# Architecture Students' Adaptation of Their Home Space During Online Learning

Salma Ghanem [1], Alia Okasha[2]

Abstract— Adjusting space, redefining architecture, and transforming space elements have gained increased attention in architectural practice and research lately, due to the widespread of online and remote learning. These issues are hardly being discussed from the students' perspective, although involving them in the current situation may positively affect both the learning and early practicing outcomes. This paper presents junior architectural students' reflections on their personal (study - online learning sessions - living and sleeping) space within the family house that has been transformed according to emergent needs. The analyzed data are drawn from students' assignments as part of their work on the theories of architecture course. The paper categorizes the work of 138 students: through a qualitative approach. The assignment focuses on the course learnt vocabularies such as the space-defining elements and the configuration and functionality of the space. Samples are categorized according to presentation techniques (3D, 2D Autocad/ drawings/ sketches, essay format) and according to the implemented solutions (whether the spaces are adjusted, extended or migrated to another space). The discussion explores creativity in both the solution and the representation scale. The conclusion highlights some of the uniqueness of the Egyptian post-pandemic case. And it asserts the importance of problem-based research as an integrative method in theories of pedagogy to engage students with real-world challenges.

Index Terms— ; Online learning; space defining elements; junior architecture students; problem-based research; Cairo, Egypt.

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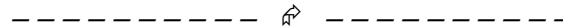
1   INTRODUCTION

THE emergence of the COVID-19 pandemic has suddenly obliged the necessity of digital online learning approaches, which have been forcefully shifted from the traditional classroom setting into digital online platforms and remote communication. Exactly on the 15th of March 2020, most of the academic institutions in Egypt are pushed into quarantine and lecturers and students are thrust into the adoption of off-campus online digital learning. Everyone quickly tried to change his/her habits and provide a working space in the house. This ranged from minor modifications of desks or homework stations to retransforming entire spaces at home to accommodate the new demands based on the internet connection, noise sources, number of family members and available space. According to Salama[1] the new situation is not the pandemic, it was expected, even the online was a futuristic expected plan, but it's the emergency and the needed actions and responses in a short time.

Many studies have been conducted so far on this shift to online learning, especially in the higher education sector (see for example [2], [3], [4]). Architecture department has been part of this distance education struggle [5], [6], [7].

However, much of the scientific research conducted adopts the perspectives of professors, deans, tutors and senior students [8,9].

In line with this, some research has been conducted to study the student's reflection on online learning; for example, [10], [11], [12], [13] and the effect of online learning on their physical health, especially muscles [14]. However, one can hardly find research tying the junior students' perspective and their own interior space.

The architectural junior students have faced complicated requirements due to the recent joining of the architecture department, such as the need for a drawing table, storage area for sheets and more architectural tools, besides the computer device for attending online courses. In addition to other aspects/ facilities concerning physical and psychological health and well-being.

This paper presents samples from junior architectural students' reflections on their personal space, within the family house, based on their study in an undergraduate theory of architecture course. The course aims to embrace and prepare the students for the type of work they will practice, and the problems they have to solve in the near future. Worth mentioning that junior architecture students are not familiar yet with a design based on architectural theories. The case at hand is about teaching theories fundamental principles of form, space and order, and their manipulations as essential elements of architecture, based on Ching's textbook [15]. The course aims to introduce junior students to the fundamental vocabulary of space-defining elements, openings, form-space relationships and solutions, and expose them to architectural examples. An assignment is given to the students in the last 3 weeks of the semester, asking the students to present and analyze what they have implemented in their personal space using the learnt vocabulary in the theory course. The given assignment explores the contribution of engaging junior students, from the first theories course, in current problem-based research [16] and

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how this might help in enhancing their understanding of the correlation between learning theories and practicing architecture.

Although design problem-based research is relatively a new approach to joining theory and practice, it's been recommended when dealing in specific contexts and with a pre-perspective goal. Dessouky [17] identifies a gap in the integration of environmental and societal needs within both architectural practice and educational programs. Consequently, many students are unable to deal with the realities of professional practice after they graduate [18] & [19]. While Dolmans [20] argues that problem-based learning (PBL) practice when adjoined with the theories or principles of contextual, constructive, self-directed and collaborative learning, helps better in design-based research (DBR). He stated that "Problems are at the center of learning and are based on real-life problems encountered in the future Cork setting" [20]. Therefore, we agree with him that teaching theories through engaging students in a real context of problem-based research can explicate compound phenomena.

Consequently, this theoretical architectural course adopts the approach of integrating architectural theories with problem-based learning (PBL) and practice, specifically in a real context and not as imagined problem-based research. It contributes a lot to students' understanding of diverse layers, such as the pedagogical layer, the uniqueness of the studied environment, and theories' role in practicing architecture and solving problems in the real context [16].

Moreover, students learn in this course that a space is defined by vertical and horizontal planes. Openings play a role in defining and articulating the space. Furniture is an element defining space and its configuration affects the perception and the function of the space. However, there are other issues that can play a role in the quality of the space, such as natural lighting which enhances not only the quality of the physical space but also the user's health and psychological wellness.

During theory lectures, the lecturer tries to encourage students to reflect on each learnt vocabulary in their surroundings, from questions raised during the online lecture or presenting a kind of pilot survey through the discussions. The lecturer has observed from early sessions that many students have done sort of transformations in their own personal space. Therefore, an assignment is set out based on an assumption that students, as a response to the lockdown, need to transform their personal space to fit their new demands. Where most of the students' personal space is mostly their own bedroom, which is transformed from a sleeping/studying space into a multifunctional space (sleeping, studying, attending online sessions, living, exercising., etc.).

Accordingly, an assignment is elaborated on and given to the students to trace the transformation done in their personal space, whether they adjusted the furniture within the same

space, migrated to another space, or redefined, added and created new spaces.

2 METHODOLOGY:

As stated above, this research is based on analyzing the students' assignments, the study adopts a qualitative research design approach [21], to study how junior architecture students transformed their personal space during the time of the online learning enforced by COVID-19', using the learnt vocabulary they acquired in Theories of Architecture course.

This research adopts the point of view of the more marginalized groups whose voices are not commonly represented in such scientific research, the junior students.

138 junior architecture students, living in Egypt and enrolled in a private university, participated in this study. Undergraduate students in Egypt are usually dependent on their families and care keepers. Normally, they live in a family house where the breadwinner supports the family members, and they may share rooms with their siblings.
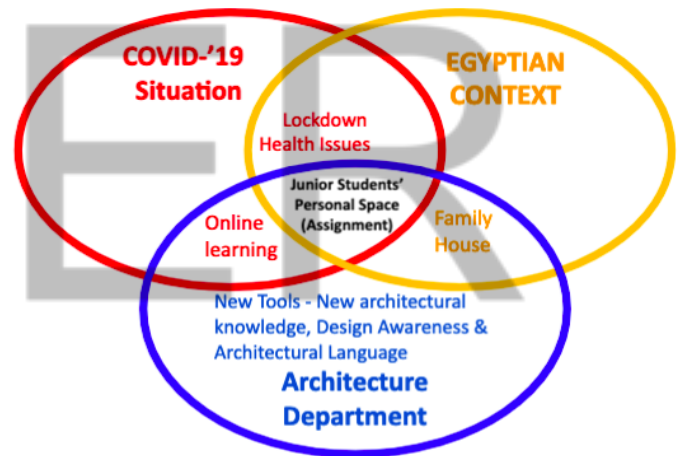
Figure 1. Factors affecting Junior students' adaptation to their personal space. Source: the authors

The sample of students participating in this study is mainly from high middle-income status. They merely started their architectural educational path and are still drawing their knowledge on a blank piece of paper. For these students, this particular semester is an educational transition, they are now shifting from basic science courses taken in the first semesters in architecture to full architectural courses syllabus. And this shift requires additional tools, they now need a 120x80 drawing board and a laptop. Some students have enrolled in the Architectural Drawing course, AutoCad course, and Theories of Architecture Course, plus other courses. The new architectural tools and new architectural knowledge along with the quarantine that forced all the family to stay at home between the same walls, besides the distance learning has had

an impact on how these students transformed their personal space at home (see Figure 1). The reflections of these junior students and how it is manifested in their personal space are worth investigating.

In a family house shared with other members, the person's room is usually the place he could freely personalize and transform. Any modification in the space depends on the budget, available materials, the family's approval along with other factors. The tutors formulated an assignment to be reflected on their personal space whatever it is. Whether it is a single private room, a shared bedroom or a living area in the house, the students were required to document how they transformed this personal space to suit their needs in the online learning era enforced by COVID-19'.

The students were required to answer a set of questions and represent them in the way they see best. The questions were:

1- How did you adapt your learning/workspace at home? Compare the before and after conditions. 2- What elements did you use to define your intimate space? (Elements of space / Elements defining space). 3- How do you perceive these spaces? Present it in the best way you are talented in, such as creative sketches/ graphic design /storytelling/diagrams or annotations/ comics … Using the learnt terms in this course.

138 students submitted their assignments on an online platform. Students also discussed their assignments with the tutors at two intervals, one in a pre-final submission and the other in the final. Assignments and discussions with the students are analyzed according to the following criteria:

1-Methods of students' adaptation to an online learning environment that replaces the physical campus. 2- The use of the vocabulary they learnt in the course. 3-The transition of the learned vocabulary of the course from the physical space to the virtual + physical space/ hybrid spaces. It all focused on defining space in the post-pandemic age.

Assignments are categorized according to the learnt vocabulary in the course. The authors excluded the essay format submissions and focused on creatively presented submissions, some submitted images, collages, comic format, 2d plans, freehand sketches, 3d models of their space, and videos.

3   FINDINGS

This study aims to answer the main research question for the study, which is how junior architecture students adopted their personal space in the online era enforced by the COVID-19 situation using the learnt topics from the Theories of Architecture Course. Hence, the student's assignments were analyzed accordingly.

3.1   Three approaches to adaptation

This section discusses three main approaches for adaptation by junior students. The approaches are; the modification of the space approach, space extension and migration of daily

activities.

A- Modification within the same place

As a start, some students have tended to do modifications within the boundaries of their space. They started to change what is permutable in their room, some modified the furniture configuration within the space and hence the circulation of the space. Others have taken a step further and changed the wall colors, while others have changed the room tiles. Some aimed to change the mood of the room, others wanted to create space for the new required functions, or to make more room for circulation and free spaces. Moreover, some students have changed the spatial organization to maximize natural illumination in their study space. Apparently, the quarantine has made them more appreciative of natural sunlight. Others have focused on their views while sitting at their desks, where they can see colorful paintings or motivational quotes that they have intentionally added.

In addition to this, students have learned how to prioritize elements in their personal space. By giving priority to the much needed and used furniture and getting rid of the less used and less important objects in the room. This is a consequent reaction to the change they have witnessed; the quarantine has forced the abortion of most of the out of home range activities. Students' personal rooms became the center for all the activities that they previously used to do elsewhere (see Figure 2). The room became the place where they would study, sleep, relax, workout and even socialize virtually.

The new situation imposed by Covid'19 called for new requirements. "I used to go to university every day, so my room was first designed only for a rest space … Now it has become the place where I play, study, relax and sleep" quoting Student A. Their room became the place where all these activities meet and where their private life merges with their social and work life.
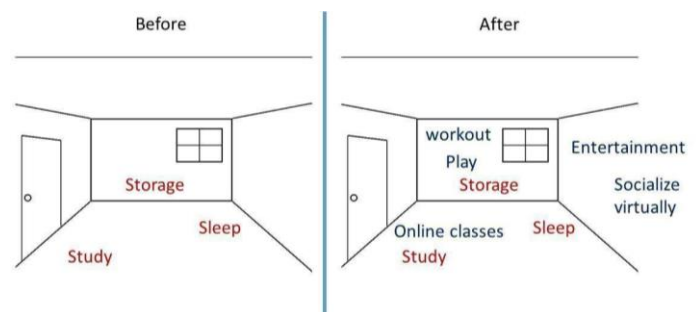

Figure 2. illustrates the activities that used to occur in the personal rooms of the students before VS. after the lockdown (Based on the discussions with the students)

Efficiency is another important aspect the students learnt in organizing their spaces. Especially in small spaced multifunctional rooms where they should fit all the required activities. However, in some cases, the small spaced room was not enough to accommodate all the activities, students then resorted to one of the following options; extension of their personal space to a non-used area near their room or migration of daily activities to elsewhere.

B -Space extension

Some students referred to utilizing an unused corner or extension to their room to perform their daily activities. This may have required an extra effort, to transform this space into a livable and usable place, but the results are also worth investigating. For example, student X presented in Figure 3 that she has extended to a small corner in the bedroom and is personalized to be her workspace. No matter how overcrowded her room was, she preferred not to leave it, as it was her private territory in the house, rather she has converted this corner and functionalized it into a cozy work corner for herself.
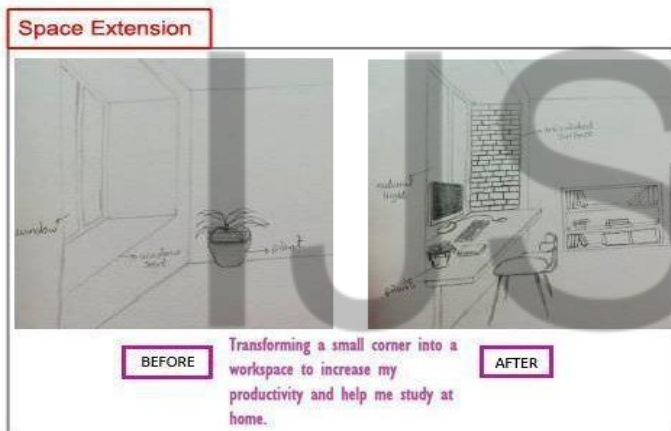

Figure 3. Student X reflection shows how she extended her activities to unused corners in the room

C- Migration of activities

However, others have taken a different way out; they have migrated to other spaces outside their room peripherals to find another gateway for their activities. There were several reasons the students stated for the migration outside their room. The reasons were either their rooms were too small, or shared with another sibling, or simply they wanted to change the mood by transiting in several parts of their house, again it is quarantine time and these are the only options they have, and finally some stated that they wanted to sit and socialize with their family while studying in the shared living area in the house and they preferred not to stay in a closed room solely. Moreover, student B had referred to unused spaces in their house, he had the chance to transform and personalized these new or unused spaces to suit his new needs (Figure 4). Others have migrated

to shared living spaces in their house, like the dining room or the reception area. Others have rather migrated to the semi-outdoor/ indoor space that is common in Egyptian households which are enclosed balconies.
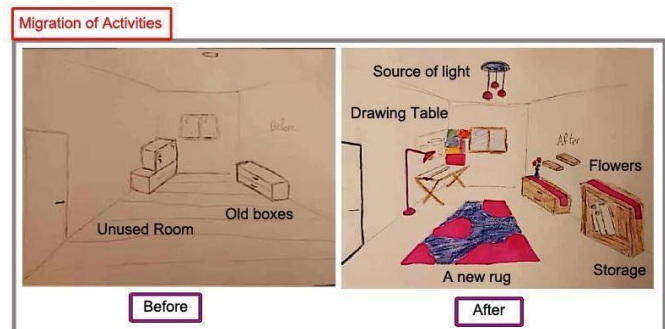
Figure 4. Student B shows the emigration of daily activities to an unused storage room in the house.
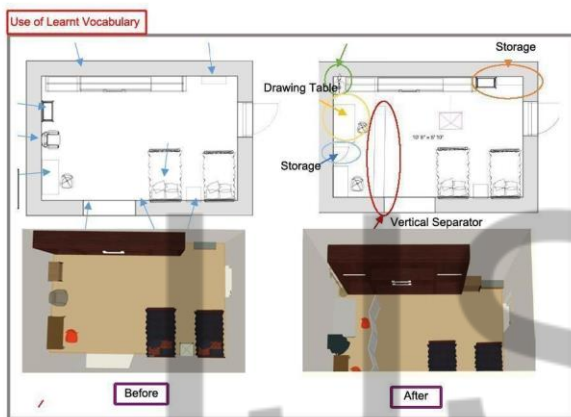
3.2 The Effect of the Theories Course On the Students' Adaptation Decisions

It was enlightening to see how the theories of architecture have influenced the students' adaptation of their personal space during the COVID-19 quarantine. Students creatively used the learnt vocabulary from the Theories of architecture course.

For example, student L tried to convey a message using one of the basic elements of the space to the members of her family; this student stated that she would put a blue coloured matt as a defined base plane underneath the enclosed door of her bedroom, the matt would be halfway in and halfway out like shown in (Figure 5). This mat acted as a red flag to the members of her family announcing that she is in a lecture or a meeting and they should not disturb her. That was one of the creative solutions some of the students implemented to fulfil privacy during the online sessions.
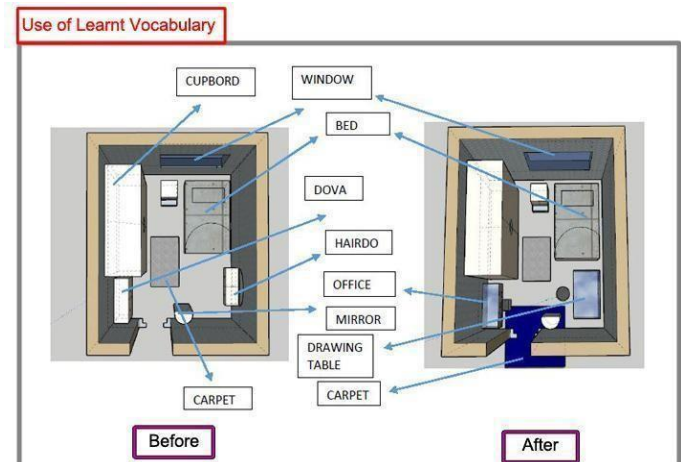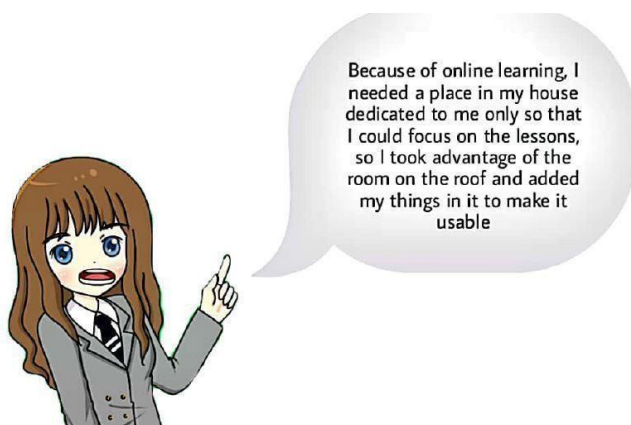

Figure 5. Student L used a base plane on the floor halfway out the door to signal her family that he/ she is in a lecture.

Moreover, to solve the problem of the multifunctional space, a student has added a single vertical plane to define different zones with different activities. In (Figure 6) student AH wanted to define the study area and block the light coming from the laptop screens on the beds, so he added this vertical plane as a space-defining element to provide a higher degree of enclosure. Whether it was using a base plane to communicate a certain message with members of the family, or using a vertical plane to divide the room, these students have had rich architectural nexus in dealing with their interior space when they needed it the most. See also (Figure 7) of student S's quote that is highlighting the necessity of prioritizing his / her needs and the approach to the adaptation to online learning.

Figure 6. Student AH used a vertical plane as a space-defining element.

Because of online learning, I needed a place in my house dedicated to me only so that I could focus on the lessons, so I took advantage of the room on the roof and added my things in it to make it usable

Figure 7. Highlights student S's quotation of prioritizing their needs and ways of adaptation to online learning.

4 DISCUSSION

The situation imposed by the pandemic lockdown has rather made these groups of students special, for they have witnessed the overlap of many factors, all affecting the way they perceive and adopt their personal space. This is to be discussed considering two main aspects which are the: Covid 19 situation and the Egyptian context.

4.1 Covid'19 Situation

Former students usually have a tremendous number of memories of their college years. Whether the memories were good or bad, one cannot deny that these memories have helped in forming the personality of the graduates. Students' interaction with each other in the studio is a very important tool in shaping their perception of the whole architectural discipline. Students working with each other, helping one another in their projects, discussing ideas and seeing each other's progress is what makes the studio spirit. And the spirit of an architectural studio is a milestone in each architect's life. It enriches their knowledge by sharing their experiences and most importantly it sometimes eases the stress the students face from their studying. Sometimes students together soothe their anxiety and stresses due to the tremendous assignments and projects they have. Moreover, Previous studies have confirmed that students' interaction in the studio is essential for innovation and creativity [22], [23], [24], [25], [26].

However, students were deprived of experiencing interactive studio spirit, when the educational sector was shifted to online platforms. That affected all students in all grades in general, but unfortunately, junior students did not have the chance to encounter college academic and social life. Moreover, their need for social interaction and face-to-face communication has been reflected in their adaptation to their personal space. Analysis of the junior student's assignments shall shed the light on how students' social needs are reflected physically in their personal space.

Students' needs due to COVID'19's lockdown are classified into physical needs, mental needs and social needs. The physical need is embodied in the need for extra furniture. extra storage, working top…etc. Many students stated that they needed to add an extra storage cupboard or a working/studying table. Some needed a more comfortable chair or a comfy sofa. Going further with this, students needed a place to physically work out and improve their fitness, some made room for a defined base plane as a yoga mat in their personal bedroom.

While the mental requirements were manifested in students' need for encouragement and motivation. Students stated that they were extra stressed due to the forced quarantine, online learning, limited social interaction along with the usual pressures of the architectural school on undergraduate students. And as each individual relieves stress in a different way, the manifestation of students' mental needs for stress relief

are different. For example, one student hung paintings on the wall that "gave the space more life" as he described. another student added flowers and some plantations as they made her feel "refreshed every day". Another one added a bookshelf next to his bed as books "helps make my mind at ease" as described. Students' responses to their social need to communicate and socialize with other people were manifested in two different ways or even two different worlds, one was real and face to face and the other was virtual. The real-life interaction was represented in students' migration of daily activities from their individual rooms to the family room space. One student justified that she needed the company of her family members while working and that she even adjusted her chair position in the family room to give her a better view of her family sitting in the living room while she was studying. While virtual interaction was embodied in the extensive use of online communication platforms for educational or for socializing purposes. This had a great influence on the transformation of students' individual spaces. The open cameras of the online zoom meetings made students cautious about how their background appeared and how the image of the space was to the people on the other side of the camera. In return, students discussed that they have changed their room configuration to give a better image of the space they are sitting in. Some added articulated paintings, bookshelves or plantations behind them. Others preferred the quietude of the white background behind them. They all focused on the cone of vision of the opened camera and organized it wherever it appeared in this frame.

However, this point emphasizes that the virtual background in an online meeting somehow reflects who we are and what we want to convey to other people. That is one of the aspects that online learning has added to our perception of the space is the virtual image of the room matters. Exactly like first impressions created when someone enters a physical space, the background context of the person sitting in front of the camera too creates a perception and leaves an impression on the people online. The context is now not only the physical surrounding anymore, but it's the virtual context that surrounds the person.

Findings indicated that online learning and the lockdown of the pandemic have enhanced the students' awareness of not only the environment around them, but also students were more aware of themselves and their needs.

4.2 Egyptian Context

Family, social relations, and the big brother authority within the family house are sociocultural issues. They influence architecture redesign processes, these issues are worth discussing intensively, thus we recommend more deep social studies and research on this topic. Space Syntax can also be used as an analyzing tool for understanding the social logic of the reproduction of such spaces.

This assignment prepared the students for their future job, as architects solving problems. It gave them a chance, to begin with themselves, consider their family as their client, convince them to do modifications, search for affordable and best suitable solutions to enhance the existing design and to fit the new emerging needs, while building self-confidence throughout this process.

Moreover, no matter how big the room was, the number of activities added to it was excessive. Some students worked on the configuration of the room and the circulation between its compact elements, like the examples discussed above. However, in shared rooms with siblings, the room configuration was more complicated. When the room accommodates two beds, two study areas and two storage areas, with two siblings who could have conflicting working and sleeping hours, the transformation of the room elements alone was not enough (see Figure 6, for student H).

Furthermore, Student Y extended her drawing table, where she spends long hours working on, to the family room as she enjoyed the company of her family around while working (see Figure 8).
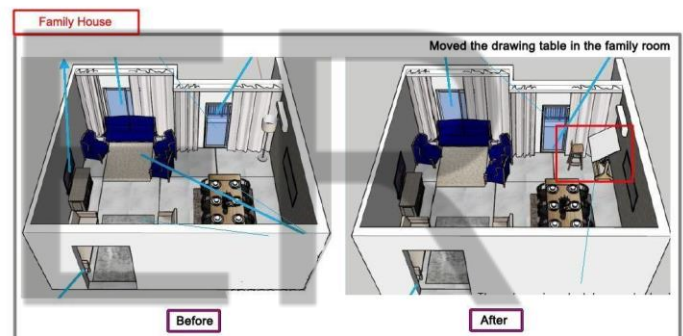
Figure 8. Student Y who moved her drawing table to the family room to enjoy the company of her family while working.

4.3 Extension to balconies

Post-pandemic has taught us to value all sorts of openings and more precisely balconies. We found from the above analysis that we can see balconies as an opportunity to strengthen the design of the house, they are not just transitional spaces between in and outside. A balcony is a private semi-enclosed space attached to the house. It plays a vital role in connecting residences to the outward during the quarantine, "it is an eye on the street", as phrased by Jane Jacobs [27], and it can for sure enhance well-being.

We argue that although many Egyptians from the informal and middle classes used to close existing balconies to widen the inner spaces or to transform them into enclosed spaces, to compensate for the lack of private intimate spaces, such as a study area as shown in one of the assignments. Balconies are better kept open as an outdoor space, it is much more compatible with the Egyptian moderate weather, where one

can relieve in lockdown time, enjoy the warmth of the sun and breath fresh air. Plus, it is the sole open space where people may own and plant to add more greens to the Cairene greyish context. Hence, we see balconies as having the potential to enhance well-being specially in the pandemic era. As done by Student K transformed the balcony into a lively space with greenery, comfortable seating and a tabletop to study.

However, these mere actions reflect not only the need to go out in the open, but also the issue of crowding in some family homes. It also indicates inadequate privacy during lockdowns which leads to the solution of extending to the outdoor balconies. For example, student M (see Figure 10) who was sharing a room with a sibling, extended his workspace to the balcony. This solution has provided him with a more private, spacious workspace of his own.

Figure 9. Student K extending the daily activities to the balconies.
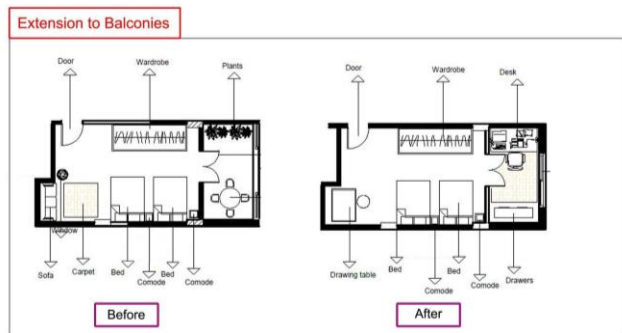

Figure 10. Student M who has a sibling sharing the same room extended his workspace to the balcony.

Many students were dreaming of having and designing a new home soundproof studio or a dedicated room to attend online sessions without interruption, but they couldn't afford that neither in cost nor in timewise. So, they managed that with limited resources. Several students redefined the vertical planes by turning the desk to face the room door and keeping behind the chair a clear wall, a painted one, with shelves, or just adding a virtual background to ensure privacy. Student L redefined the base plane by using a movable-colored floor mat, as a busy/free sign. Other students transformed the dressing area or attached storage space into a temporary online session space. Many students choose to reorient the desk towards natural lighting, a window on their left side, to provide a better lighting direction or frame the view outside the window. This shows more gained attention and response to the context. While other students searched for marginalized open spaces inside their homes, like balconies, whether by adding curtains, glass windows, shuttered, or keeping it open to keep an eye on the street, to breathe the fresh air and to keep connected to outside during the lockdown. Others chose to move the drawing board to the living room, as they need to maintain social interaction with their family while working. This solution opens the eye on the importance of social reinforcement, things that are missed when joining the architecture department and increased during the quarantine.

We argue that these presented samples and solutions are junior students' trials to enhance the built environment with quick action, minimal cost and limited resources. Although this course focuses on architectural elements, students are encouraged to think of other layers as enhancing the quality of space and searching for meanings behind the architectural elements, even though they didn't dig deep into these issues. But we may notice that they have received the message that architecture is not only about forms and that there are more topics to look for in the architecture design process. One of the most important results is that students gained theoretical knowledge and courage to convince their family to adopt and redefine their intimate space, to act and practice architecture in a confident with the theoretical base they gained in this course. Thus, we argue that engaging junior students in the current crisis may have a positive effect on both their physical and mental wellness (see Table 1 and Figure 11).
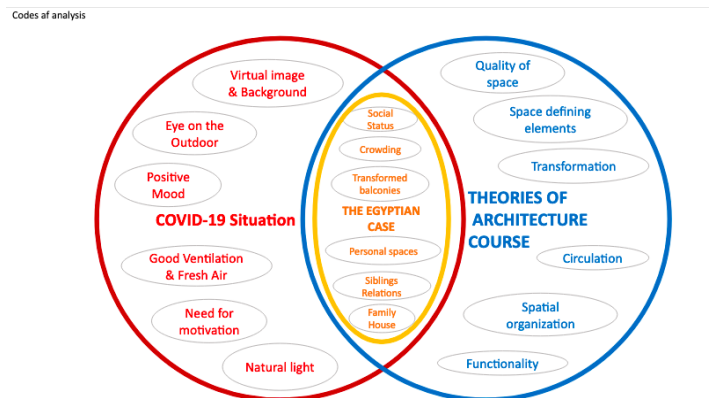

Figure 11. Diagram concluding the Analyzed Codes out of the

given assignment.

Table 1 Codes, analysis and summaries of the analyzed assignments. Source: Authors

CODING

	METHOD			ANALYSIS	Discussion
Assignment Format Categories	Degree of Modification before/ after (simultaneously)	Evaluation of the Learnt vocabulary/ learned lessons related to the course		Response to COVID-19	Particularity of The Egyptian Case
1 - 2D drawings	**Adjusted** Adjusted (Within the same space) - Exploring (Within the same space) - (desk orientation, furniture organization...).	Space defining elements	Physical Health	ergonomics/ comfortable furniture/ add a space for exercise	Family house - Family bonds
2- 3D drawings	**Extended** Redefined, added elements and created new spaces (physical, ...)	Functionality	Mental health	- (psychological)- need for motivation and encouragement- stress due to COVID-19- architectural school requirements	Socio-economic factor - affordability (time and cost)
3 - Hand sketches	**Migrated** Migrated (to another space) (living, terrace, store...)	Circulation	Social aspects	-Socio-cultural- need to socialize/ connect with people- stuck in the virtual world - eye on the street and outside	Balconies
4- Others	**Others**	Other points as Ergonomics	Other aspects (Creativity) Authors' critical eye	-Presentation technique as comics - -Solution scale as Planting, Ecodesign, recycle, awarness towards environmental issues	shared bedrooms, siblings

5 CONCULUSION

This approach of integrating problem-based research within the theories of architecture course is not a new method but the added factor, here, is engaging junior students in reality-problem-based practice. This pedagogical method intends to help the students in using the learned vocabulary, evaluate and criticize their well-known daily living spatial boundaries and redesign them in a better suitable and adaptable way to the emergent needs.

The conclusion highlights some of the uniqueness of the Egyptian post-pandemic case. Analyzing this collection of the students' views presented in the assignments shows samples of the emergent patterns in the current Egyptian situation. The paper delves into some issues, for example, many middle and upper-middle-class houses lack adequate private outdoor spaces, such as gardens, or enough balconies and open terraces, and it's common in Egypt to close it and add its area to the inner enclosed space of the house. Thus, we argue that Egyptian

architects need to revive and reconsider the role of balconies and open terraces in their designs.

Some students mentioned that they suffer from overcrowded apartments, and lack of privacy, as they share a room with their siblings. Other students highlighted psychological and mental problems such as anxiety, insomnia, depression, and learning problems; those issues are also expected to be enormous on younger school students.

One can imagine a worse situation among the poorest people and in informal areas, which are generally poor overcrowded urban fabric, high illiteracy and unemployment, where more socio-economic problems and environmental risks are magnified. Thus, we recommend, for future research, a deep study of other lower/ lower-middle social statuses or engaging architecture students with other marginalized groups and adopting their point of view.

Moreover, findings highlight the importance of design problem-based research as an essential method in theories pedagogy to engage the students with real-world challenges.

As mentioned earlier, the course teaches basic vocabulary and the theory of space and form, hence the assignment tests the learned vocabulary and how they are applied throughout the students' experiment and description of the reshaped/transformed space.

In this assignment, Architectural theories have been elaborated to help in the design process and solving real contextual problems, it's not just a theoretical background. This proves that such similar assignments link learned theoretical lessons, concepts and vocabularies to design, shall improve the student's perception of theories' role in elaborating the design process, and bridge the gap between theories and problem-based practice in a real context.

The creative solutions are proposed by junior students. They recommended rethinking the living space. The students saw it necessary to increase the exposure to the natural environment as it affects physical and mental health, to ensure the use of suitable materials and to maximize the summer shading of the buildings in order to reduce surface temperatures and to limit noise pollution. Some even dreamed of creating a small place around their desk with soundproof dividers or partitions to attend the online sessions without outer disturbance. They even painted their rooms, planted greens and did major modifications by themselves.

Even though many students struggled a lot through distance learning from; technological misuse, suffering from disturbance and unfocused mind, lack of teamwork discussions and motivations, and many other serious problems. One still can see benefits, as one of the most important results is that students gained theoretical knowledge and courage to convince their families to adopt and redefine their spaces, to act and practice architecture. Thus, engaging junior students in the current crisis and evolved challenges may add a positive effect on their physical and mental wellness. We found that involving

students, from early stages, in current challenges and problem-based research influences their ideation process and prepares them for the continuously evolving professional challenges, by being better autodidact self-learners. Students learn more by responding to the local social, cultural and environmental aspects and considerations. Thus, we agree with those who call problem-based research a reality-problem-based Learning.

6   Acknowledgments

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