

CO-RELATIONAL STUDY ON COURTYARD AND SURROUNDING SPACES ITS ACTIVENESS, EXCITEMENT, AND EMOTIONAL EXPERIENCE AMONG THE OCCUPANTS OF SIVAGANGA – TAMILNADU

Komagal Anupama K.¹
C. V. Subramanian

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ABSTRACT

Housing evolution has been driven by cultural, economic, and technological advancements. Architecture has a significant role in shaping this evolution, as architects continuously respond to changing needs by using innovative designs and materials. This results in functional, creative, optimizable, and customizable housing solutions. Research and this manuscript are focused on adapting and incorporating elements of vernacular architecture into modern housing designs. This aims to create sustainable and culturally-sensitive homes that balance tradition and modernity, while still retaining emotional and visual connections. The courtyard and surrounding spaces induce a strong positive effect on the occupants. Studies demonstrate that activeness and excitement are positive feelings that are induced by a courtyard and surrounding spaces respectively. By analyzing the data collected from diverse houses and people strongly judge that certain people are triggered to induce these spaces in housing. It confirms the hypothesis that a physical setting has a significant role in inducing Positive affective among the occupants of the vernacular settings.



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1. INTRODUCTION

Housing refers to the basic need of the person. However, spaces confined in the housing mainly depend on the residents. As people are distinct from each other the usage and requirement of the housing spaces also vary. Vernacular architecture which is also called local architecture has a huge impact on people who uses that place. As vernacular architecture refers to local architecture it uses local techniques and concentrates on

geographical aspects like climate weather and occupations over there. To sustain the psychological well-being of the occupants, retainment of certain parameters like; spatial form, order, and physical features play an important role in the lives of people through the place they live with the episodic memory under the Specific environment settings psychologically. Additionally, the courtyard and its proportions have a significant impact on the internal surface shade. The position of the sun in the sky and the geometry of the courtyard may influence the courtyard's shading

¹ Corresponding author: Komagal Anupama K
Email: anup_shots@yahoo.com

conditions. The study of the courtyard is one of the crucial housing space studies in the manuscript. The psychological impact of the courtyard on various emotions of the residents will be studied. This manuscript determines the relationship between the central courtyard (Mutram) and warmth to learn how the physical environment affects people's experiences of positive effects like being active, strong, or determined.

2. BACKGROUND STUDY

2.1 Vernacular architecture

The architects and designers are in search of appropriate methods to address the issues of ecological and environmental degradation that prevail in the newly developed environments. In the process of addressing the issues, the architects are forced to look back into their traditional vernacular built environment to achieve not only harmony and ecological balance but also the socio-physical dimension of vernacular architecture which has never failed in provoking the desirable emotions among the occupants. This trend indicates that the traditional wisdom and knowledge used to design vernacular architecture is inevitable for the architects in the present time if they want to equip themselves for the present day's needs and issues however the modern and traditional systems are practiced separately without any interaction. This situation is not desirable in the long run for it will push out people from places both physically and temporally. Therefore, to produce a built environment that provokes desirable emotions among the occupants it is very much essential for the academia and professional fraternity to recognize and realize the importance of vernacular systems, spatial order, perceptual order, and conceptual orders in the vernacular built environment. Several context-specific studies have provided useful information about material usage, construction techniques, and thermal comfort for specific places. Identity: Maha Salman talks about people, culture, places, architecture, and those things. Vernacular architecture and sustainability are also discussed by the author: reimagining both vernacular architecture and identity: cross-cultural effects and localism. The goal of sustainable building design is to create the best possible interactions between people and their surroundings. Planners, architects, designers, developers, and operators have the responsibility to preserve a location's unique character, its inhabitants, and its spirit (Maha Salman, 2018). E. Malaktou et al. focus on the environmental study of Cyprus' traditional semi-open spaces under various conditions throughout the year. He featured the significance of semi-open spaces regarding different periods, areas, and various circumstances. According to E. Malacotic et al. (2016), the author concludes that Vernacular architecture demonstrates the significance of semi-open spaces and environmental behaviors in the construction of buildings in response to various climatic and regional conditions.

Vernacular housing have various housing spaces. However, Most of these spaces are not actively opted by Occupants. In this regard, I had referent to one of my earlier studies and observations and mentioned: "Study on people's Psychodynamic influences towards various spaces in Tamil-Nadu". It was demonstrated that people's livelihoods are greatly influenced by vernacular architecture. In many parts of Tamil Nadu, traditional houses are very important. (Komagal Anupama K et al , 2022).

2.2 Architectural impact on human psychology

Environmental psychology is a relatively new multidisciplinary field. Components are people who have psychological characteristics. Vision, awareness, and behaviour studies are used in the study. Due to our distinct usage and occupation fields, the relationship between the user and the environment is reciprocal and two-way. The social, economic, political, cultural, and psychological factors all play a role in the climate. That includes individuals, whose perceptions, emotions, and actions also have an impact. Kirsten K remarked that The psychological tensions that the spectator experiences have an effect on how we perceive space. Individuals should hold and perceive what their identity is to separate themselves from others (detachment), however they likewise have an obligation to answer. Because people are uncomfortable in both situations, your fear of being alone influences your perception of a place. You are constantly aware of the sense of isolation and separation created by our surroundings. Another psychological paradox is that we seek change and challenge in addition to responsibility and volition. The eyewitness has unseen fits of turmoil that influence how they see space. People need to keep and realize themselves so that they can differentiate themselves from others. The fear of isolation affects your space view as a person (Professor Kirsten K.Roessler, 2012). Architectural spaces also impact our social behaviour Anna P. Gawlikowska clearly explains that the social impact of architecture and urban planning is sensitive. Social impact is a social psychological phenomenon that is researched. Architecture and urban space exercise an important influence. In addition, the social impact of architecture and urban planning is sensitive. Social impact is a social psychological phenomenon that is researched. Architecture and urban space exercise an important influence (Anna P. Gawlikowska, 2013).

2.3 Central courtyard

A courtyard can be designed however you like. The basic shape of a residential courtyard is typically square or rectangular, but it can also be circular or curved. A courtyard could be two-sided, partially enclosed (three sides), or completely enclosed (four sides). Buildings with multiple stories have also incorporated the courtyard design. The microclimate of the environment can be altered through the design form. According to

research, the courtyard's geometry and proportions have a significant impact on the amount of shade on the internal surface. The geometry of the courtyard as well as the location of the sun in the sky may have an impact on the shading conditions inside (Abdulbasit Almhafdy et al, 2013). A courtyard can be designed however you like. The basic shape of a residential courtyard is typically square or rectangular, but it can also be circular or curved. A courtyard could be two-sided, partially enclosed (three sides), or completely enclosed (four sides). Buildings with multiple stories have also incorporated the courtyard design. The microclimate of the environment can be altered through the design form. According to research, the courtyard's geometry and proportions have a significant impact on the amount of shade on the internal surface. The geometry of the courtyard as well as the location of the sun in the sky may have an impact on the shading conditions inside (Fatma Abass et al, 2016).

2.4 Surrounding spaces

E. Malaktou explains the Environmental behaviours of semi-open spaces connecting the data with the architectural research author had collected the data of environmental conditions across different seasons in the year to get better results in domestic constructions. Surround spaces are the semi-open spaces that were studied here, in addition, the Author also studied Vernacular architecture shows the importance of semi-open spaces with environmental behaviours in the construction of buildings according to the different climatic and regional conditions. Malaktou strongly believes that architects should consider the climatic and behavioural aspects while designing the surrounding spaces (E. Malaktou et al, 2016).

2.5 Impact of the courtyard on human psychology

Hany E. Hossam El Din alludes that Architecture tries to provide security for the human being; it strengthens its skills and efficiency both indoors and out. The disregard for Architects' sensational view of urban space and the environmental effect led to their failure to meet the anticipated objectives of urban development. This research aims to explain the impact of the courtyard setting geometry and orientation (H. Hossam Eldien et al, 2012). Part of psychology, environmental psychology is the science of marginality and honesty. The architecture of the central courtyard is very similar to how people feel inside. As a result, the occupant's cognitive processes are strongly correlated with the architectural expression of the courtyard in an urban setting. Behaviours the study of people's attitudes and feelings. It can be broken down into three categories: processes that are cognitive, emotional, and voluntarily defined, as well as the individual's feelings and emotions. Showing people's minds, quality, psychology, or other

aspects of various day-to-day behaviour is sufficiently referred to as behaviour. Everywhere, it is demonstrated that the architecture of a private courtyard is environmentally psychological. If space did not interact with the actions of people, it would have no practical meaning. There are a lot of complicated reasons for the central courtyard landscapes in different areas, but one important one is that everyone likes and enjoys them because they fit with their psychological identity (Huaizu Cui et al, 2015).

2.6 Relationship between space and human emotions

Experimental "demand" typically defines some mood-inducing techniques in ways that are unrelated to the individual's mind. Some scientists argued that experimental moods are stronger; some people separate emotion from the mood. According to Ingram's review from 1990, the majority of psychiatric conditions are self-focused. "Behavioural activation strategies" that are intended to translate into the real world are sometimes incorporated into cognitive-behavioural therapy. Through the environment's control of attention, specific procedures, such as graded tasks, can result in success. The main question is whether the procedures can be started in the future when people are in trouble (Paula T. Hertel, 1996). Eugen Bleulerin was the first person to support Sigmund Freud's theories. Freud and Carl Jung lacked a thorough understanding of the ever-changing nature of deep brain networks. It is necessary to conduct additional research into the reasons behind the selective selection of these neural pathways by the brain. The secret and open demands of the client should be examined by genuine architects. When it comes to attaching an architectural symbol of a person's consciousness and unconsciousness, architects play the leading role of an official priest. As a result, all architects must comprehend their clients' internal dynamics (Prof S.T. Janetius, Thekkechangampatt, 2019).

2.7 Study area

As mentioned, the house will give a sense of living to human beings however home should support not only human psychological needs but also environmental and livelihood needs. This had led to the development of various types of housing and housing spaces (Komagal Anupama K and CV Subramanian ,2022) the physical, environmental, and behavioural aspects of the courtyard's adaptability are all examined by B. Dhanan et al. The courtyards of Thirukazhukundram and Medavakkam were studied for their comprehension of proportion, orientation and enclosure, temperature and comfort, and culture. This shows that our housing will show our culture and way of life. Vernacular architecture also makes our local cultures and neighborhoods more visible (B. Vedhajanani* and A. Lilly Rose, 2016).

2.8 F - Test

The author investigated a test statistic for determining equality of means under unequal population variances in a comparative drug experiment. The adjusted F-test is viewed as proper for the hypertensive medication deals informational collection because of the chi-square conveyance of the example consonant mean of differences. That's what the creator reason, as suggested by the guardians, the new prescription, cardesartan, contends well with the current meds for the treatment of pulse (BP)A comparable application was applied analyze the different lodging spaces of vernacular design. Abidoeye A. O., E. T. Jolayemi, Sanni O. O. M, and B. A. Oyejola (2016).

3. METHODOLOGY

3.1 Significance of courtyards

Central Courtyards have a significant role in Indian vernacular architecture. Even most foreign architects personally admire the courtyard that we have in our southern architecture. The courtyard is called mutram in the traditional language. Courtyards can be optimized in various shapes like circular, rectangular, and square. This mainly depends on the occupants and other aspects. Because this courtyard emphasizes air movement and solar light into the housing, courtyards will not only assist us in building a better house, but they will also assist us in establishing a connection with nature. In addition, the courtyard is regarded as the earliest housing location due to its centuries-old use. The courtyard has a pedestrian route that runs around the spaces and allows you to enter/connect to various living units. However, the surrounding of the courtyard can be open, closed by half walls, full, and widows based on ecological and psychological needs. In most cases, it was found that the courtyard works as a partition between private and public spaces of housing. This housing space gives visual connections to the people across the housing as it centers and connects others. People interpret a given location using their field of view as a guide, which is an important element in the visual connection model. When the spaces within bring in visual connectedness, an interior appears larger and more fluid. Even the smallest areas take on a larger visual feel when they are free-flowing, and only utilitarian demarcations are used.

3.2 Significance of surrounding spaces

Surrounding spaces refer to passages or walkways which run throughout the courtyard. The significance of the surrounding spaces is it connects the various spaces of housing to the central courtyard. More ever surrounding spaces give the feasibility for sunlight and air to enter into various housing spaces from the central courtyard. Ideally, surrounding spaces are part of the courtyard however based on the requirements of the occupants

surrounding spaces can be customized into partial type where we can plan to have surrounding spaces and corner surrounding spaces.

Here various types of courtyards including surrounding spaces were explained Based on the shape construction and other attributes courtyards are divided into various types.

Type – 1 Central courtyard

The central courtyard is one type of central courtyard. This is treated as a major type as it covers four spaces of housing and connects them. The shape and aesthetic central courtyard with a closed structure with an entrance and exist around it. Usually, this type of courtyard can be either with a cover dome or an uncovered dome. In addition, the aesthetic of the courtyard allows an immense amount of light and air to come and circulate in the house. However, their type of courtyards occupies more space. As these spaces are open at all ends they give emotional, psychological, and physical connectivity to the occupants. The majority of family gatherings that happen over will have a hugely positive psychological impact on the people.



Figure 1. Source of the image – Author



Figure 2. Source of the image – Author

Type – 2 Partial courtyard

A partial courtyard, also known as a "courtyard garden" or "enclosed courtyard," is a type of architectural feature where a section of a building is open to the sky, surrounded by walls on three sides. This type of courtyard is not completely open like a full courtyard, as the fourth side is usually closed off by a building or a wall. Partial courtyards can be found in a variety of architectural styles and can serve a variety of purposes.

The walls surrounding the courtyard can provide privacy and shelter from wind and other elements, making it a comfortable place to spend time. Partial courtyards can also serve as a visual element in the building's design. They can be used to break up large, open spaces and create a sense of intimacy and coziness. The courtyard can also be used to bring natural light into the building and to provide views of the sky and the surrounding area. They can be designed to complement the overall aesthetic of the building, whether it's a traditional or modern architectural style.

In many cases, partial courtyards are designed to be multi-functional spaces, serving both practical and aesthetic purposes. They can be designed to be low maintenance and easy to clean, making them a practical option for many different types of buildings. Overall, partial courtyards are a versatile and attractive architectural feature that can add value and functionality to a building.



Figure 3. Source of the image – Author



Figure 4. Source of the image – Author

3.3 Regional analysis: Sivaganaga

By pilot-level analysis and study, it was clearly found that their people are viably different from each other psychologically. In addition, it was found that geological and cultural aspects are crucial in the evolution of human ideology. With this as a reference, it was found the people from Sivaganga is a place where most of the people are preferred to have a courtyard in their housing spaces. Sivaganga is the headquarters of the Sivaganga district. It was spread across 43.28 sq km. The concentration of the Hindu population is 85 % which is almost 3/4th of the total population. Based on the district statistical handbook 2020-21 around 73% of the workforce depends on agriculture in this place. As the temperature over here might go as high as 45 deg C convectional housing design might not help. So localized vernacular architecture was used to adapt to both the environment and occupational activities. Courtyards play an important role in assisting agriculture and its capabilities. In some areas of disintegration, these elements kept ancient vernacular design alive. With this plethora of references and key elements, dissolve was chosen as the scope of the investigation to investigate the character and enthusiastic experience of courtyard occupants.

3.4 Effect of courtyard on human emotions

People's moods are always affected by their housing. For instance, our house is a portrait of our personality. Even though a home as a whole may not have an effect on people's emotions, certain living spaces do. In these ways, the courtyard is the housing space that causes people to act in an active way. It can happen because of the home's aesthetic or the surrounding environment. Behavior aspects in general and desirable emotional behavior of the residents in particular were investigated in order to establish an experiential relationship between a variety of physical feature variables of the vernacular residential area. settings with material differences, positive thinking, affection, empathy, comforting, composure, control, work efficacy, identity, order, connectedness, and warmth among the occupants of the selected vernacular settings are examples of form variations. These settings include House front sit-out (Thinnai), Central courtyard (Mutram), surrounding spaces (Sutrukattu), and Backyard (Kollaipuram). However, because it serves as a central connecting space between all of the housing spaces, the courtyard has a special significance in each one. It Triggers sociocultural physical and profound parts that have been collected by the singular right from the client's life as a youngster where they develop. It's possible that courtyards have a readable spatial form with a clear meaning that is supported by physical feature variables to meet people's needs, desires, motivations, actions, and feelings in everyday life. However, these feelings and actions are individual to each person. This study aids in our comprehension of the primary emotion that a courtyard can elicit in the majority of people. The below table refers to various emotions that a housing space can trigger in occupants. Below refers to the certain emotions that are set off in table -1.

Table 1. Various emotions triggered by housing spaces.

S.No	Emotions	
E- 1	Cheerfulness	Feel to be light-hearted and happy. It implies being happy and having joy looking over circumstances.
E- 2	Serenity	It means to be calm, steady, and people. Serenity implies internal peace irrespective of external aspects.
E- 3	Enthusiasm	Enthusiasm refers to having a self-motivation and being prepared for the things
E- 4	Relief	The feeling of getting rid of certain unplanned consequences
E- 5	Optimism	The emotion of having self-belief and believing in ourselves to do things forward
E- 6	Active	Feeling of readiness and preparedness to do something
E- 7	Excitement	The feeling of eagerness and commitment to deliver the things
E- 8	Safe	Being protected is the condition safeguarded from hurt or other non-positive results

3.5 Data collection

People have different thoughts and feelings about courtyards, which suggests that some people prefer to have a central courtyard, according to research on various forms of courtyards. However, some people favour having a partially enclosed courtyard. In addition to this, a descriptive study was conducted to determine the predominant emotion that the courtyard inducing in the occupants. Though the same emotion does not get implied by all people, we in this research predominant emotion was filtered to strongly conclude the aim. Although this depends on the personal needs and ideology of the people, it strongly concludes that people are distinct from each other.

A. Statistical data collection (Grading):

Collection of opinions is a major thing in understanding the people's requirements though we have various types of courtyards and surrounding spaces we would like to collect the data to know which is most favourable by the people so rating was collected by using a Likert scale – 5. By this Likert scale we can understand the predict the occupants.

Table 2. Likert scale of -5 with statements.

S.no	Statement	Grading
1	Strongly Acknowledge	1
2	More or less Acknowledge	2
3	unsure	3
4	More or less contradict	4
5	Strongly Contradict	5

4. DATA & RESULTS:

Based on the pilot study sivaganga was selected to study the courtyard's impact on people's behaviour and emotion. As part of this, we investigated around 200 houses that contain various types of housing spaces however in this we found out that 95 % of the houses had a courtyard, and people living over there had preferred to have the courtyard and surrounding spaces in their houses. Moreover using questionnaires and discussions we captured various responses that occupants had provided these responses are filtered and structured in a certain manner to understand and prove the aim of the study. As part of the study people from various ages, and occupations are considered to maintain diversity across the results. The below table refers to various occupations and headcounts that contributed to the research.

Table 3. Occupational data of people considered for studies.

Profession	People count
Accountant	40
Architect	18
Homemaker	43
professor	38
Self-Employee	28
Student	33
Total	200

Table 4. Quantity of houses studied.

No of the houses considered for the study	Approx 200
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As alluded to in Table 5 The numerical method of analysis is not strong enough to understand and evaluate the psychological aspects of occupants, whereas statistical data provide a strong judgment about the opinions and needs of people. All these 200 people are investigated for their rating on both the central courtyard and partial courtyard. However their response different a lot. So certain analysis was done to understand the effect of the courtyard and surrounding spaces.

5. ANALYSIS

Data collected were sorted and compared to each other to get the inference of comparing the spaces i.e. central courtyard with surrounding spaces and partial courtyard. As part of this responses were collected by both the manual and google survey. The below graph indicates that the majority of the people are strongly preferring to have a central courtyard however the other had scattered behaviour from the people in preferring the central courtyard. This comparison states that the people would like to opt for a central courtyard rather than a partial courtyard.

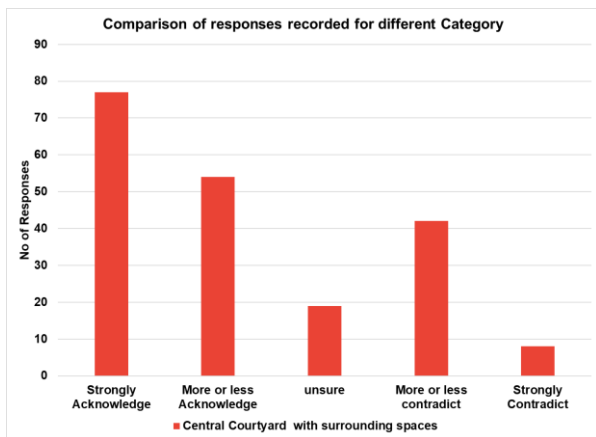


Figure 3. Graph representing the distribution of people’s response for the central courtyard

By comparison of the data and plotting it we found that more people are inclined to the central courtyard and it’s also strongly just that people expect to have an emotional connection to the courtyard. The legibility of a courtyard space, meaning its clear layout and organization, can evoke positive emotions in its occupants by promoting a sense of safety and control. Being able to easily navigate and understand the space can make people feel more comfortable and at ease.

Apart from this, we would like to understand as any part of people also like to have a partial courtyard as mentioned above. This population can give us an idea of new architectural changes than should be considered by upcoming architectural practices.

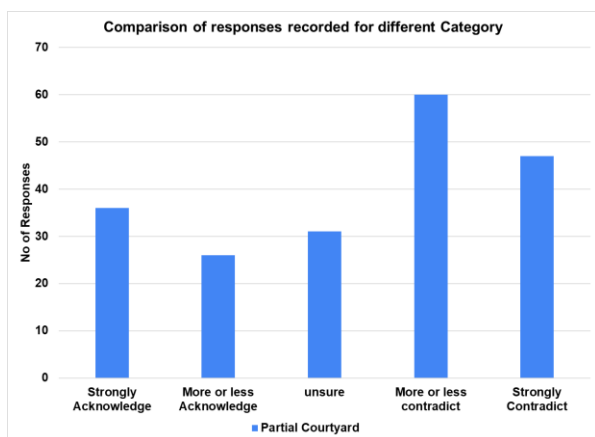


Figure 4. Graph representing the distribution of people’s response for partial courtyard

However, With the above graph, it can be concluded that they are inclined towards cultural and traditional housing practices. However certain people strongly believe in modernization to the idea of a partial courtyard. For example, a partial courtyard is a type of architectural feature where a section of a building is open to the sky, surrounded by walls on three sides. It can serve as an outdoor space for activities or as a visual element in the building's design. It is not completely open like a full courtyard.

In addition, Whether all these occupants are similar to each other or distinct from each this interpretation will help us to know the importance of courtyards and surrounding spaces in our new-age housing designs and modern architecture to verify the variation between the data sets F test was conducted. F test gives a clear comparison of two data sets that we have with us.

Table 5. F test for data collected for various responses over central the courtyard and partial courtyard.

F-Test Two-Sample for Variances		
	Variable 1 - Partial Courtyard	Variable 2 - Central Courtyard with surrounding spaces
Mean	3.28	2.25
Variance	2.0217	1.6256
Observations	200	200
df	199	199
F	1.2436	
P(F<=f) one-tail	0.0624	
F Critical one-tail	1.2633	

The above table gives the results of the F test conducted Mean of responses collected over the partial courtyard was 3.28 however for the central courtyard was 2.25. The lower mean represents the higher chances of opting for that space. In addition, data represents that no of observations is 200 in both cases. Based on the F test it was found that $F < F_{critical}$ item Calculated is lesser than that of F critical which strongly states that the null hypothesis was proved. This null hypothesis strongly proves that there is no significant difference between the two sets of data. Interpreting this study we can clearly understand that any type of courtyard is good for the people and there is no variation in people's psychological feelings about having either a partial courtyard or a central courtyard.

Meeting people in person in a home's courtyard, and surrounding area is the best. Instant human visual connection emotion exists. That substance is what gave us life. Consider how you feel when you first meet someone. The term "human-made space" or "human-made surrounds" can be used to refer to the general built environment that serves as the context for human habitation. Every part of our existence is impacted by the vernacular built environment, including the home we reside in, the roads we use to get about, and the water and energy we utilize. Concerning the above analysis, it can be stated that the courtyard and surrounding spaces have an incredible impact on human emotional aspects and social connectivity.

6. CONCLUSION

To accomplish this, Based on investigating the physical setting feature of the vernacular house, the courtyard to determine how it contributes to the identity of the house within its context and how it influences the experience of active behaviour. This lends support to the hypothesis that a physical setting is important in fostering a positive attitude among people who live in vernacular settings.

The study reveals that the built environment, as a subsystem, may impact and drive the behaviour of its residents. It is possible that behaviour is the inhabitants' outward action in reaction to an internal or external stimulus, and that it is mediated by another subsystem or the ecosystem. Future plans use this information to learn about people's emotional and exciting demands, allowing dwelling places to be designed to satisfy these needs.

By analyzing both the qualitative and quantitative data, the study was able to determine the relationship between the courtyard and warmth and the impact it has on the occupants' effect. The study also concludes that People have a strong emotional connection to the surrounding spaces of courtyards, as these spaces can hold memories and evoke feelings of nostalgia and comfort. Courtyards can act as a visual representation of the residents' personal histories and

can be associated with positive memories and experiences. Additionally, courtyards can also act as a canvas for people to project their positive desires and aspirations. For example, a courtyard with a beautiful garden can represent the desire for a peaceful and harmonious environment, while a courtyard with a pool can represent the desire for leisure and relaxation.

Assuming future-oriented society is the focus of vernacular architecture and built environment research. It also emphasizes the construction process as well as developing, managing, and planning built environment-related activities. The study culminates that various housing spaces of vernacular architecture emphasize psychodynamic factors like cognitive psychodynamics, physical psychodynamics, and emotional psychodynamics.

References:

- Abdulbasit-Almhafdy., Norhati-Ibrahim., Sabarinah,Sh., Ahmad., & Josmin-Yahya. (2013). Analysis of the Courtyard Functions and its Design Variants in the Malaysian Hospital. *Procedia - Social and Behavioral Sciences*, 105, 171 – 182. doi:org/10.1016/j.sbspro.2013.11.018.
- Abidoeye, A.O., Jolayemi, E.T., Sanni, O.O. M., & Oyejola, B. A. (2016). On application of modified f – statistic: an example of sales distribution of pharmaceutical drugs. *Science World Journal*, 11(2), 68-71. doi:10.5923/j.statistics.20150502.03
- Anna, P., Gawlikowska. (2013). Spaces of Social Influence. *Architecturae Et Artibus*, 3, 10-15.
- B., Vedhajanani, A., Lilly-Rose. (2016). Contextual Comparison of Courtyard Houses in Tamil Nadu. *Indian Journal of Science and Technology*. 9(5), 1-7. DOI: 10.17485/ijst/2016/v9i5/87268.
- E., Malaktou., et al. (2016). Environmental behaviors of semi-open spaces in Mediterranean vernacular architecture. The case of rural traditional dwellings of Cyprus. *Renewable Energy & Power Quality Journal*, 14, 599-604, 10.24084/repqj14.406.
- Fatma-Abass., et al. (2016). A Review of Courtyard House: History Evolution Forms, And Functions. *ARPN Journal of Engineering and Applied Sciences*, 11(4), 2557 – 2559.
- H.,Hossam-Eldien., et Al.(2012). Impact of Inner Courtyard Form on Human Sensational Perception. *Port Said Engineering Research Journal*, 16(2).
- Huaizu-Cui., Qingqing-Hu., Fengmiao-He. (2015). Brief Discussion on People's Behavior Psychological Demand in Private Courtyard Space. *SHS Web of Conferences*, 17(5), doi.org/10.1051/shsconf/20151702002.
- Komagal-Anupama, K., C., V., Subramanian. (2022). Study on people's Psychodynamic influences towards various spaces in Tamil-Nadu. *Journal of Positive School Psychology*, 6(5), 2717-7564.
- Komagal-Anupama, K., C.,V., Subramanian. (2022). Spatial Analysis on Psychodynamic Influences on Dwelling Spaces of Vernacular Architecture –Tamilnadu. *Journal of Algebraic Statistics*, 13(3), 2783-2797.
- Maha-Salman. (2018). Sustainability and Vernacular Architecture: Rethinking What Identity Is. *Urban and Architectural Heritage Conservation within Sustainability*, 978, doi10.5772/intechopen.82025.
- Paula, T. (1996). Hertel. Practical Aspects of Emotion and Memory. *Basic and Applied Memory Research: Theory in Context*, 1, 317-336.
- Kirsten, K., Roessler. (2012). Healthy Architecture! Can environments evoke emotional responses. *Global journal of health science*, 4(4), 83, doi:10.5539/gjhs.v4n4p83
- S.,T., Janetius., Thekkechangarampatt-Mini. (2019). The Marriage of the Conscious and Unconscious in Architecture. *EC Psychology and Psychiatry*, 77-81.

Komagal Anupama K.

Periyar Maniammai institute of science and technology, Thanjavur, India
anup_shots@yahoo.com
ORCID 0000-0001-7376-988X

C. V. Subramanian

Periyar Maniammai institute of science and technology, Thanjavur, India
cvsutra@gmail.com
ORCID 0000-0001-9313-0311
