

The relationship of the internal space of buildings design with human behavior

Assist.Prof. Dr. Nawal Al Sanafi

Associate Professor College of Basic Education. Public Authority for Applied Education and Training. State of Kuwait

nalsanafi@yahoo.co.uk

Abstract

We, humans, spend most of our lives at designed or specific places that might be residential or commercial spaces, and also natural environments that have a direct impact and effect on our behavior. There are direct and multiple indirect effects of internal architectural designs of buildings on our minds and psychology and these can either enhance functions or aesthetically please us. More probably, the alternating architectural design is the one that impact or manipulate human behavior; therefore, buildings designs and their functionality type model can inspire the behavior in positive and negative ways and can manipulate the health and well-being of humans, as well as human performance. Interactive and learning ways of the internal architecture of buildings could be the best ways to achieve new interactive relationships and build strong ties in between people and spaces. The prime focus of this research is to study factors with a higher impact on human behavior that could be predicted to be more influential concerning architecture, interior design, and the psychological well-being and association of residents. The level of awareness concerning the importance of this association is to justify the identity, privacy, and safety impacts regarding human health concerns, open spaces features, and aesthetic senses and psychological aspects regarding human health. The research will analyze the opinions of a random sample of employees selected to determine the appropriate environment for work from their point of view. The second is to recognize the important architectural consideration needed to realize the psychological condition of residents. There is a concern to raise the interaction between interior design of buildings and human psychological behavior. So, that this might be used to draw the conclusion and help designers in choosing and applying a suitable interior design manifesto that matches psychological needs through better architecture, interiors, and the psychological status of users of the place.

Keywords:

Human Behavior, Design Strategies, Smart Environments, Health concern, Accessibility, Open space, Aesthetics, Psychological effects.

ملخص البحث:

نحن، البشر، نقضي معظم حياتنا في أماكن مصممة أو محددة قد تكون مساحات سكنية أو تجارية، وهي جزء أقل من حياتنا في بيئات طبيعية لها تأثير مباشر على سلوكنا. هناك تأثيرات مباشرة ومتعددة غير مباشرة للتصميمات المعمارية الداخلية للمباني على أذهاننا ويمكن أن تعزز وظائفنا المناسبة أو ترضينا جمالياً. على الأرجح، التصميم المعماري البديل هو الذي يؤثر أو يتلاعب بالسلوك البشري؛ لذلك، يمكن أن تلهم تصميمات المباني ونموذجها الوظيفي السلوك بطرق إيجابية أو سلبية

ويمكن أن تؤثر على صحة ورفاهية البشر، وكذلك الأداء البشري. يمكن أن تكون الطرق التفاعلية والتعليمية للهندسة المعمارية الداخلية للمباني هي أفضل الطرق لتحقيق علاقات تفاعلية جديدة وبناء روابط قوية بين الناس والمساحات. ينصب التركيز الأساسي لهذا البحث على دراسة العوامل ذات التأثير الأكبر على السلوك البشري والتي يمكن توقع أن تكون أكثر تأثيرًا فيما يتعلق بالعمارة والتصميم الداخلي والرفاهية النفسية وترابط السكان. إن مستوى الوعي بأهمية هذا الارتباط هو تبرير آثار الهوية والخصوصية والسلامة فيما يتعلق بمخاوف صحة الإنسان، وخاصة المساحات المفتوحة، والجوانب الجمالية والنفسية فيما يتعلق بصحة الإنسان. سيحلل البحث آراء عينة عشوائية من الموظفين تم اختيارهم لتحديد البيئة المناسبة للعمل من وجهة نظرهم. والثاني هو التعرف على الاعتبارات المعمارية الهامة اللازمة لتحقيق الحالة النفسية للمستخدمين. هناك اهتمام برفع التفاعل بين التصميم الداخلي للمباني والسلوك النفسي البشري. لذلك، يمكن استخدام هذا لاستخلاص الخاتمة ومساعدة المصممين في اختيار وتطبيق بيان تصميم داخلي مناسب يلبي الاحتياجات النفسية من خلال هندسة معمارية أفضل وتصميمات داخلية وحالة نفسية لمستخدمي المكان.

الكلمات المفتاحية:

سلوك الإنسان، استراتيجيات التصميم، البيئات الذكية، الاهتمامات الصحية، سهولة الوصول، الفضاء المفتوح، الجماليات، الآثار النفسية.

Introduction

With a major part of our lives spent indoors, either in working environments or in residential space, the space we occupy might directly affect our psychological behavior. These could be associated with Environmental psychology or Space psychology and that too discusses the interaction between people and the spaces they occupy or used to live. These spaces could be flourished and highlighted with lightings, colors, configuration, scale, proportions, acoustics, and materials that match the likings of the individual and generate a spectrum of positive feelings.

From inducing safety, defining the well-being of humans, and mesmerizing the positive working environment, and conducting a living environment, space will have direct impacts on how and what we feel about things; therefore, designs and occupying measures should be considered according to the social and psychological needs of the humans occupying these spaces and mingling with those environments, (Mahmoud, 2017) (Figure 1).

The psychology of space and its environmental impacts regarding the focus of this study of human behaviors within the context of the built and natural environments is amendable and could generate more aesthetics; according to Dave



Figure (1). Some people need living in luxury according to their social surrounding atmosphere (inscape.2022).

Alan Kopec, a specialist of architectural studies and professor at the New School of Architecture and Design in San Diego. This has a direct impact on the subconscious of human beings, contributing to their emotions, perceptions, and feelings through that special part of the brain that reacts to the layout of the space occupied, so that this becomes an inherent part of people's psychology. Though this isn't the only factor involved, it also has various implications, and it will be the architect's responsibility to shape long-lasting and favorable solutions for humans and incorporate these ideas as well as integrate them into reality (Ricci, 2018).

Human behavior will be influenced by architecture in different formations just like a comfortable space will bound to satisfy one's physical needs, and might not be more feasible to others (Figure 2), but most probably to most humans as well attributes of sunshine. There is one more thing that influences human behavior and psychology and that is the structure of color and pattern could also influence the mood. In human-computer interaction, this concept has a well-known name and that is 'Pave the cow paths'; or in other words, see where the paths have motives and will direct your behavior and then formalize new behavior, rather than moving ahead with new types of idealized path structures that ignore history and tradition, as well as, human nature (C Crumlish, 2009).

This could also be applied strategically by firstly defining the desired paths and secondly formalizing the structural paths that entail every detail of the entity and its formation to make it long-lasting in some way that could be normative and discussable. It could be obvious to compare and find contrast in between an imaginary approach and a realistic approach that considers human behavior and look for ways to change it, to make it understandable; checking the realistic outputs of their merits and demerits.

Architectural spaces with built shapes, different aesthetics, and qualities will have the power to inspire human behavior and flourish the experiences, as there is an option to control the spaces of the built environment and amending the solid walls, roofs, and columns that shape the behavior of the human being. Most People prefer positive spaces because of their high social interaction level. These positive impact their social and motivational interaction levels and will motivate them further to enhance their observance and observing levels. Unlike negative spaces that encourage movement out of those spaces and will motivate getting out of those places rather than dwelling into the place to get more interaction and social integration (Figure 3).



Figure (2). Luxury is the main demand for some occupants, and for others are not interested (covetlounge.2020).



Figure (3). Example of negative spaces in working area that create pressure on human behavior and make him less creative and more susceptible to diseases (wirehd.2012).

Positive architectural spaces must have implications and interactions associated with their designs to support specific behavior and program them accordingly, experience, or purpose of your motives behind those designs. These all could be designed and amended by avoiding drawing rectangular or standard shape on a floor plan, to avoid cohesion but label it to know if it aligns with the psychology and suit the space functions according to users desires and requirement details to determine the specifics of the activities that will draw conclusive paths, therefore space is designed to accommodate various minds, and enhance them as architecture is the thoughtful making of space (Jingyun Shen, 2020).

Aim of the research:

Discussing the effect of design on people related to this place.

Research importance:

The importance of this research lies in the spread of this problem in most working areas whether governmental or private sector which reduces employee productivity and makes the work environment repellent, in addition to the lack of studies in this field.

Research field:

Interior design; human behavior.

Research Methodology:

The research follows the descriptive analytical approach of the relationship between design method on behavior in internal spaces. The research also aims to reach the impact of surrounding design on people. To achieve this, the descriptive analytical approach was used to overview opinions of a random sample of employee that were also discussed.

Research Hypotheses

How can we possible increase productivity of employee? Is it by changing the design of the place or using colors, or more wide offices perhaps?

Research limits

The target group that the researcher conducted the study on is the category of employees in the public and private sectors.

Previous Researches

A research study conducted by Julia K. Day and her research fellows has discussed the building design and how their postures impact human behavior at large scale. This research study was aimed at understanding how residents could interact with building spaces and how these spaces could be tamed or decorated according to the interests of human beings. This study discussed both commercial and residential spaces and interaction of human behavior with these outcasts. They discussed several interaction levels including level of control, comfort, coziness, and understanding how this design aesthetics can change human behavior. This paper was all about discussing building interfaces such as designs of windows, window shades, decorative measures, and lighting controls and how they affect human behavior. The goal was to discuss certain characteristics of design, challenges, and relationships of building infrastructure with human behavior. They emphasized on discussing enhancing the research needs to understand design aesthetics, interior designing skill used, and characteristics of interest (Julia K.Day, 2020).

Another research study with the subject of conventional and energy-saving buildings to design aesthetics and human dependent factors, conducted by C. Filippín and his research fellows has discussed conventional and energy-saving buildings together with human behavior aesthetics. They discussed various aspects including social, economic, socio-political, socio-psychological, educational and environmental concerns of the interior design. They discussed the use of energy conservation materials and open exposures to sunlight so as to keep occupants' health intact and save the valuable energy resources. They discussed some aspects of human behavior as well, together with the design aesthetics, how humans can build habits of working and staying lazy from their residential environment.

This research study was all about discussing how economical and residential settings can change human behavior and how well it can organize human behavior as well in certain circumstances. The evolution of these design aesthetics and difference in each apartment or residential setting could be the key to compare results from different settings.

Though, human behavior might not vary a lot in these settings, but yet it can give idea of how it has evolved over time and how different settings can alter their behavior. People love to spend time where they feel belonged and where they have enough attachment to spend most of their day. If they feel comfortable in office setting, they would love to spend time there, work there joyously (Figure 4), and stay loyal to their job.



Figure (4). Adding green areas & colors gives work areas a joyful feeling and makes the time pass fast (mos-schilderijen.2022).

In contrast, if they feel obliged and bound, they will find ways to restrain them from office routines and spend time there unwillingly. Their behavior might be harsh with everyone at office and they develop sense of rage and offense (C.Filippín, 2005).

Here is another research study conducted by Wissam Hassan Hashem about Design Performance of Internal Spaces and Its Relationship to the Social settings within an environment.

Their research study was about discussion of architecture in various past settings and how they have observed the need and discussed some variables within societies that contribute to perception building and human behavior. They discussed social organizations that have a key role in building certain types of architectures within cities, their native homes, service facilities, and standards to meet human needs.

His research was about getting to know how well a human-oriented setting can alter the human behavior, how it can drive the human nature towards its motive, and how it can drive himself to work. They discussed certain settings for offices, residential places, gathering and entertainment places and their difference according to their use and according to the demands of society. They took an example of cafes for rest and entertainment purposes, and their orientation mostly in urban areas providing social gathering and setting channel to human beings (Figure 5). These places could act



Figure (5). Shows the higher demand on group seating over individual seating areas. Union Artisan cafe - Damen Mall, Malaysia (vmo.rocks.2021)

like communication channels and learning can take place together with solving social problems. So, these places could act like schools that can initiate positive action in changing the behavior of society and the transfer values and traditions. Same would be the case with homes and residential environment where social changes and political interactions can take place and might create sometimes the sense of conflict as well and will pose positive and negative impacts on the productivity of the society (HASHEM, 2019). With hikes in the functionality of the space throughout the last decades, building spaces have become a mere reflection of the program and associations. People were stacked in situations and remedies to produce and feed into a consumer-oriented society. The idea of just dwelling and adjusting the individuals in any place started with the industrial revolution that has brought flux of people into non-equipped cities, but the situations get worse and worse with time.

The house plans were amended and divided to accommodate as many people as it could tolerate (Figure 6);

without concerning their psychology and their emotional levels. So, things get worse and people start to gain

flexibility, inactiveness, and more profoundly, dissatisfaction from their lives. Homes and jobs were dedicated

and allocated towards fast-paced-production. Usage of space and the psychological understanding behind it

came later, maybe in the coming future.



Figure (6). Studio apartment example shows how does these designs isolate users from social gathering which put them under pressure (roomskether.2022).

Psychological Effects of Architecture

Attention to mental and psychological well-being has increased over the past decade, particularly in workplaces, to help employees perform better, or to make hospital buildings less worrisome, or classrooms and schools more stimulating for learning, or art spaces more stimulating for creativity. The designers carefully consider all aspects of the space, including the exterior and interior designs, artwork, furniture, lighting, sounds and other environmental

elements that interact with the architectural design of the space. As Winston Churchill said “We shape our buildings, and then our buildings shape our lives.”

Architect Ben Shannon, author of the book “Architecture and Mental Wellbeing”, asserts that architectural design that provides adaptable spaces that residents can change to suit their needs or whims, leads to happier people, in addition to that some designers can employ designs that encourage healthy behavior, such as building Aesthetically attractive stairs to be an incentive for physical activity and to reduce the use of elevators.

Sociological Human Need

There is one thing that needs to be highlighted and has positive as well as negative impact on human psychology and that is the social interaction that has the power and potential to improve the perception and image of the interior space to the human mind they inhabit, these interactions and their associated effects can be summarized in four concepts:

- Privacy, personal interaction levels, territoriality, and crowding.

Let's highlight these motives and their current situations:

The psychological impact of Privacy;

Just like the name suggests, it is all about giving personal space and it is the process in which people define themselves to be reachable to others. In an official working space or interior space, privacy could be maintained by protecting the individual from physical or visual interaction using partitions (Figure 7). That might be there to separate your identity or personal space from others and may prohibit others from breaching it. Also, these privacy levels are meant to be established by the office plans according to space functions and human needs (Gieryn, 2000).



Figure (7). Shows kind of workstation that compact six people which give some privacy for each person but keeps them in contact with each other all time (tekkashop.2022).

The psychological impact of Interaction levels is the next phase of human interaction and societal as well as psychological well-being of humans (Figure 8).

This is one of the techniques that might curtail or entice the level of privacy desired, as people might change or alter the level of their relationship with others in terms of distances, or spaces, between them. Everyone with the need of suitable space for their concerning privacy and interaction and achieve different tasks in specific time will be different and will be highlighted by certain motives. This space could also be expanded and contracted to solve individual needs and social circumstances. Together with the perceptions, experiences, and uses of



Figure (8). Fusion of students while they are inside school with the surrounding environment, new school in New York (dezeen.2014).

those specific environments while determining the space size; Edward T. Hall in his research work "The Hidden Dimension" defined all four motives that define interpersonal cooperation; and normally contain intimate, personal, social, and public interactions (Till Ballendat, 2010). The first concern that is intimate space corresponds to the individual's body surrounding area. These are more precisely the personal space and breaching it could be the violation of law as well. It is considered the most private space and inspires both physical and emotional communications among humans.

Personal space corresponds to the area which is limited and restricted to just one person and selective friends, or fellow workers with whom personal conversation could take place.

Social space corresponds to the area where individuals exercise their social networks and meet with them to carry out activities and kill leisure time with relevant activities. These spaces could be the public places to meet community fellows and individuals from your concerned circle. Public space is that area within which the individual has direct contact with different people.

Territoriality is the new way of control that is meant to provide security and identity of the individual through personal and defined individual interactions. These interactions could be person to person or person to groups to give more or less exposure to what is required and what is desired. Territorial controls of space correspond to the individuals or groups as well as is mentioned above to interact with the community and boost your psychological needs. This control will ascertain all the privileges and may take aggressive actions to provide defensive measures. If privacy achieved the required and desired levels; territoriality takes place (Graham Brown, 2014).

Crowding is another term that was mentioned and highlighted earlier and could also be interpreted to function for both personal space and territoriality, reflecting the limited social contact. From the social point of view, users respond in different ways toward social connections and formation of bonds with society depending on their situation, as they might

show unpleasant behavior towards others and might not be paying attention to temporary connections. However, they might be more influential towards building associations and their impact might be due to the association of strong psychological ties with the space that is decorated and designed well (Joel Thiessen, 2013).

Psychological Human Response towards spatial space

Understanding human responses to the environment could be more complicated than you assume, as this corresponds to the further three psychological stages of human behavior. These stages are perception, cognition, and spatial behavior shown by humans corresponding to different places and might have different impacts on human well-being (Figure 9).

Perception is what most humans get from different things, places, and these are associated with the virtual images formed in their mind so that the sensing process towards their surrounding environment will curtail their sensations of vision, hearing, smell, taste, and touch, to gain the space information and get familiar with the motives of the space.

Cognition is another psychological effect that takes place after gaining the sensory information and then transforming it by certain mental processes, this will highlight and formulate all the activities related to thinking, remembering, or analyzing the information (Roger M. Downs, 2017).

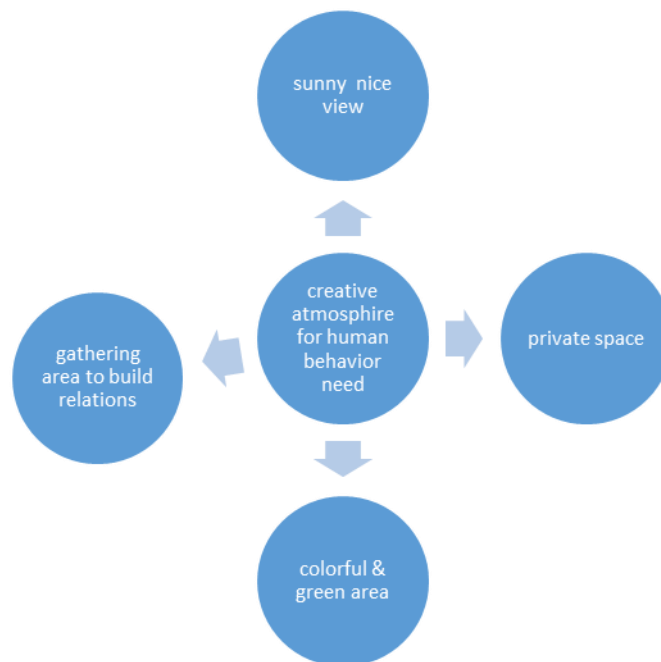


Figure (9). A Diagram shows what human needs from buildings design

The next concerning point is the **spatial behavior** that entails the reactions and responses to the environmental information depending upon the perception and cognition of the human mind and concerning that specific place. Architectural designers direct these psychological stages by creating environmental stimulation of their concerning designs and could also highlight every issue with regards to human mind development or alignment with space. With the formation of design and managing the internal space and concerned secondary processes that involve motivation, Mind-Bourne effect, and development. Interior designers will consider the environmental expectations as the decisive element and will develop his/her design side by side

with human experiences, explorations, and interaction with the environment. These are further explained and associated with the sensations that come as an integration between the environment expectations and human perception of the specific space.

Survey results

An interview survey been made by the researcher on 411 employee, 256 males, and 155 females randomly selected from different sectors of government & private companies of Kuwait (Figure 10).

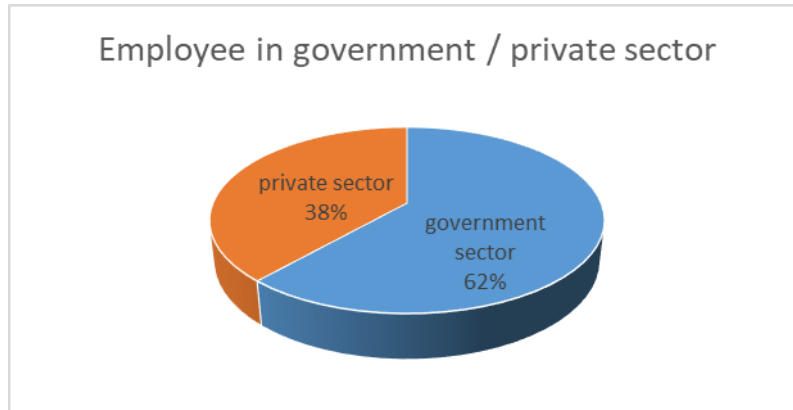


Figure (10). Number of the employees who participate in the survey

Those responses from 253 government employee, 158 private sector employee, from different ages (Figure 11), you can find the sample details below.

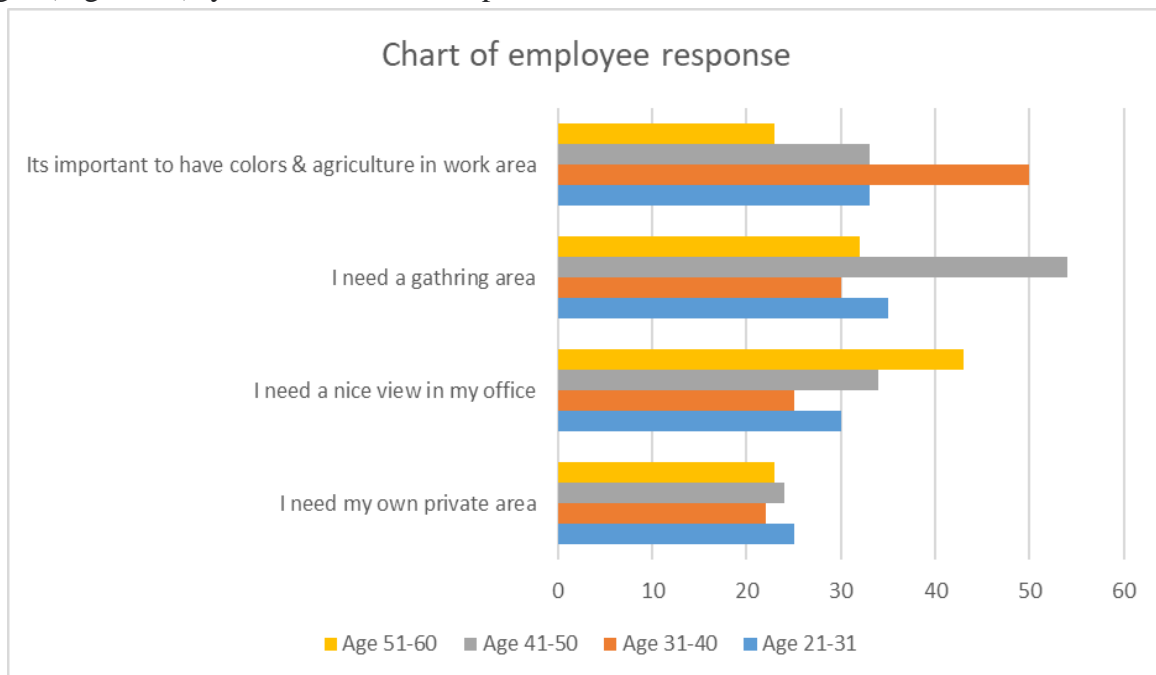


Figure (11). Chart of the employee’s response

As it is shown above in the chart, the employee of age 31 – 40 were the highest response about demanding colors & agriculture, comparing to the group of age at 51-60 which has the lowest demand of that issue, but they have the highest demand of needing nice view in the office, and nearly equal to the group of age 31- 40 in needing their own private area. In the second question if need a gathering area at work area, the group of age 41 -50 has the highest demand.

Results:

As responses shows that each age of employee had its own needs, beside gender. Those needs should be considered in designing working areas to be suitable and fulfill those needs for all. It's important also to consider using colors in working areas, natural light, and good ventilation.

Conclusion:

The familiarity and adaptiveness of any design depend upon how much it creates an interface between humans and the environment. This must also specify how much it builds ties with the space they occupy and how much familiar they are to adapt to new places as well as how much connection-to the building they have with their community remembers. Customer-oriented designed environments and places will have a direct influence on people's behavior in several different ways, and some might also have intentions of clarity and ties-building motives.

Affective response associated with the architecture can extend the existing capacity of the human being as a setting for human activity within the built environment; though might not last long if not properly planned and executed, by facilitating more intuitive and inclusive user interaction. This can also highlight and formulate high-level visions of influencing wide social or community behaviors, to very specific techniques applied to influence particular behaviors in a specific context; the use of specific patterns into the interior designing of the space will facilitate re-use of techniques wherever a similar problem recurs.

In overall execution, patterns could also be applied with combinations to create different orientations and types of space with different effects on human behavior. Some concepts related to changing human behavior with the built environment may be transposed and facilitated to other designed systems and contexts. We cannot control or dictate human behaviors with buildings. We need to figure out things or seek out ways that can formulate specific behaviors. However, there is a possibility to design a dynamic architecture with four dimensions: Length, width, depth, and Time; and to interact with human behavior with these dimensions. Thus, human behaviors could also play their part in designing buildings so that they have an interaction with each other. Architects are well equipped with concepts and formulations of the things that can amend human behavior and also with the conceptualization of applications in interactive architecture because their backend motive is to visualize space and understanding the humans as well as the environmental requirements.

Recommendations:

It's time for resource departments to take role in shaping work environments, beside designers and architects

who have certain methods to do so. The work environment has great repercussions on the way employees work, their well-being and culture which makes a real positive impact on quality of working life of employees and healthy office environment that promotes satisfaction and productivity.

References

- C Crumlish, E. M., 2009. *Designing social interfaces: Principles, patterns, and practices for improving the user experience*. Sebastopol, CA: O'Reilly Inc. .
- C.Filippín, S. F. L. A. B. G. L., 2005. Response of conventional and energy-saving buildings to design and human dependent factors. *Solar Energy*, 78(3), pp. 455-470.
- Gieryn, T. F., 2000. A Space for Place in Sociology. *Annual Review of Sociology*, Volume 26, pp. 463-496.
- Graham Brown, C. C. S. L. R., 2014. Psychological Ownership, Territorial Behavior, and Being Perceived as a Team Contributor: The Critical Role of Trust in the Work Environment. *Personnel Psychology*, 67(2), pp. 463-485.
- HASHEM, W. H., 2019. THE DESIGN PERFORMANCE OF INTERNAL SPACES AND ITS RELATIONSHIP TO THE SOCIAL VARIABLE: BAGHDAD CAFES ARE A MODEL. *International Journal of Humanities and Language Research*, 2(2), pp. 9-19.
- Jingyun Shen, X. Z. Z. L., 2020. Impact of Wooden Versus Nonwooden Interior Designs on Office Workers' Cognitive Performance. *SAGE Journals*, 127(1), pp. 36-51.
- Joel Thiessen, B. M., 2013. Sacred space: function and mission from a sociological and theological perspective. *International Journal for the Study of the Christian Church* , 13(2), pp. 133-146.
- Julia K.Day, C. M. C. B. M. T. C. P. J. H. W. O. V. S. R. M. D. S. M. B. K. M. P. A. S. Y. P. M. S. G., 2020. A review of select human-building interfaces and their relationship to human behavior, energy use and occupant comfort. *Building and Environment*, Volume 178.
- Mahmoud, H.-T. H., 2017. Interior Architectural Elements That Affect Human Psychology and Behavior. *SSRN*, 1(1).
- Ricci, N., 2018. The Psychological Impact of Architectural Design. *CMC Senior Theses*..
- Roger M. Downs, D. S., 2017. *Image and Environment: Cognitive Mapping and Spatial Behavior*. London, UK: Aldine Transaction.
- Till Ballendat, N. M. S. G., 2010. *Proxemic interaction: designing for a proximity and orientation-aware environment*. s.l., ITS '10: ACM International Conference on Interactive Tabletops and Surfaces.

Websites

- <https://www.dezeen.com/2014/02/11/the-new-schoo-university-campus-som-new-york>.
- <https://www.inscape.ac/we-are-inscape/our-stories/blog/2018/how-to-find-the-right-balance-between-modern-and-traditional-in-design.php>
- <https://m.facebook.com/covetlounge/photos/a336911793118776/1754121304731144/?type=3>
- <https://www.mos-schilderijen.nl/en/product-category/plantenwanden>
- <https://www.roomsketcher.com/floor-plan-gallery/apartment-plans/>
- <https://www.tekkashop.com.my/collections/6-person-workstation>.
- <https://www.vmo.rocks/item/union-artisan-damen/>
- <https://www.wired.com/story/cubicle-is-back>