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Architecture Studio Space Analysis of Engineering Faculty, Subang University

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A B S T R A C T

The Architectural Design Studio Room, Faculty of Engineering, University of Subang is a room with a large intensity of use, the core activities of the studio start from carrying out the design planning process, making design concepts such as drawing concept sketches, then making pre-design drawings and detailed drawings to make design presentations such as mock-ups and poster. architectural design studio space design needs to accommodate the various activities it contains. Today, many students prefer to work on this course elsewhere rather than in the studio. As a result, the use of studios becomes less effective and has an impact on the condition of the studio which is empty of students. The use of the studio is greatly influenced by the quality of the studio space itself, starting from architectural components such as lighting, ventilation, and the carrying capacity of the furniture as well as the condition of the interior wall color of the studio space. The quality of this space can be seen from the level of student attendance, and the intensity of students being in the studio. This critique aims to find out how much influence the quality of space has on the effectiveness of space use, in this case, the design studio space in the architecture department. and it is hoped that the process of making changes or adding facilities that are able to accommodate all lecture activities and be able to provide lecture facilities that are comfortable and accommodate lecture activities. study program in the Department of Architecture. the carrying capacity of the furniture and the condition of the interior wall color of the studio space.

1. Introduction

Subang University (UNSUB) is one of the tertiary institutions in Subang Regency, West Java. Unsub has 7 Faculties and 14 Study Programs (Prodi) with Master, Bachelors, and D3 levels. Subang University consists of 2 (two) campuses, namely Campus I which is located at Jalan RA Kartini Km. 03 Subang, while Campus II is on Jalan Arif Rahman Hakim Subang, namely the Faculty of Engineering Campus

The Department of Architecture, Faculty of Engineering, University of Subang is a school that studies the field of building design where the school has a special room that other departments don't have, namely an architectural design studio room. The Architectural Design Studio is the main place for carrying out lecture activities at the Department of Architecture, namely Architectural Design. In the Studio class, students work on the design process and provide assistance to supervisors (Akbardin, J., and Permana, A. Y., 2020; Kencanasari et al., 2020). In general, the activities carried out by students in architectural design studios are drawing and conceptualizing ideas with sketches that are carried out on tables and then modeling and making design presentations, not a few students complain about the conditions and quality of the studio where they work.

In a scientific work of research type management *of School Supplies* school equipment or also often referred to as school facilities, can be grouped into (1) educational facilities; and (2) educational infrastructure. Educational facilities are all equipment, materials, and furniture that are directly used in the educational process at school. While educational infrastructure is all basic equipment that indirectly supports the implementation of the educational process in schools. In order to better understand what an architecture classroom/lecture or studio space means, we can refer to the opinions of the following experts: According to (Obeidat, 2012) states that the design of a classroom will affect the level of creativity, concentration, behavior, performance, and happiness of students. A study related to students' perceptions of architectural studios, it is stated that studio size is closely related to aspects of student privacy. The lecture room is a room where teaching and learning activities take place face to face in the form of discussions, lectures, tutorials, and so on, The maximum capacity in the lecture hall is 25 students with a standard area requirement of 2m2/student. The minimum circulation of 60% with the intention of facilitating the movement of students and lecturers in the room according BSNP, 2011.

Furthermore Studio quality greatly affects the level of effectiveness of using a studio space where the better the quality of an image studio, the more effective its use will be (Bagaskara et al., 2018). The large size of the studio can provide a variety of activities. However, the size of the studio is too large will result in ineffective use of space, and students tend to gather in the corners of the room. Some students also want a separate room to maintain their privacy and concentration. Apart from the size of the studio, the visual interaction produced by the studio can increase positive responses to the student learning process. Adequate studio facilities will increase student motivation and commitment to work on studio assignments (Nadiar et al., 2019; Nurrahman and Muslim, 2019; Rinaldi and Permana, 2019; Soewarno, 2020).

While in the drawing studio, architecture students need a room layout and arrangement of furniture that can support their activities, including drawing tables, chairs, drawing cabinets and others. According to the Architect's Data, there are layouts and dimensions of furniture for drawing studios in the architecture department. The furniture used is a means of complementing and filling space, this furniture must be able to serve all activities in an image studio (Anggraeni, 2015). The circulation of human movement in the drawing studio is influenced by the layout and type of furniture. The placement of the furniture needs to be arranged in such a way as to produce circulation based on anthropometric data (Hakiki et al., 2020; Ibrahim and Ashadi, 2020; Rahayu and Swari, 2020).

Meanwhile, the seating arrangement pattern in the classroom/studio is divided into 5 types (Muman & Hadiansyah, 2016):
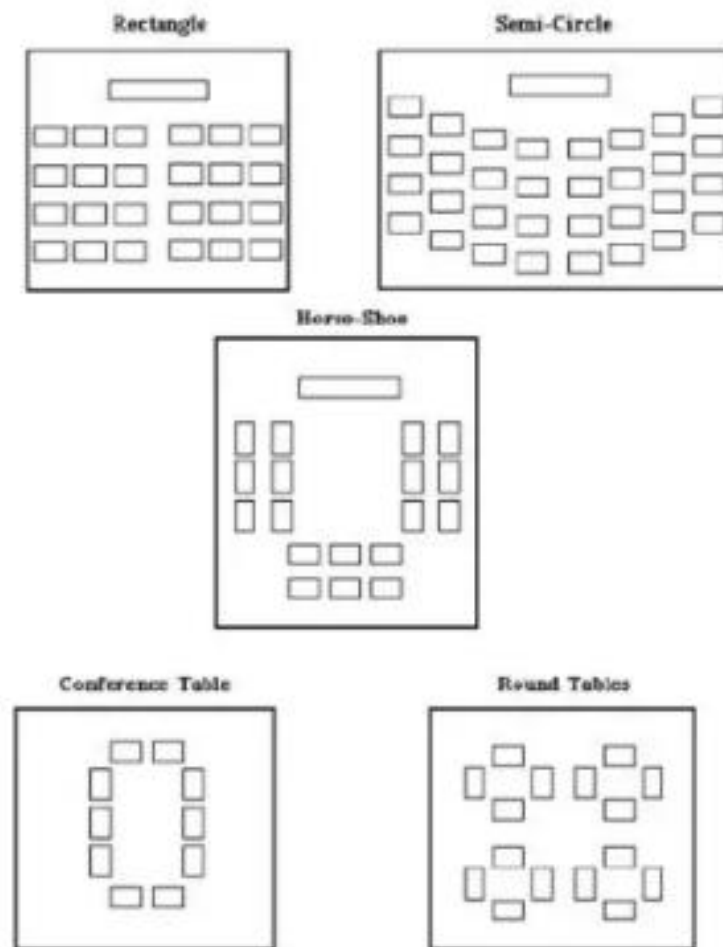
Figure 1. Model Classroom

*(a) Pattern*rectangle is a pattern facing forward that forms a square pattern. Patterns like this are widely used in study spaces such as classrooms and lecture halls. The activities that occur in this pattern are a bit of a discussion. (b)*Pattern*semi circleis a tiered pattern that forms an arch facing forward. This pattern is usually used for auditorium rooms. This pattern is for rooms with groups that require little discussion. (c)*Pattern*horse-shoeis a stacked pattern that goes around from the same pattern facing forward. This pattern is usually used in workshop rooms and lecture rooms. (d).*Pattern*conferenceis a tiered pattern with a circular shape with a reference point in the middle. This pattern is suitable for use in meeting rooms or conference rooms. This pattern is for rooms with groups that require a lot of discussion. (e). Pattern*round tables*is a pattern composed of several patterns that are the same with several reference points. Patterns like this are usually used in studio rooms or spaces for internal activities.Comfort is one aspect that is highly influenced by the quality of architectural studio space. The benchmarks for comfort are facilities, furniture layout, and circulation created through dimensions.

Studio Room Standard

Based on ISO-8402, 1994 Energy Conservation in Lighting Systems, the required illuminance in the drawing room is 750 lux. Comfortable interior air temperature in the humid tropics according to Santoso, 2012 is 230C - 260C. This can be worked around by either using openings for natural ventilation or vice versa, using an air conditioner to stabilize the air temperature in the room. Layout, completeness and standard sizes of furniture for architectural design studios must also be considered in order to support the activities of architectural design courses in the architecture department. Based on Neufrt in 1996 in his book entitled Data Architect volume 1, there are standard layouts and furniture dimensions for drawing studios in the architecture department. based on the layout of the studio space of at least 3m x 4.6m.

Figure 2 includes several labeled diagrams:

240 (220 – 200)	240 (220 – 200)
Meja tempat menyim-pan konstruksi	Meja tempat menyim-pan konstruksi

DIN A0 – DIN A2

100 (80 + 55)

200 (180 + 160)

Meja penulisan konstruksi

Bidang gambar

Meja penulisan konstruksi

Bidang gambar

100 (80 + 55)

150 – 250

DIN A1 (DIN A0) 80 (100) max. 135

⑦ Tempat/bidang bekerja (irisan gambar) → ⑧

③ Jatuhnya cahaya ketika menulis dari belakang kiri, ketika menggambar dari kiri depan

140 – 220

80 – 125

⑤ Alat gambar (bergerak) yang berdiri → ⑥.

80° 60° 45°

10°

213
165
157
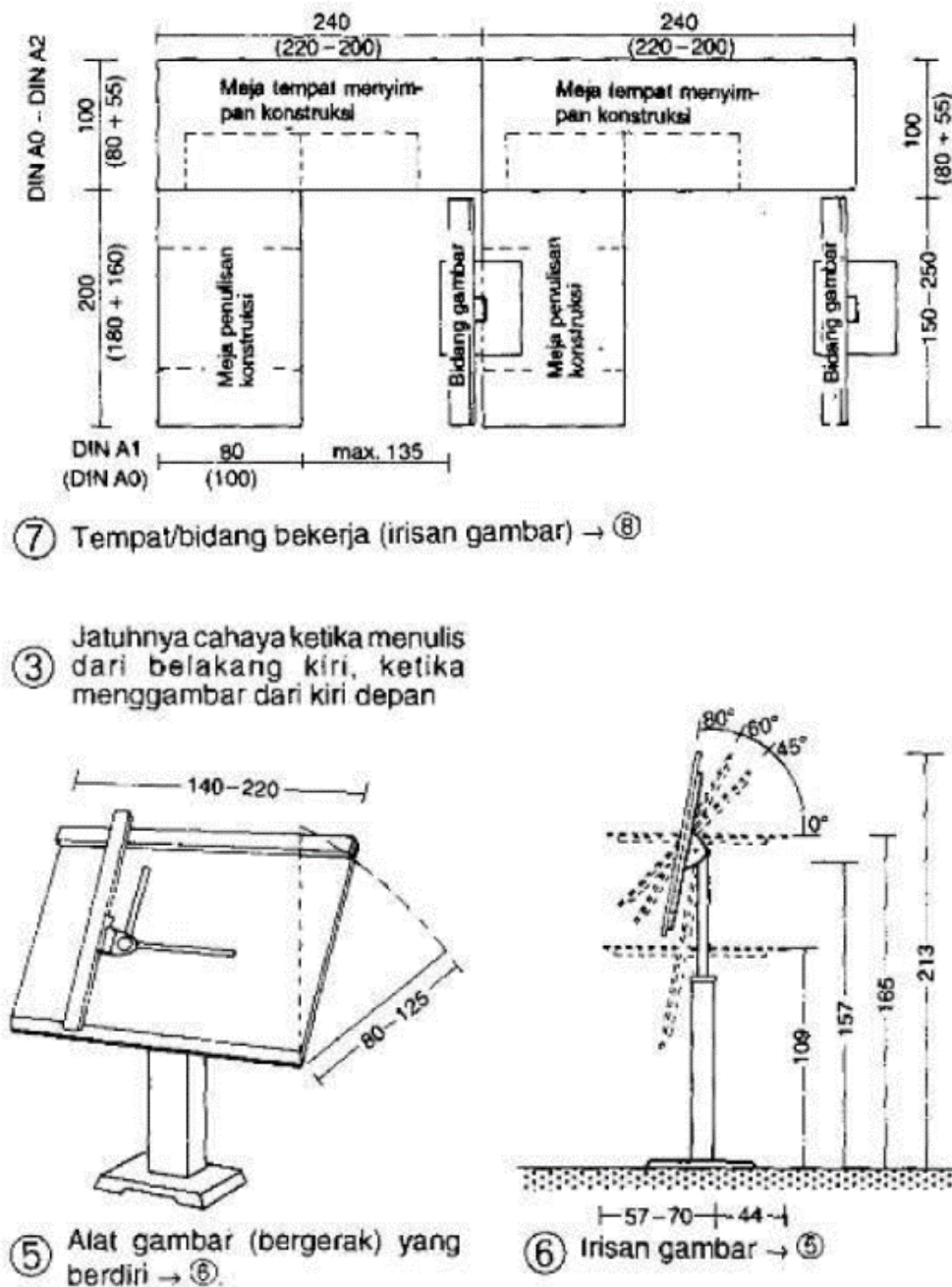109

57 – 70 44

⑥ Irisan gambar → ⑤

Figure 2. Furniture Standards

Wall color psychologically influences students' behavior and learning enthusiasm in designing activities in the studio. According to (Prasetya, 2007) the dominance of white in the work space actually has a positive effect, which has the ability to reduce the increase in work stress compared to the composition of Harmonis and Disharmonis colors. Harmonious color composition means a blend of two or more colors, which are in harmony so as to form a perfect color combination and constitute one unit. Disharmonious color composition can be interpreted as a combination of two or more colors that are not in harmony so as to form an imperfect color combination and do not have one unit.

2. Research Methods

The method used in critiquing the Architecture Studio space is a measurable normative critique method, this method is a set of conjectures that are able to define buildings both quantitatively and qualitatively. Critical method by looking at the size and amount of space used in a building with reference to standardization with other buildings. The essence of the measurable critical method, measurement criticism states a use of numbers or numbers resulting from various kinds of observations as a way of analyzing buildings through certain mathematical laws. Measurement norms are used to provide a more quantitative direction. This is an analogy form of science. Processing through statistics or other techniques will reveal new

information about the object being measured and certain insights in the study. Numbers or measurement standards specifically provide norms for how buildings are estimated to be implemented. Standardization of measurements in building design can be: Minimum or maximum limit sizes, Average limit sizes (average), Desired conditions. Primary Data Represents data directly obtained from the main data at the research location. It is carried out through technical and non-technical field observations, as well as through questionnaires aimed at student supervisors. Secondary data is carried out through literature studies by studying books, journals, and related research to be used as a reference in collecting and analyzing research data. Direct Observation is carried out by observing and measuring the condition of the object (in this case C101 & C102 studios) in general such as studio area, studio capacity, collecting data on the number of components and the condition of the components in the studio then reviewing it from the architectural side of the studio, namely from ventilation, lighting and the carrying capacity and ergonomics of furniture in the room.

The results of the data are in the form of general studio data, room furniture layout plans. and data on the number of furniture, floor plan for the placement of lamps and room lux data, floor plan for the placement of air conditioners, floor plan for the placement of sockets and the number of sockets. The questionnaire was carried out by giving a number of questions to level 1, 2 and 3 students as the main users of the studio, regarding the purpose of students coming to the studio, the user's presence in the studio, the length of time the student was in the studio and the user's feelings about the studio conditions. illumination and bearing capacity and ergonomics of indoor furniture. The results of the data are in the form of general studio data, room furniture layout plans. and data on the number of furniture, floor plan for the placement of lamps and room lux data, floor plan for the placement of air conditioners, floor plan for the placement of sockets and the number of sockets. The questionnaire was carried out by giving a number of questions to level 1, 2 and 3 students as the main users of the studio, regarding the purpose of students coming to the studio, the user's presence in the studio, the length of time the student was in the studio and the user's feelings about the studio conditions. illumination and bearing capacity and ergonomics of indoor furniture. The results of the data are in the form of general studio data, room furniture layout plans. and data on the number of furniture, floor plan for the placement of lamps and room lux data, floor plan for the placement of air conditioners, floor plan for the placement of sockets and the number of sockets. The questionnaire was carried out by giving a number of questions to level 1, 2 and 3 students as the main users of the studio, regarding the purpose of students coming to the studio, the user's presence in the studio, the length of time the student was in the studio and the user's feelings about the studio conditions.

3. Results and Discussion

Data Umum

Nama Gedung : Fakultas Teknik Unvesitas Subang

Lokasi : Jl.A.Rahman Hakim Subang, Jawa Barat

Luas Lahan : 20.340 m2

Batas Lahan :

    Utara : Pemukiman

    Timur : Sekolah MTS

    Selatan : Jalan Raya

    Barat : Pemukiman

Lokasi Tapak
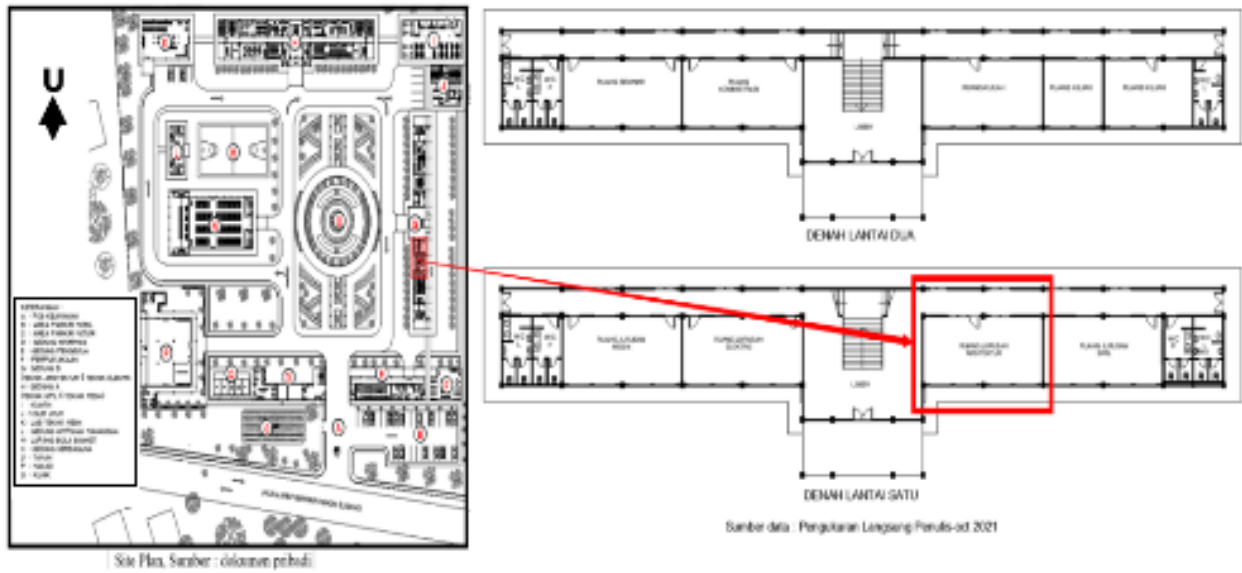Sumber : www.googleearth.com 2021

Figure 3. Conditions of the architecture studio at the University of Subang
Source: doc. writer 2021

Figure 4. Classroom

Tabel 1. Existing room conditions

Existing room conditions:

Room Name	Capacity	Area m²
R. Lecturer	5 people	10 m²
R. Student	30 people	30 m²
Final Project Studio	(20 people/)	20m²
R. Big Lecture	35	-
R. Student Activities	30	10M2
R. Exhibitions & Seminars	20	-
	Total	**70 M2**

3.1 Architectural Studio Room Size Standard

The Campus Architecture Studio Room, Faculty of Engineering, University of Subang is located on Jl. Arief Ranchman Hakim subang, has not been able to accommodate teaching and learning activities. Based on a comparison of the number of students with inadequate facilities available. Architectural Studio space analysis is needed to determine the amount of space in the building. In determining the amount of space required a standard as a source of consideration. The standards used in this case are sourced from: NE:(Ernest & Neufert, 1996; BSN, 2011)

Table 2. (Standard size of Architectural studio space)

ventilation (oC)	Condition	Conclusion
29,3	The AC was all on, and the windows were closed	Not up to standard
30,8		Not up to standard

Tabel 3.

Space Requirements	Capacity	standard	Source	Area m²	Flow	Total m²
R. Lecturer	5 people	4 m²/etc	BSNP	20m²	20%	24 m²
R. Student	10 people	2m²/mhs	BSNP	20m²	20%	24 m²
Final Project Studio	4 units (20 people/)	2m²/mhs	BSNP	160m²	20%	192 m²
R. Big Lecture	80 people	1.5m²/mhs	BSNP	120 m²	20%	144 m²
R. Student Activities			EN		20%	14 m²
R. Exhibitions & Seminars			EN		20%	25 m²
Construction and Materials Technology Laboratory			EN		20%	25 m²
R. Center for Architectural Research & Work			EN		20%	25 m²
Total						473M2

The comparison between the area of the old room and the size of the new room is: Total area of the old building = 7m x 10m = 70m2, Needed space = 473 m2, Shortage of space = 403 m2 Based on these comparisons, it can be concluded that there must be an additional building of 403 m2 to accommodate can meet the activities and needs of lectures in the Architecture Studio Room, Faculty of Engineering, University of Subang.

3.2 Lighting Standard

Tabel 4. Lighting standard

Studio	Illumination (lux)	Condition	Conclusion
C-101	140.5 lux		Not up to standard
		Lights all on, windows open	
C-102	174.8 lux		Not up to standard

It can be concluded that the lighting quality of Studio C-101 & C-102 does not meet the illumination standard for this type of drawing room, which is 750 lux.

3.3 Studio Room Ventilation Standards

The comfortable interior air temperature in the humid tropics according to Santoso (2012) is 230C - 260C. It can be concluded that the quality of the ventilation for Studio C101 & C102 does not meet the temperature comfort standards, namely between 230C -260C.

3.4 Quality of Furniture in the Studio

Table 5. (Furniture in the Architecture studio room)

Studio	Furniture	Material	Excess, Lack
C-101	Chair	Metal with sponge mount (non wheels)	Excess: The holder is made of sponge Lack: Not praying
	Table	MDF finishing HPL	Excess: Scratch resistant
Dimensions	**Conclusion**	**Wall Color**	**Conclusion**
40x40x	V	Beige Domination	V
50 Backrest area 40x3 8	X		
Studio	**Furniture**	**Material**	**Excess**
C-102	Chair	Wood	Hard stand, No pray
	Meja	Wood	Unable to draw
Dimensions	**Conclusion**	**Wall Color**	**Conclusion**
45x45x40	V	Domination Beige combination	V
Backrest 45x15	X		

It can be concluded that the materials and dimensions of the furniture tables and chairs in studio C-101 & C-102 do not meet the standards from architect data, the color of the inner walls of the studio C-101 & C-102 does not meet the comfort standards for workspaces with a predominance of light colors.

4. Conclusion

In general, studio conditions can be categorized as having poor quality, in terms of lighting and ventilation, they do not meet comfort standards. Then in terms of the quality of the furniture, it also does not meet the standards of comfort and ergonomics. The use of studios with studio conditions which are

generally categorized as having poor quality greatly affects the effectiveness of the use of the studio. To further increase the effectiveness of the use of the studio, campus managers are advised to improve the quality of the studio by: (a) The comparison between the area of the old room and the size of the new room is: Total area of the old building = 7m x 10m = 70m2, Needed space = 473 m2, Shortage of space = 403 m2 Based on these comparisons, it can be concluded that there must be an additional building of 403 m2 to accommodate can meet the activities and needs of lectures in the Architecture Studio Room, Faculty of Engineering, University of Subang; (b) Provide adequate ventilation, such as adding natural ventilation systems by planting trees, adding louvres, and sun shaders. If you still feel hot, you can add artificial ventilation such as air conditioning or something like that to further stabilize the comfortable temperature in the tropics, which is 23-26oC; (c) Repair the lights that are off and or replace the lights with higher power to increase the lux of the room to match the drawing room illumination standard of 750 lux; (d) Replacing furniture that is not adequate to support the work of PA assignments such as tables that are not able to carry out the drawing process by students, even though nowadays they use laptops as a substitute, but design exploration still uses free hand drawing. Wooden chairs should also be replaced with chairs on wheels with sponge seats so that when working on PA with a long sitting time you don't feel sore or tired; dan (e) Increasing the quality of studio supporting components such as wifi whose speed is still relatively low for browsing references for PA assignments and the number of sockets where students still feel that there are those who are unable to recharge their laptop batteries so that the effectiveness of using the studio decreases.

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