in student density in the classroom in the three cases. shown in the Table (6) and Figure21.
= 100- (Student density in the classroom/ideal density in the classroom 12 students×100) .

Classroom	Classroom1	Classroom2	Classroom3
Student density decrease	0%	33.33%	50%

Table 6: showing the percentage of reduction in student density in the classroom in the three cases . (researcher's work).

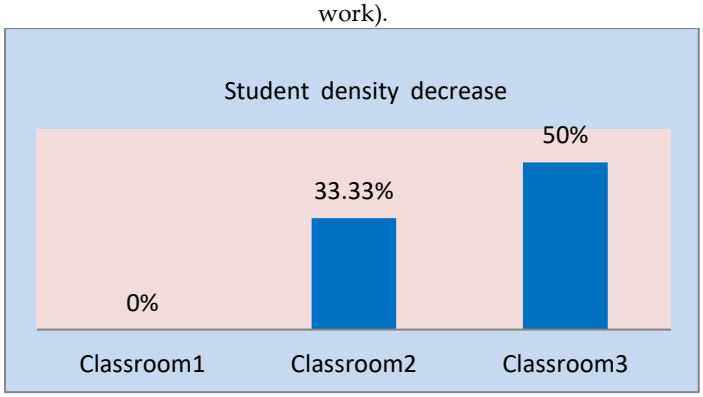


Figure21 shows the percentage decrease in student density in the classroom in the three cases . (researcher's work).

D . The percentage increase in space per student per classroom is shown in Table (7) and Figure 22.
= Student share in the classroom in the ideal case 12 percentage students/percentage increase in student share in the classroom in the target case×100 .

Classroom	Classroom1	Classroom2	Classroom3
Percentage increase in the area per student	0%	150%	200%

Table 7 : showing the percentage increase in area for each student . (researcher's work).

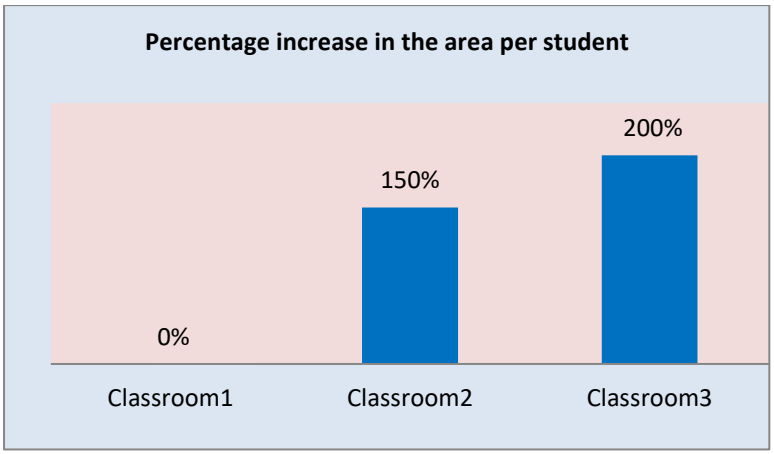


Figure 22 the percentage increase in area for each student in . (researcher's work).

8. Discuss the results

A . The student density decreases by [3] 33.33% in the case of distributing the furniture in the axial position in the smallest dimension of the classroom, and by 50% after applying the architectural containment in the circular position.

B. The students' share of the space is 150% in the case of distributing the furniture in the axial position in the smallest dimension of the classroom, and by 200% after applying the architectural containment in the circular position.

C . The compatibility of the application of architectural containment in the classroom for people with special needs. [13] The Egyptian Code for People with Special Needs 2015 and the design by applying social distancing in critical circumstances such as COVID-19. [11].

D. Quadrantizing the design of classrooms to prepare the circular situation for architectural containment.

9. Conclusion

A . The quality of integration of all categories of students, whether regular or with special needs, is achieved by relying on the circular distribution in the shape of the letter U for classroom furniture.

B . Architectural containment in the design of educational buildings is suitable for all categories of students with special needs and normal students and in critical situations such as Covid-19 to feel closeness between students and break the psychological barrier .

10.Recommendation

A . Holding conferences and seminars to raise awareness of the integration of people with special needs in all sciences in general.

B . The necessity of conducting specialized physiological and psychological studies and linking them to architectural rooms according to the use of the room.

C . Maximizing the role of using modern technology in building materials to provide a high-quality building suitable for people with special needs.

D . Applying architectural containment to make the space more flexible for the user in critical circumstances such as Covid-19 to integrate people with special needs into buildings.

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