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Studio Space Preferences and Comfort Factors of Architecture Students at Universitas Pendidikan Indonesia

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ABSTRACT

Studio spaces play an important role in architectural education, being the main place for students to learn, discuss, and develop skills. This research aims to understand architecture students' preferences towards studio spaces at Universitas Pendidikan Indonesia (UPI) and the factors that support their comfort in these spaces. The method used is a qualitative approach with grounded theory. Data were collected through an online questionnaire filled out by 81 architecture students from various batches. The data analysis process involved open coding, axial coding, and selective coding stages to identify the main factors that influence comfort. The results showed that aspects of lighting, ventilation, quietness, comfort, dimensions, and space utilities were the main factors considered by students in choosing studio spaces. Studio 1, for example, is chosen for its spacious dimensions and good accessibility, while Studio 4 is preferred for its view. These findings provide design recommendations for the development of more optimized studio spaces in architectural education environments, particularly in improving student comfort and productivity.

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1. INTRODUCTION

Architectural education continues to depend on the design studio as the core of its pedagogical approach. Despite technological and methodological changes, the studio tradition still inherits the *Beaux-Arts* learning system, emphasizing apprenticeship, critique, and experiential learning (Rijal & Aldy, 2012; Salama, 2020). Within this model, students learn by doing through continuous design exploration, feedback, and iteration, making the studio an essential arena for developing creative and critical thinking skills (Webster, 2020). The studio environment is not only a place for skill acquisition but also a cultural and social space that shapes professional identity, collaboration, and creativity (Hassanpour et al., 2011; Dutton, 2021).

As the central setting of architectural education, studio spaces have a significant influence on students' comfort, productivity, and emotional well-being. Numerous studies emphasize that the design quality of learning environments—including spatial configuration, ergonomics, lighting, thermal comfort, acoustics, and access to technology—plays a critical role in supporting learning performance (Fairuza, Riska, & Kusuma, 2021; Elnaklah et al., 2023; Ezz et al., 2025). Environmental comfort affects not only physiological aspects but also students' satisfaction, motivation, and creativity (Vischer, 2008; Romero, Miranda, & Montero, 2023). Recent post-occupancy evaluations reveal that deficiencies in natural light, air quality, or spatial organization can lead to fatigue and decreased academic performance (Ezz et al., 2025). Similarly, lighting and thermal conditions directly influence perception, concentration, and mood in educational spaces (Idrus, Irnawaty, & Latif, 2025; Elnaklah et al., 2023).

In the Indonesian context, several studies highlight the importance of environmental adaptability in tropical architecture studios. Atthaillah, Saputra, and Iqbal (2025) found that natural ventilation, orientation, and spatial openness strongly affect students' thermal comfort in studio settings. Idrus et al. (2025) further demonstrate that optimizing daylight uniformity enhances visual comfort and reduces glare, aligning with the broader goal of sustainable design in academic facilities. These findings align with earlier Indonesian research, which identified cleanliness, furniture quality, thermal comfort, and spatial spaciousness as key factors influencing students' satisfaction and productivity (Fairuza et al., 2021; Vijaya, 2023).

Beyond environmental aspects, the architectural studio also contributes to students emotional and cognitive attachment to their learning space. The term *studio* originates from the Latin *studere*, meaning "to pursue," and in architecture it embodies both a place (noun) and a process (verb)—a continuous act of exploration, creation, and reflection (Suartika et al., 2023). This dual meaning situates the studio as both a physical and symbolic space for identity formation in design education (Boyer & Mitgang, 1996). When students spend extended time in these spaces, they develop not only spatial familiarity but also a deeper sense of belonging and ownership, which influences their comfort and engagement (Lewicka, 2022; Wang, Zhang, & Chen, 2024).

Recent research has further highlighted the psychological dimensions of comfort and attachment within architectural studio environments. Şekerci and Kahraman (2024) explored how interior architecture students perceive and redesign their own studios through the lens of environmental psychology. Their findings reveal that factors such as spatial layout, ergonomic furniture, color composition, and the presence of natural elements significantly influence emotional well-being and creativity. The study emphasizes that studio spaces should not only fulfill functional needs but also foster psychological satisfaction and a sense

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of ownership through flexible, aesthetically engaging, and human-centered design. This perspective reinforces the importance of understanding students' subjective experiences and supports the relevance of investigating spatial preferences and comfort factors as undertaken in this research.

This sense of belonging can be understood through the concept of sense of place, which reflects the affective, cognitive, and behavioral connections individuals form with particular environments (Cross, 2001; Shamai, 1991). A strong sense of place within educational settings fosters motivation, participation, and collaborative learning (Scannell & Gifford, 2017). According to Shamai (1991), attachment to place progresses through multiple stages—from simple awareness to deep emotional commitment—suggesting that well-designed studios can cultivate higher levels of attachment and care among students.

Designing architectural studios that support both environmental comfort and psychological well-being thus requires attention to multiple dimensions: spatial layout, lighting quality, air circulation, accessibility, cleanliness, and flexibility of use (Fairuza et al., 2021; Ezz et al., 2025). Creswell (2014) emphasizes that understanding individuals' experiences and meanings within specific settings requires qualitative exploration, as perception and comfort are inherently subjective. Therefore, this research adopts a qualitative exploratory approach to understand the preferences of architecture students toward studio spaces at Universitas Pendidikan Indonesia (UPI) and the factors that contribute to their comfort and attachment.

While previous studies have discussed environmental quality and studio pedagogy, few have explored *students' subjective experiences and sense of place* within Indonesian architecture schools. This study fills that gap by examining the relationship between environmental and psychological comfort in studio spaces at UPI. The findings are expected to provide recommendations for optimizing studio design in architecture education—creating spaces that are not only functional and sustainable but also emotionally engaging and supportive of student well-being.

2. RESEARCH METHODOLOGY

The approach used in this research is an exploratory qualitative approach. Exploratory qualitative research is an approach that is useful for exploring and understanding the meaning of individuals or groups of people (Creswell, 2014). The data collection method used is an online questionnaire with respondents being students majoring in Architecture and Architectural Engineering Education at Universitas Pendidikan Indonesia, starting from the Class of 2020, 2021, 2022, and 2023. The selection of the class of respondents refers to the active class that is still carrying out lectures on campus. The sampling method used is purposive sampling, where sampling only refers to students at a university, with certain majors and classes. The questions asked were presented openly to gather respondents' answers more broadly. Data collection was carried out in a one-month period, namely in March 2024. Respondents consisted of 81 people with a percentage of 76% female (62 people) and 23.5% male (19 people).

The data analysis method uses grounded theory which includes open coding, axial coding, and selective coding. Grounded theory is a research strategy whose goal is to generate theory from data. 'Ground' means that the theory will be generated based on data; therefore, the theory will be based on data. 'Theory' means that the purpose of collecting and analyzing research data is to generate theory. What is important in grounded theory is that the theory will be developed inductively from the data (Khan, 2014).

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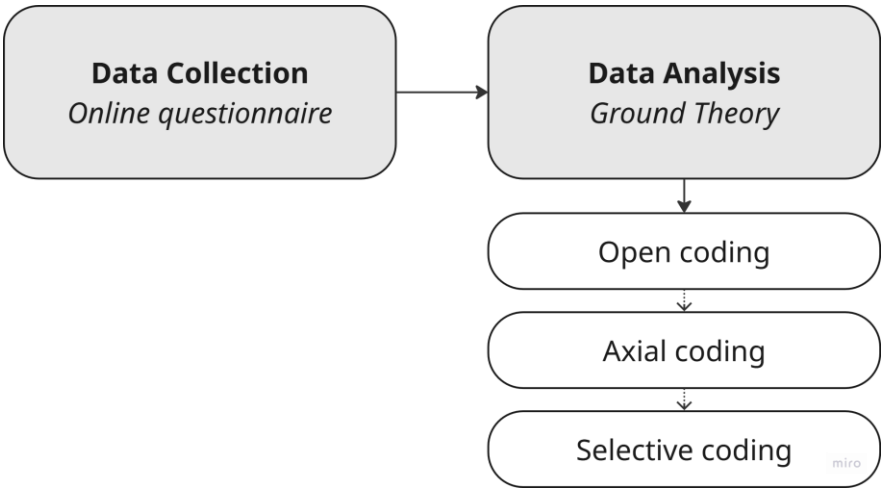

Figure 1. Research methods
Source : Personal Documentation, 2025

The open coding stage was carried out to identify keywords from respondents' answers. Axial coding is then carried out to form categories from the keywords that have been found by grouping according to closeness of meaning or nature. Meanwhile, selective coding is used to develop hypotheses referring to the category results from axial coding.

3. RESULTS AND DISCUSSION

In the questionnaire that has been distributed, there are questions related to which studio space students feel most at home in. There are five studio options, namely studio 1, studio 2, studio 3, studio 4, and final project studio. The questionnaire results show that most students feel at home in studio 1 with a score of 59 (36.65%) followed by studio 2 with a score of 41 (25.46%) and studio 4 with a score of 34 (21.12%). Studio 3 has a value of 18 (11.18%) and the final project studio has the lowest value of 9 (5.6%). The following are the results of the distribution analysis related to the studio that feels most at home.

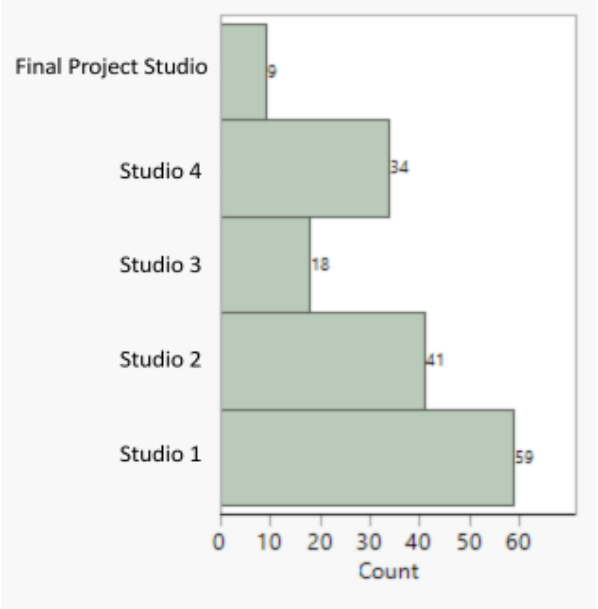

Figure 2. The results of the studio distribution analysis are most at home
Source : Personal Documentation, 2024

Most students chose studio 1 to be the studio they feel most at home in. This was followed by studio 2 in second place, then studio 4, studio 3, and finally the final project studio. When

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referring to the questionnaire question related to which studios students have used, studio 1 is the studio that all students must have used. Studio 2 and 3 have the same frequency but there are a few students who have never used the studio space. The frequency of students using studio 4 also has no significant difference compared to the other three studios, but shows that there are some students who have never used studio 4. As for the final project studio, only a handful of students have used it.

The results of the open-ended questionnaire were then processed using the open coding method. Open coding is taken from respondents' answers regarding the reasons for feeling at home in the studio. The following are examples of open coding from several respondents.

"Close to everything, stairs, elevator, corridor in front of the studio, toilet. The lighting is also still better than studio 3 and 4, which makes it dazzling. It's also more spacious, not stuffy." (Male, Architecture Student).

"Because the light circulation that enters the studio is just right. It is comfortable to work on assignments even without lights (if the weather outside is sunny)." (Female, Architecture Engineering Education Student.

The quotation from the open questionnaire above then found several keywords, namely, "close to everything", "good lighting", "light circulation feels right", "comfortable for doing tasks". Based on the results of open coding of the entire questionnaire, 17 categories were produced as presented in Table 1. The categories that have been formed will be divided into two, namely physical spatial characteristics (accessibility, dimensions, furniture, cleanliness, comfort, tranquility, availability, views, lighting, air conditioning, circulation, and utilities), and cognitive affective aspects (comfort, privacy, familiarity, safety, crowds, and concentration).

Table 1. Results of Open Coding Text Data

Accessibility	Ease of access
	Near supporting facilities
Dimention	Wide
Furniture	Adequate quantity
	Good condition
Hygiene	Clean
Comfort	Condusive
Calmness	Away from the crowd
	No noise
	Not many people passing by
Availability	Open until late
Scenery	Good Scenery
Lighting	Natural lighting
	Artificial lighting
Ventilation	Openings
	Cool
	Air circulation
	No stuffiness
Privacy	Small
Circulation	Good circulation
	Not cramped
Utilities	There is a power outlet
	Good signal
	Air Conditioner
	Wifi

Source: Personal Documentation, 2024

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The results of open coding have a frequency which is then used for distribution analysis. The distribution results reveal that the highest factor affecting the level of student friendliness in the studio room is lighting at 42 (26.08%) followed by ventilation and quietness which have the same value of 17 (10.56%) and in the next position there is comfort and dimensions with a value of 15 (9.32%). The distribution results can be seen in Figure 2.

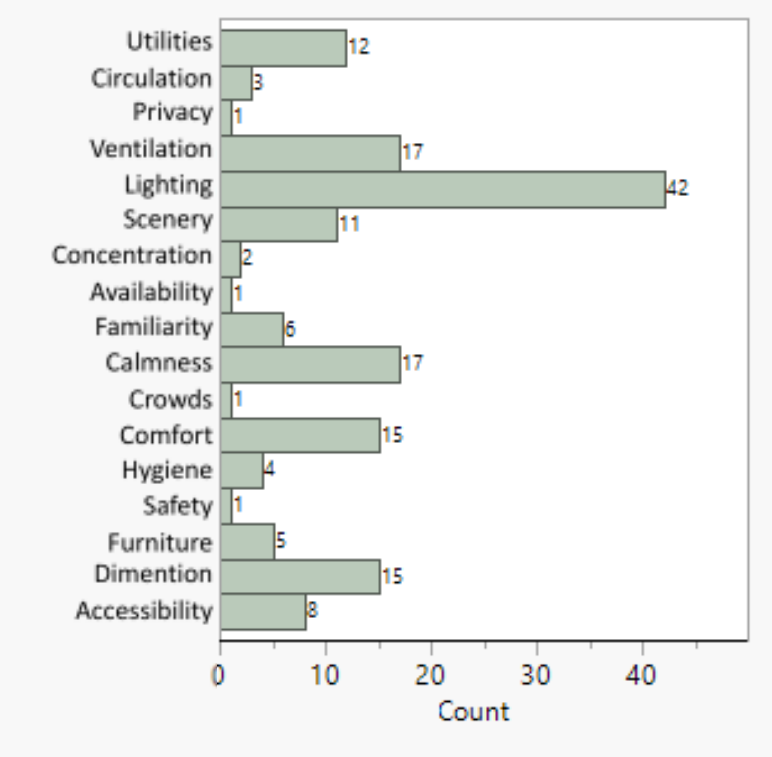

Figure 3. Results of distribution analysis of reasons for staying
Source: Personal Documentation, 2024

The accessibility category includes ease of access and proximity to community facilities. Studio space is considered accessible if it can be accessed easily without students being confused about finding the room. Another element is close to supporting facilities, which can be in the form of bathrooms, prayer rooms, elevators, and stairs. Accessibility also refers to the position of the studio space which is close to the center of activities on campus, making it easier for students to carry out various activities simultaneously.

The dimension category refers to the word area. The area in this case is seen from the size of the cubic meter of a studio space. Students feel that a wider studio space can provide better and more free space for movement. Students do not feel confined or feel cramped in the studio space due to its spacious dimensions.

Furniture is the next category that is considered important. Students consider the amount of furniture available and also its condition. The number of students in each class averages 30 people. Furniture in the form of adequate tables and chairs in each studio room must cover the needs of all existing students. An adequate amount but forced because some furniture is still in poor condition is also a shortcoming in terms of furniture.

The hygiene factor in detail refers to clean behavior. If the cleanliness of the studio space is well maintained, then students will feel comfortable in it. The cleanliness of the studio space is inseparable from the role of the students themselves as its users. So in this case, students need to be given an understanding in maintaining the cleanliness of the studio space that is being used for the convenience of the students themselves.

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The comfort that students expect is in the form of conducive conditions. Conducive conditions are influenced by the location of the studio space which is not close to the crowd. Some students also stated that the studio space that is considered at home will provide a feeling of comfort. The feeling of comfort in question is also influenced by various aspects such as lighting and the location of the studio space.

The next characteristic is tranquility. The keywords include far from the crowd, no noise, and not much traffic. The location of the studio space in Building B is considered to have better tranquility characteristics because Building B is not as crowded as Building A. The position of the studio space away from the highway also causes students not to feel noisy in the studio.

Availability refers to the time when students can use the studio. Students feel that studio operating hours that are open until night can benefit students. Longer operating hours also cause students to feel at home in the studio until night.

A good view refers to one of the studios located in Building B, namely studio 4. All students who feel studio 4 is more comfortable will mention that studio 4 has a good view. The position of the studio on the 3rd floor, at the end of the building and the end of the campus area provides a wide view due to the openings facing south and west. Students feel that the view seen from studio 4 can relax their minds from the tasks they are working on.

Lighting characteristics are the most important aspect with the highest score from the analysis. Lighting includes natural lighting and artificial lighting. Students feel that natural lighting arising from openings is sufficient in some studios. Students compared the studios in Building A which had sufficient openings and Building B which had excessive openings. The openings in the Building B studio are considered to be the entry point for too much light resulting in the room being too bright.

Airing includes openings, coolness, air circulation, and not stuffy. Existing openings in the studio space are considered sufficient for the entry and exit of air. As a result, students feel cool and not stuffy in the studio room. Air circulation also has a relationship with the dimensions of a large space so that the air circulation that occurs in it runs well.

Privacy is a category that refers to the final project studio. There are students who feel that small space dimensions provide a higher level of privacy because they do not face many people.

Circulation characteristics look at the arrangement of furniture in the studio space. If the furniture arrangement is not good, the circulation used for walking will be hampered. Students also refer to the circulation path out of the studio space which is not a lot of goods outside. In the studio located in Building B, the circulation path to the elevator is slightly covered with student mockups which causes the circulation to be slightly obstructed.

Furthermore, utility characteristics include the presence of sockets, good signal, air conditioning, and wifi. Studios located in Building B have advantages in the availability of sockets, air conditioning, and wifi. Power sockets are located on every table in studios 3 and 4, making it easier for students who need to charge their laptops during class. AC is basically available in every studio room, but the AC in Building B studios can be used better than in studios in Building A. WiFi coverage is also greater in Building B studios. However, good signal coverage is felt by students in studios located in Building A.

The category of habitability is mostly aimed at studio 1. Since the beginning, students have carried out various activities in studio 1, starting from student admission, introductory period activities, to learning carried out in the first semester of lectures, most of which are carried out in studio 1. Therefore, students feel accustomed to the conditions of studio 1. This also

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affects the memory that occurs in studio 1 since many activities have been or will be carried out in studio 1.

Security in this case has a relationship with lighting and refers to studio 2. Students feel safe when they are in studio 2 even though they are alone because of the good lighting. Darker room conditions will affect human feelings so that humans feel safer when they are in a brighter place.

The characteristic of crowdedness is inversely proportional to calmness. Crowds refer to conditions where there are many people and in this case the crowd is one of the elements that cause students to feel at home in the studio. Crowded conditions create a feeling of safety and comfort for some people.

The last characteristic is concentration. Students feel that they can focus on several things, in this case influenced by lighting, quietness, and air conditioning. The conditions created by the combination of stable space conditions result in increased student performance and also a high level of focus.

The next stage of analysis is axial coding. The keywords and categories that have been formed at the open coding and distribution analysis stages are then subjected to correspondence analysis using ward hierarchical clustering. Correspondence analysis was conducted to find out the reasons why the studio students chose felt more at home. The following are the results of the correspondence analysis between the selection of studio space and the reasons why students feel at home.

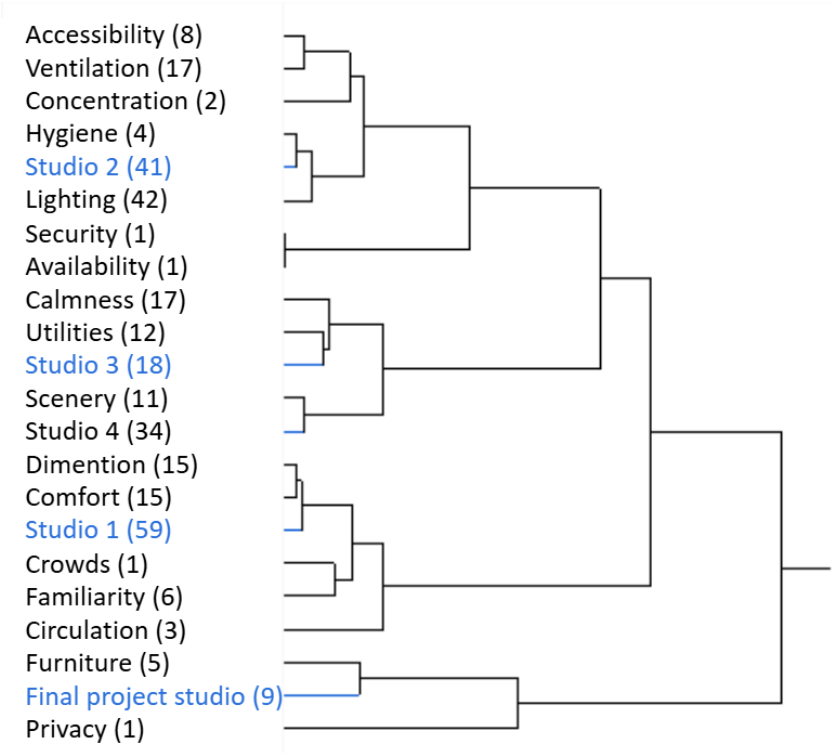

Figure 4. The results of the correspondence analysis of the studio space with the most reason to feel at home
Source: Personal Documentation, 2024

Referring to the results of the correspondence analysis, it can be seen that studio 2 has a direct relationship with accessibility, ventilation, concentration, cleanliness, lighting, security, and availability. The most prominent characteristic of studio 2 is cleanliness. The level of cleanliness in studio 2 is considered higher than other studios. The level of lighting in studio 2 is also considered the best and sufficient compared to other studios.

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Furthermore, seeing studios 3 and 4 meet on the same line, it can be concluded that the reasons students feel studios 3 and 4 are similar. Studio 3 has advantages in the characteristics of tranquility and utility. While studio 4 has advantages in terms of views. Studio 4 also has advantages in terms of tranquility and utility, but when compared to studio 3, these advantages are more owned by studio 3.

In studio 1, it was found that the reason students feel at home is due to dimensions, comfort, crowds, familiarity, and circulation. Dimensionality and comfort characteristics are at the highest level of reasons why studio 1 is considered home. The dimensions of studio 1 space are larger than other studios and the good arrangement of furniture gives students a sense of home. Familiarity is also one of the biggest elements why students feel at home in studio 1.

The last studio is the final project studio. As explained earlier related to the use of the final project studio which is specifically for final semester architecture study program students who are doing their final project. The smaller size of the final project studio, presents a higher level of privacy and adequate furniture for final project students.

Previous research by Fairuza (2021) revealed that studio space must be designed by paying attention to several important aspects, namely facilities, cleanliness, tidiness and maintenance, thermal comfort, connection, spaciousness, then followed by other aspects. In this study, the results reveal that important aspects that must be considered starting from the highest priority include lighting, air conditioning, quietness, comfort, dimensions, utilities, and the rest follow.

The results also illustrate the reasons why students feel at home in each studio space as illustrated in the following selective coding analysis results.

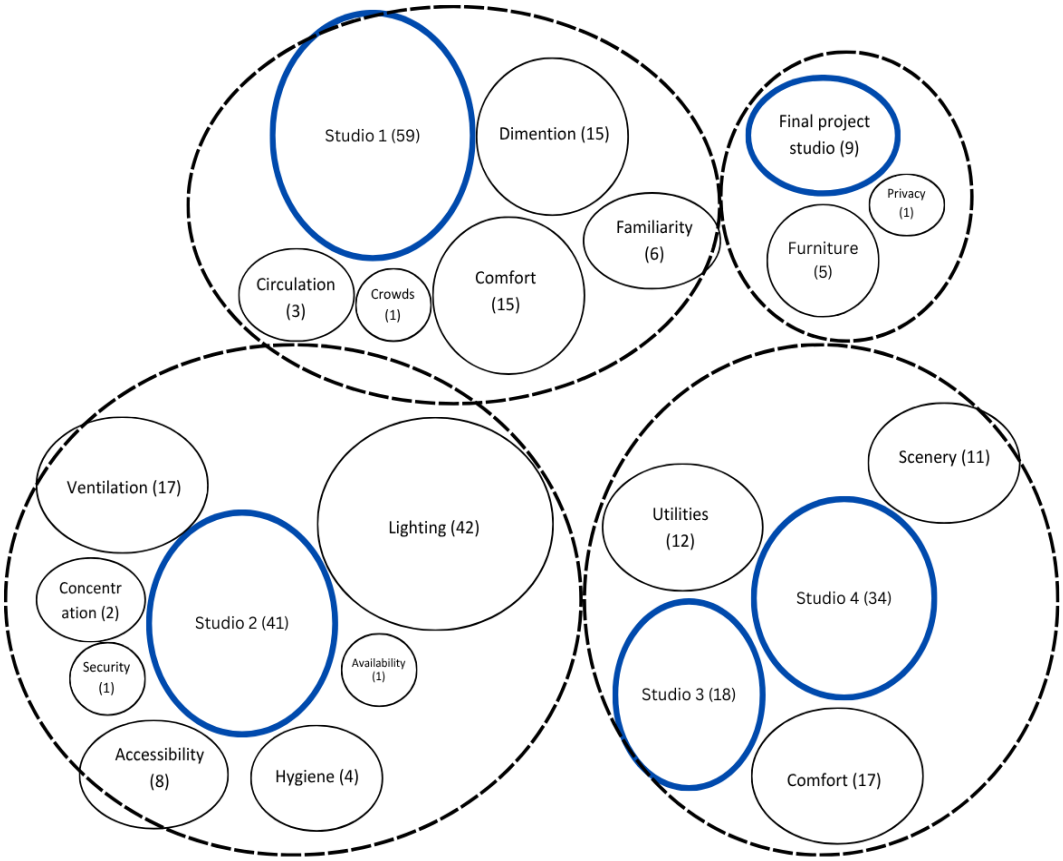

Figure 5. Selective Coding Analysis
Source: Personal Documentation, 2024

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3.1 Level of Sense of Place

According to Shamai (1991), there are seven levels of sense of place, namely, (1) not having an attachment to a place, (2) having knowledge of a place, (3) having a sense of ownership of a place, (4) attachment to a place, (5) identifying the purpose of a place, (6) involvement in a place, and (7) sacrifice for a place. Each level has characteristics that can describe a human relationship with a place. At the first level, it is certain that there is no relationship between humans and a place. At the second level, humans know the existence of a place but do not feel like being part of the place. At the third level, humans already feel like they are part of the place. The fourth level is similar to the third level but the place already has its own uniqueness that humans are aware of. The fifth level is a condition where humans have blended in with the purpose of a place. The sixth level is humans who are involved in all activities in a place or can be called a community. The seventh and final level is a condition where humans are willing to sacrifice for a place. Based on the 17 categories that have been classified, the level of sense of place that students have towards the studio space is at the fourth level, namely attachment to a place. This is due to the existence of categories that are factors in student comfort, which are unique points of the studio space. Students can choose the studio space they want based on these factors. However, each student certainly has a different level of attachment to the studio space, accompanied by various reasons.

3.2 Factors Forming Sense of Place

Sense of place arises due to various factors. Cross (2001) groups the factors that can form a sense of place into six types, namely biographical, spiritual, ideological, narrative, commodification, and dependency. Biographical explains the sense of place that can be formed because a place has been inhabited for a long time. This factor is the strongest compared to other factors because the relationship will continue to strengthen over time. The spiritual factor appears not based on something real but in the form of feelings. This is often inexplicable and is an intuitive relationship rather than an emotional, cognitive, or material relationship. Ideological relationships are conscious relationships and refer to beliefs about how humans should deal with an environment. This factor is often related to religious or secular matters. Narrative factors arise from stories heard, which can be myths, family history, or fictional stories. The story can provide information about the history and relationship of humans to the place. The commodification factor is a relationship that arises because humans themselves choose a place based on the desired features. This relationship is not related to personal history but often arises from dissatisfaction with a feature in a place so that they look for another place that can meet human needs. This relationship is based on the match between the attributes of the place and human thinking about an ideal place. The last is the dependency factor, a relationship that arises from the result of coercion because there is no choice or limitations in choice. This relationship seems to lack a positive emotional or mental connection.

There are 17 categories that have been classified into factors that are benchmarks for student comfort. These factors emerge based on students' perceptions of the studio space that they feel comfortable occupying. The existence of factors that are benchmarks in choosing a space that is considered comfortable indicates that sense of place emerges due to commodification factors. Students can choose one of the studios that they consider comfortable, and tell about the things they like or dislike about the space.

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4. CONCLUSIONS

Most students feel most comfortable in studio 1, followed by studio 2, 4, 3, and finally the final project studio. In terms of usage, all students have used studio 1, while a few students have not used studios 2, 3, 4. As for the final project studio, only final year students use it.

The level of student comfort in the studio space is influenced by various factors that are categorized into 17 aspects: accessibility, dimensions, furniture, cleanliness, comfort, tranquility, availability, view, lighting, ventilation, privacy, circulation, utilities, familiarity, security, crowds, and concentration.

Accessibility is important because of the ease of access and proximity to campus facilities. The large dimensions of the room provide more comfort for students. Adequate furniture and cleanliness of the room are also very important. The comfort of the room is influenced by conducive conditions and being away from the crowd. The availability of long operating hours, good views, and good lighting are other important factors.

Studio 2 excels in cleanliness and lighting, while studios 3 and 4 are equally valued for their quietness and utility, with studio 4 also standing out in terms of views. Studio 1 is considered comfortable because of its large dimensions and good furniture arrangement, as well as the habit of students who often use the space. The final project studio offers high privacy because of its smaller size and limited use by final year architecture students. The level of sense of place that students have with the studio space is at the fourth level, namely attachment to a place. The factors that form a sense of place are the result of commodification factors.

This study has shortcomings related to the universal level. The object of research that focuses on the architectural studio space located at the Indonesian Education University can result in the results of the study not being able to be used in studio spaces at other universities. This can be overcome by matching the characteristics of the studio space at the Indonesian Education University with other studio spaces.

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