

## THE IMPACT OF THE ARCHITECTURE INTERIOR DESIGN OF STUDENTS' SPACE ON THE SUSTAINABILITY OF SPACE

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### ABSTRACT

*The interior space in the educational building has a role in the sustainability of using that building, which students are the main users of that space. Unfortunately, this space is the results of designing the building. However, designers should give more effort to design these spaces according to users and function needs. The architecture and interior design linked the users' needs to space. The study focuses on the interior space of architectural engineering departments, university of Mosul as a case study. The research question of the current study is "what are the sustainable factors that can make the interior space liveable in the educational spaces". Therefore, the study approach is quantitative, using survey and VGA image analysis. The sampling follows the random method for those students that used the space. The results show that factors are related to the environment and design systems. The area and volume are not important to the students. However, the interior design elements and movement system show the high impact on users' behaviour. The architectural space should respond to the needs of the function and users to create a liveable space within educational space.*

Key words: Interior space, liveable space, VGA analysis, educational buildings.

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### INTRODUCTION

Creating liveable space is a critical process, which most designers tried to reach the needs of the function in the education buildings more than focusing on the users' needs in the interior space. However, the space in education buildings is the only interior space that users (students) can communicate and socialize. Therefore, these spaces should be designed or re-arranged to achieve the users' need (physical, psychological, and emotional). The problem of negative space in the education building has a role in the academic and social process of the students. Belonging to place and attraction are the main aspects that users search for it. The problem of the current paper observed in most of the education buildings in the University of Mosul, especially, after the last war in 2017, where most of the buildings adapted re-used. The emergent needs for buildings are the main factor for the adaptation processes and to include social sustainability.

Therefore, the problem statement of the current paper is, "The absence of the interior design methodology in the adaptive reuse of the educational buildings of University of Mosul". In order to solve this problem, the aim of the study is; "to determine the factors that impact the livability of educational space". However, the study questions are; "What are the factors and aspects that enhance the value of the space in the educational buildings" and "what are the users' needs in the educational building to feel belonging and attractive to space". A sample of the case study was selected from engineering college, which is (Architectural Engineering Department) as a vital space for various activities during the academic year. To reach the aim of the study, literature will be reviewed to identify the aspects and factors that can be measured in the fieldwork session.

### LITERATURE REVIEW

Previous studies in the current paper focus on the field of education interior space and human needs in these spaces. Caan (2011) highlighted that interior space should respond to the human needs for safety, peace, and balance. The interior space can be understood by the users through the sense tools, therefore, physical, psychological, and emotional needs are important in designing interior (Caan, 2011). Tanner & Langford (2003) mentioned that the environment in education space has a role in the outcomes of students, which physical environment can enhance the educational space through the interior elements, such as, floor, wall, lighting, colour, flexibility, patterns, clearness, and layout. However, the researcher asked the users about the principles needed in the space (Tanner & Langford, 2003). Tanner & Langford (2003) shows that 95.8% of students mentioned that interior design of the educational space very important for good learning environments (Tanner & Langford, 2003).

Fan (2016) linked the physical space with the psychological needs of the users, where designers should respond to the various factors related to health, dynamic, environment, management, and the human body. Users are the main object using the interior space, which “Humanized design is the unity of human and design, which emphasizes not only the functions, forms and significance of space but takes people in the indoor environment as the only criterion to decide, create and judge a space” (Fan, 2016, p. 1126). Mahmoud (2017) and Kaup, Kim, & Dudek (2013) mentioned the comfort human zone in the interior space could be affected by the culture, social, physical environment, and psychological factors. The flexibility of the furniture has a role in the interior space value. The researcher explained the relationship between architecture and interior design, which both should consider the human needs in the design process (Mahmoud, 2017). However, architecture circulation and interior architecture movement and accessibility is a continuous process that we exercise in requirements. The design of these processes needs wide scopes. All routes of both horizontal circulation elements and vertical circulation elements within any space or building should be as free as possible of obstacles and they should be easy to distinguish. Moreover, the aesthetic aspect had mentioned as a necessary aspect in the comfortable interior space (Mahmoud, 2017; Sorrento, 2012).

The successful design for achieving welfare and happiness of interior architecture depends on how the designer finds a balance between the most dominant factors such as identity, privacy, safety, accessibility, functionality, flexibility, community interaction, and the provision of adequate space, should be given due weight (Mahmoud, 2017; Perolini, 2011; Smith, Metcalfe, & Lommerse, 2012). Human skin is the interface between the body and world, it is sensuous to touch and constantly gives us information about our surroundings. In design history, the concept of ‘skin’ has been used as a site for rich metaphors referring to the clothing that wraps around the body or the building walls that enclose and protect our body. In fact, ‘second skin’ is often used as a metaphor for clothing or fashion while ‘third skin’ is often used as a metaphor for architectural cladding and surface interiority (Wu, 2016). Therefore, space should reflect and match to the nature of the users. Another study focuses on the related between outdoor and interior space, which is part of green architecture, especially in office and education buildings. The elements of interior space can be in the skin of green as a continue of outdoor space as shown in figure (1) (Wong, 2013).

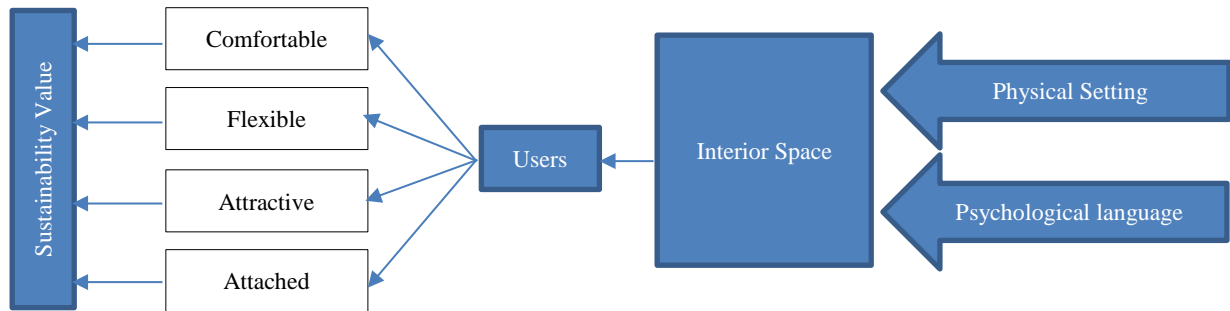
Figure 1: The outdoor areas is continued into the interior space. (Wong, 2013, p. 69)



Silverstein & Lorinda (1993) argues for imaginative reasoning in the formulation of interior design value claims and in the conduct of interior design research. The designers have a role to translate the ideas and concepts suggested by the users to create interior space, which can represent the concept of “a place like home”. An analysis of several specific characteristics of interior design suggests that people in the field are in a good position to use imaginative reasoning to contribute to the lives of people in a diverse society (Soja, 1996; Silverstein & Lorinda, 1993).

In summary, the previous studies mentioned two types of aspects; the first aspect is “physical environments setting”, which included the design principles, relationships, and elements. The second aspects are “psychological language” of the space, which most of the study explained the relationship between users’ needs and interior space of the educational building. Moreover, the concepts of green space, sustainability, attraction, belong to a place, and social space are explained as a result of the contribution of the interior design setting to the users’ needs. Figure (2) illustrated the framework that concluded from the previous studies, which show the plan of the current study to collect, analyse, and reach the aim of the study.

Figure 2: The Conceptual framework of the current study. By Researchers Adopted from (Fan, 2016; Caan, 2011; Sorrento, 2012; Wong, 2013; Wu, 2016; Mahmoud, 2017)



## METHODOLOGY

The quantitative approach applied in the current study to collect the data and reach the aim of the study. Two methods applied to collect the data from the users and physical space in the case study. Firstly, a questionnaire sheet (see Appendix-1) designed to ask the users about three main themes (physical setting satisfaction; users' needs, and social activities) in the interior space. Each theme has a set of the question using structured close end type. Two categories, scale format (Likert Question) and Bipolar Question types used in the design of the structured questionnaire. These types are used usually in the qualitative studies (Srivastava & Thomson, 2009). The sample population is the undergraduate student in the Architectural Engineering Department – University of Mosul. The sampling size is 176 sample, which represents the maximum sample that used the interior space. Secondly, visual graphic analysis of the interior space of the case study (VGA), which prepared using Computer Aided Drawing software and DepthmapX. The layout of the ground floor case study (Architectural Engineering Department- UoM) was made as a first step of analyzing the case study. The data will be analysed statically and present the results by the percentage rate.

## CASE STUDY

The case study selected from the Engineering College in University of Mosul, which is the Architectural Engineering Department. The building selected due to the various adaptive re-used and rehabilitation. The building originally used as Electrical Engineering Department, then library, after that, renovated and used as Architectural Engineering department. The building needs to renovated and modified due to the different function. However, the architectural department also modified three times to respond to the architectural activities needs. The last renovating process is done after 2017, after the war (Figure 3), where the building used to host various activities. Therefore, the interior space, especially the ground floor prepared to host these activities from overall the university.

Figure 3: The Student Space (Lobby) of the Architectural Engineering Department after the war.

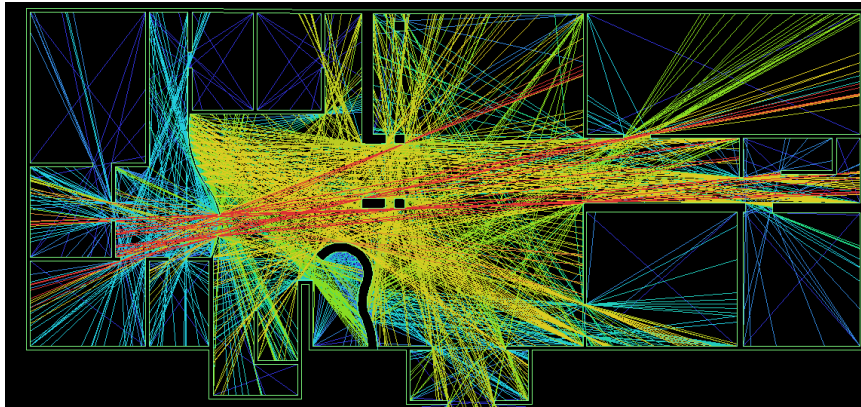


The researchers tries to find out the suitable and comfortable interior space that can host various activities and work as students' space. The students need to find a space where can socialise and communicate freely.

### VGA ANALYSIS OF THE CASE STUDY

Visibility graph analysis investigates the characteristics of vertical plans in term of space and relationships, which can be applied to two levels, eye level for what people can see, and knee level for how people can move which is critical to understand spatial layouts (Turner, Doxa, O’Sullivan, & Penn, 2001). Therefore, the method used to analysis the case of the current study to find out the connectivity, steps, and core area. Figure (4) show the steps long paths with connectivity in the ground floor of Architectural Engineering Department –UoM using Depthmapx. The yellow lines in the students’ area show strong connectivity in the space. However, the red lines interacted with the students’ area, which is the path from administration office.

Figure 4: Steps and connectivity



The core zone of the activity, visibility, and movement in the student space only illustrated in figure (5). The red zone is the most active, visible, and used in the student space in the ground floor of the case study. The orange, yellow, and yellow-green colour show the second active zone, which represent the 75% from the area of student.

Figure 5: The core area value of the students’ space.

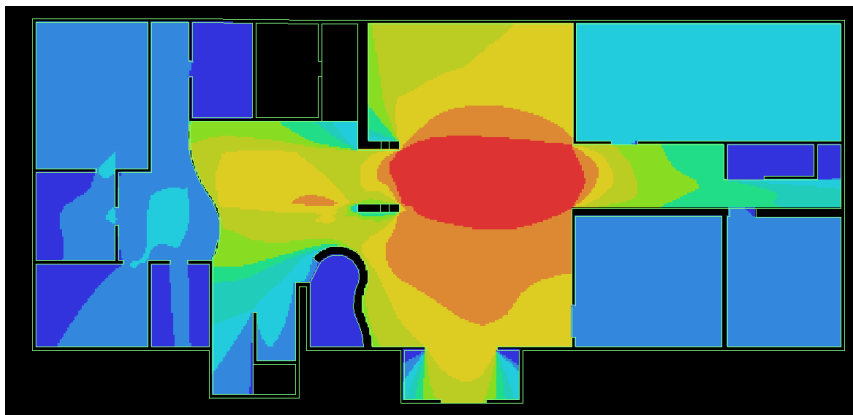
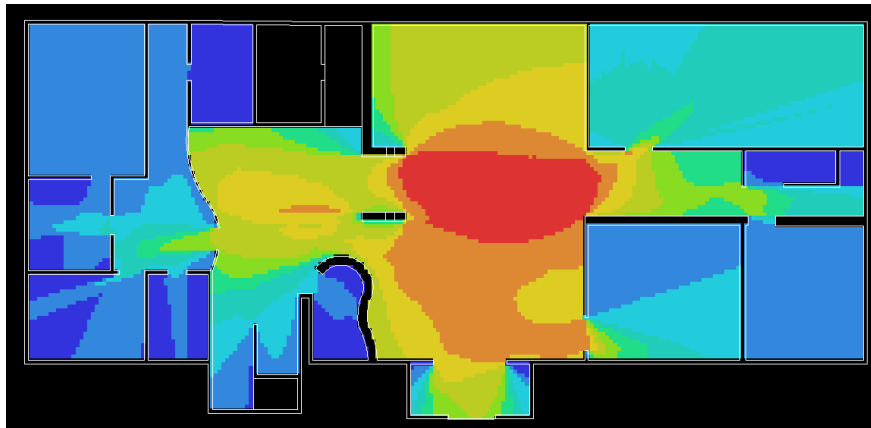


Figure 6: the core areas of the ground floor of activity and visual steps.



## RESULTS AND DISCUSSION

The result shows that the majority of the student is satisfied with the interior space of the lobby in the architectural department in overall scale. The students select (green and decorative elements as the main needs that the students' space need to improve in term of quality and quantity. In the second level of needs, trash bin and furniture were selected to complete the needs of space. About 35% of students select the green elements as important elements that needed in the interior space. 16.7% of students select furniture as a second important element after green elements. In addition, 16.8% of students answered decorative elements as an important element for improving interior space.

The answered of the students about the quality of interior space of the architectural engineering department are 3 from 5, which exactly 60.4% of students selected the value (3). The evaluation of students matched with the satisfaction value that selected in the first question of the questionnaire, which give validation to the data. The thermal confection, ventilation, and sound treatments are the most environmental treatment that students select it to create a comfortable interior space. The results shows the interior space in the architectural engineering department –UoM need to improve, which the space is not enough to the various activities in the department. The space used usually for social activities form overall university.

The VGA image show that the core area of the students' zone located in the space that no furniture, which is usually used by students as groups of students. The quality of elements in the space lead to leave the students the space and lose the factor of belonging and attach to the space. The value of flexibility is limited which nearly to 10%, which reflect the liveability factor in low value, which affect the sustainability of the space in term of social activities. The value of sustainability in the space affected by the quality and quantity of the interior elements that linked to the green and environments. Moreover, the sustainability value influenced by the psychological factors like belonging to a place, attached to the place, and place like home.

## CONCLUSION

The quality of students' space in the educational building has a role in the suitability of social and educational activities, which students need a comfortable and free area to communicate and socialise. The results conclude the physical and psychological needs of the students, which should respond to these needs. Each school, department, or centre included different users and student which may have various needs in creating the area for them. Therefore, the designers should make an analytical study of the students' needs to build the space according to the students and function. Social sustainability is highly recommended in the education building to attach and attract the students to stay in near the study area, which can increase the quality and performance of students. The interior space in the educational building needs a variety of green elements, flexible and comfortable furniture to sustain the activity in the interior space.

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**APPENDIX 1**

The Questionnaire sheet

Sheet No:	Gender:	F	M	Stage:	1	2	3	4	5	
Affiliation:	Name:				Email:					
Q1	Which place you prefer to use in the rest time		Lobby	Entrance	library	Administration	classes			
Q2	What is your evaluation to the lobby and entrance area in term of (comfortability)		not good				excellent			
Q3	Which elements of interior design should be used more in the students' space	Electrical machines	Decorative elements	Trash bin	screen	paints	furniture	Green elements		
Q4	Can you select one of the elements as an important one for you	Electrical machines	Decorative elements	Trash bin	Screen	paints	furniture	Green elements		
Q5	From your view how much from 1 to 5 can you give to the green treatments in the buildings		One				Five			
Q6	Do you think the students' area is responding to the student needs		No				Yes			
Q7	What is your evaluation of the area of the students' area		Not Enough				Enough			
Q8	Which items of the following need to improve in the area	Ventilation	Natural lighting	Lighting	Sound treatments	Thermal Convection				