Wellbeing Study in Architectural Design Studio for Generation Z Student

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Abstract. Architecture education is inseparable from the studio, where the students spend most of their study time doing the design process. As the building has a longer lifespan than a student's study period, the studio may serve cross-generational users. It is important to reassess how students feel while using the same space designed mainly for the generations before them. This research aims to collect the assessment of the studio features, namely physical condition, spatial configuration, flexibility, accessibility, room facility, room performance, and satisfaction, as well as self-assessed well-being by Generation Z respondents. Online questionnaires were given to 80 students during their second year of study in the undergraduate architecture department, as they experienced different studio conditions in their 3rd and 4th semesters. The result is that the students feel more fit with the studio in the 4th semester in every aspect, except the studio's zone clarity. They assessed the same level of well-being also. Comfortability, ease of interaction, and furniture condition are considered essential for the students, as well as group partners and relations with tutors, to make them comfortable in the Studio.

1. Introduction

The presence of studios plays an important role in Architectural education, where students usually spend one third of their day working inside the studio, refining their ideas to make their architectural design . This system rooted back to the practice of studio in the Ecole des Beaux Arts in France in 1819. Teaching architecture means giving the student space to grow their critical thinking, to interpret and to explore from multiple perspectives, to produce a holistic contextual design, rather than merely a building. In the process, dialogue, interaction and criticism is very important. The students are expected to do learning by doing [1]. There has been research regarding the pedagogy of how to teach architecture to students, but not so many of them try to understand the relationship between the place where the architectural education takes place and how it will affect the students.

1.1. Studio Essentials

Previous research has been done around the world to understand the connection between studio physical space - features and how the students will perceive their surroundings, in relation to the education process in Architectural studio. These concluded essential aspects from the previous research, such as: ambience, spatial, and technology features [2], lighting quality [3], privacy [4], thermal [5], spatial layout and adjustable furniture [6], and noise [7]. These aspects are usually being explored individually, so that the relation between one aspect related to a student's performance, satisfaction, or comfort can be clearly defined. In this research, these aspects are being explored and included in the questionnaire

that will be given to the students, to find how well the observed studio has been functioning, in the perspective of the students.

1.2. Wellbeing Metrics

In terms of the built environment, well being has been an important consideration, mainly in indoor environmental quality, and could act as the manifestation of empathy to the building occupants. The term well being itself is usually associated with health, but actually not only physical health, but also mental health. Well being is commonly defined as the positive feeling, relation and emotions towards life, and also the ability to function well, that makes one is able to realise their potential, overcome the pressure and stress they may experience, and can contribute positively to their surroundings [8]

On the other hand, students who choose architecture majors have been famous for their tight assignment deadlines, works to do and competencies to master that leads to lack of sleep. This lack of sleep was proved as the cause of mild stress [9]. Furthermore, chronic mild stress can lead to anxiety and, much deeper, to depression [10] Therefore, architectural design studios are not only a place for working assignments, but a place to share the ups and downs of life in the architecture education process.

There are two perspectives regarding the well being state, they are hedonic and eudaimonic well being. While hedonic well being focuses on pleasure and avoiding pain, eudaimonic well being focuses on meaning and self-realisation, that makes a person able to function well and wholeheartedly [11]. Ideally, it is the eudaimonic well being that should be experienced in the architectural design studio.

Previous research has done some literature study regarding wellbeing and attempt to measure the well beingness that is manifested in certain variables by adapting the The Warwick-Edinburgh Mental Wellbeing Scale, which are: optimistic, knowing self purpose clearly, relaxed, easy to interact, become oneself truly, solve problem easily, ability to think clearly, feeling useful, closer to other people, satisfied, make decision easily, good concentration and focus, feel valued, ability to make decision and the energised feeling towards life [12].

1.3. Generation Z Student

Generation Z is often defined as the generation that was born between 1997 and 2012 [13]. As their age ranged from around 11 to 26 by this year, this generation will generally be at the periods of intense education, one of which is in university. This generation has their own unique character, as a result of being exposed to gadgets and the internet since their young age. They tend to be creative, goal oriented, likes hands on experiences, has high expectations, pragmatic and self reliant [14]

There are many theories about the standpoint of assessing the Studio and Architectural Education in general. Researchers has done quite an extensive research, regarding the learning styles of generation Z students, like:

- Students should be encouraged to communicate frequently with their tutors and other students and explore the potentiality of various design solutions [15]
- Students learn a great deal from one another and that this happens when they are easily able to meet, work together and socialise with their peers and also with students from other years and levels in the studio [16]

Many of the previous research describe the pedagogical and psychological of architecture education with Generation Z as the students, but less research is done in connection with the studio features and space with the wellbeing that the generation has perceived.

2. The Observed Studio

2.1. The Students

The subjects for this research were the second year Architecture students in a University, located in the southern part of Surabaya. As the studio culture in architectural education is different from the class they have experienced during highschool, therefore it was assumed that in their second year, they have overcome the adaptation - transition period in architectural education system, that makes their responses

valid to represent how architecture students will be feeling genuinely. The building for the Undergraduate Department of Architecture and all its studios was built around 1990.

The studio consists of around 80 students with the age range from 19 to 21 years old, in which, 36 of them are female students and the rest is male. All of the students participating in the studio will have to be at the studio for three days per week (on Monday, Wednesday and Thursday), between 7.30AM to 5.30PM. They will have break periods for participating university's communal prayer activities, and also having a break, such as lunch break. This means they ideally have to be at the studio for minimum 8 hours per studio day, which resembles the working hours of professional architects. They were exposed to different studio conditions in their third and fourth semester of study.

2.2. The Existing Condition

There are three design studios that the students used during their third and fourth semester in their Architecture major. In the third semester, students worked in three smaller studio rooms, which are P705, P710 and a part of P701 studio (highlighted with yellow colour in figure 1), while in the fourth semester, the students were moved into the whole P701 studio (highlighted with blue colour in figure 1). The openings of the studios are oriented to North (P705) and South (P710 and P701). There is also some part of P701 opening that is facing West. All of the studios are using air conditioning systems, while having operable windows for natural ventilation.

Between the studios, there is a lift lobby hall with proper seating arrangement for discussion, as well as working their drawings. As in the 3rd semester, the spread of covid19 was still a thread, this hall was also regularly used by the students and tutors to do design discussion, even crits.

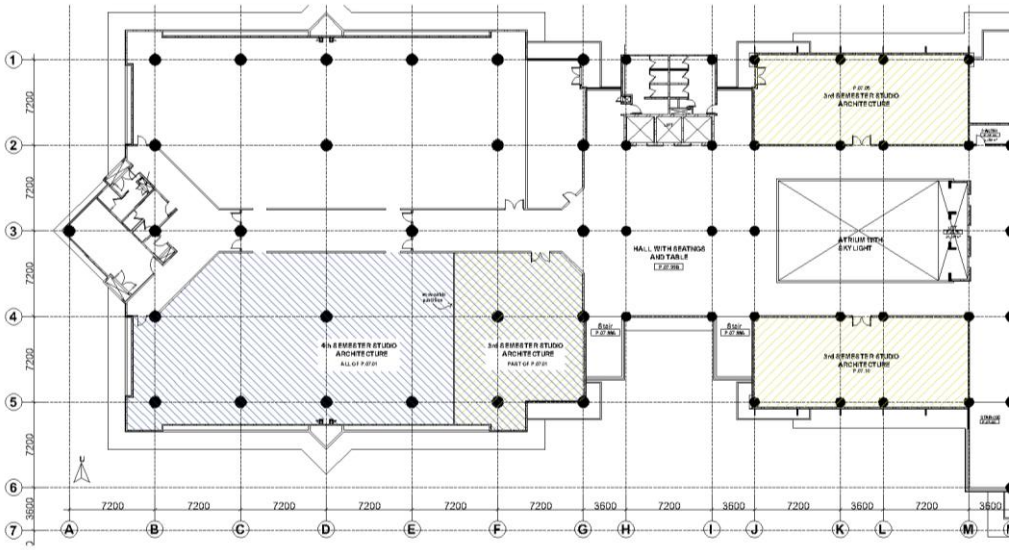


Figure 1. The location of studio in 3rd and 4th semester

P705 and P710 Studio has the capacity of six groups of seats (around 48 seats), but only being occupied by around 60% (four groups: around 30 person per room) to prevent the spread of covid19. The studio dimension is 18 m x 7.5 m, and the ceiling height is 3.2 m. They are located beside an atrium with skylight, making the rooms able to use daylighting as their main source of illumination on most of its operating hours.

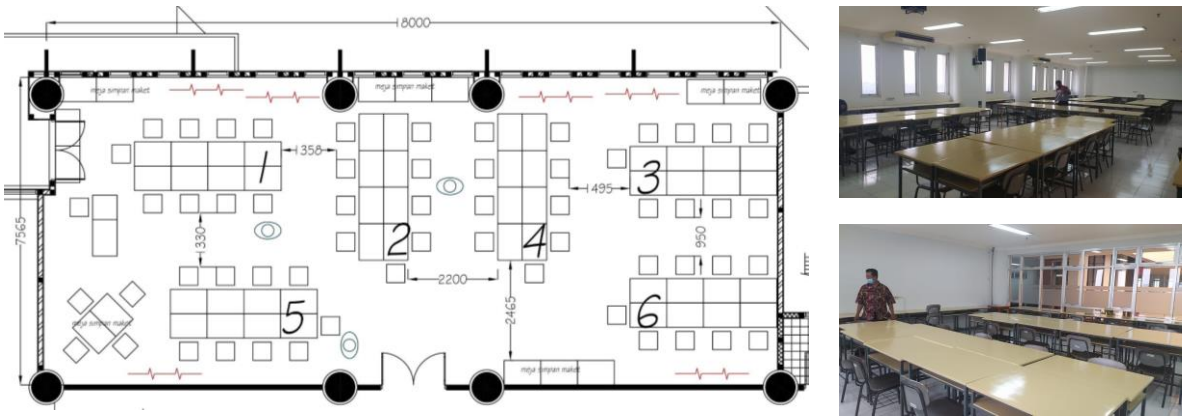
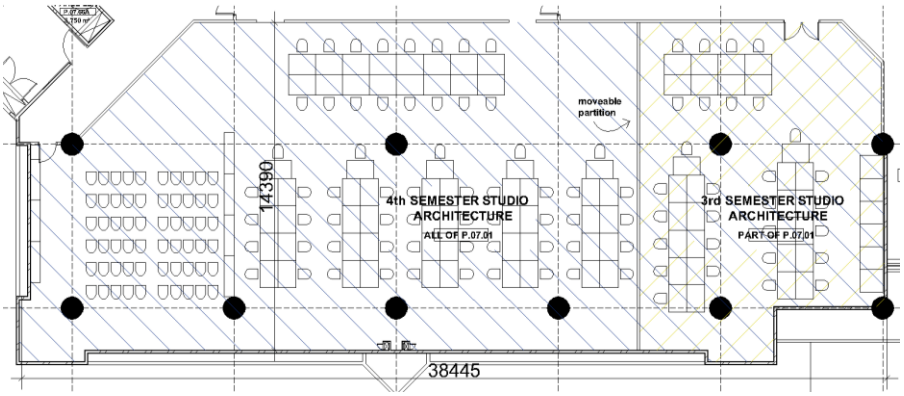


Figure 2. The situation of P705 studio, that mirrors the P710.

Beside the two mirrorlike studios in P705 and P710, students also use a part of P701 studio, as they have to share the studio with the first semester students. The used part of the studio has a ceiling above the room (+3.5m) and is well partitioned by a moveable acoustic partition. The studio has only three windows facing south.

In the fourth semester, all of the students moved to a larger studio: the unpartitioned P701. This studio can accommodate all of them, so they faced a different situation and scale than the previous semester. The dimension for the fourth semester studio is around 38.5 m x 14.3 m, and the students can use the whole P701 room for themselves. This studio has no ceiling, so that they can see exposed beams and utility pipes above their working space. The studio is more spacious also, as the vertical limit of the working space is heightened by the absence of ceiling. More detailed comparison between the studios can be summarised as follows in Table 1.



Condition in 3rd semester

Condition in 4th semester - all partitions were opened

Figure 3. P701 studio within the different semester

Table 1. Studio room comparison

	Third Semester			Fourth Semester
	P701 (Partitioned)	P705	P710	P701 (whole)
Area / Capacity	103.87m2 for 21 students	138.88m2 for 30 students	138.88m2 for 30 students	513.32m2 for 84 Students
Area per student	4.95m2	4.63m2	4.63m2	6.13m2
Table Dimension	120x100cm	90x65cm	90x65cm	120x100cm
Window presence	One side of the room facing South	Throughout the two perimeter Facing North and atria	Throughout the two perimeter Facing South and atria	Two sides of the room, facing South and West
Room finish	Ceiling: Gypsum board Wall: White paint finish Floor: White tile 33,3 x 33,3			Wall: White Paint Ceiling: No ceiling, directly to cable tray, lighting installation, sprinkle system and beam Floor: White tile 33,3 x 33,3
Facilities	Table and chair Partition panel as pinup panels	Table and chair Steel pinup panel	Table and chair Steel pinup panel	Locker Table and chair Discussion spot Pinup panels

3. Method

By the end of the third and fourth semester, the students were given an online questionnaire regarding their personal assessment of the studio. The questionnaire that was given in the third semester consist of:

- Identity: name, student number ID and the studio they were supposed to use for the studio days.
- Three questions regarding their activities in the studio
- Thirty questions regarding the studio's conditions, that were further categorised into six aspects: physical (6 questions), spatial design (3 questions), flexibility (3 questions), accessibility (4 questions), room facility (1 question), room performance (5 questions), and satisfaction (4 questions). Each question has to be answered using 5 points likert scale.
- One open ended question regarding what could be improved in the studio to encourage their comfort and performance in the studio.

The analysis method is to compare the mean between the aspects and highlight the findings.

In the questionnaire at the end of fourth semester, there were thirty additional questions that made the respondents compare the studio condition between the third and fourth semester, in relation to their well being in the studio. Respondents were asked to self assess their wellbeing by giving a score to the studio (using 5 points of likert scale), and assessing the improvement (or degradation) in how they feel in the studio by giving a score, ranging from -100% for degradation to +100% for total improvement in studio condition. The scores are then converted to numerical scores and accumulated for the final scoring. The conversion scores can be seen in table 2. Combinations of verbs used to describe the ratings are also accumulated and analysed, to summarise the keywords that affect student's well being in the studio.

Table 2. Score conversion in Comparison Question

Answer	-100%	-80%	-40%	-20%	0	+20%	+40%	+80%	+100%
Score	-4	-3	-2	-1	0	+1	+2	+3	+4

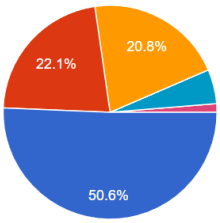
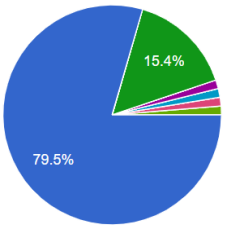
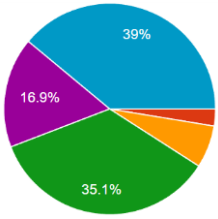
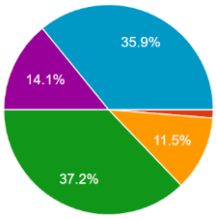
4. Result and discussion

As mentioned, the questionnaire is meant to gather information regarding student's perception of the Studio rooms, and compare them. The questionnaires were sent in two different periods, with exactly the same group of respondents. In the first period of distribution, out of 80 students, 77 responses were collected, and in the second, 78 students responded.

4.1. Presence and activity in the studio

The first thing that reflects a student's willingness to be involved in the studio is their presence. The comparison can be found in the table 3 below.

Table 3. Time spent in the studio

Question	3rd Semester	4th Semester
Where did you mainly work during the studio time ?		
	93.5% of the respondents work in a studio, but they tend to work not at their own 'arranged' space in the studio, as 50.6% of them said that they work from P701 studio. This is more than the designed capacity of each studio (P705 at 22.1% and P710 at 20.8%).	79.5% of the respondents stay mostly in the studio, where surprisingly, the percentage of students that work outside the studio increases to 15.4%. The accumulated percentage of students working in their boarding house near the campus is also increasing (5.3%).
How long exactly have you been effectively working in your studio during studio days ?		
	39% of the respondents spend more than 6 hours effectively working on their design at the studio. Other 52% spend 3-6 effective working hours with the variation activity of strolling around the studio (16.9%) and leaving the studio for a moment to rest in nearby facilities (35.1%). 6.5% respondents only visit studios for the attendance proof. 1.3% of the respondents had 1-3 hours of active working in the studio.	35.9% of the respondents work effectively in the studio for more than 6 hours. The percentage of the students that strolled inside the studio when not actively working in the studio is 14.1%, while another 37.2% will leave the studio, so that they answered 3-6 active hours in the studio. The percentage of students that leave the studio only to come back to take the last attendance mark also increases to 11.5%.
Other activities done in studio	Eating Playing online games Looking for design inspiration by seeing friend's work and discussion Sleeping Doing other assignment and committee meeting	Looking for design inspiration by seeing friend's work and discussion Playing online game Doing other assignment and committee meeting Eating Sleeping

4.2. Important Studio Features and The Comparison

Few things to be highlighted from the result of the questionnaire, regarding the studio features are divided into certain points: The highest and lowest score of the studio's feature, and also what features that the 3rd semester studio scores better than the 4th semester studio, as well as what feature that has the biggest gap between the 3rd and 4th semester studio, that can be improved in the future. To calculate the difference gap, we subtract the average of the studio in 3rd semester with the 4th semester, therefore when the result is in minus (-), that means that the 4th semester studio has greater average performance than the 3rd semester studio.

- In the physical condition of the studio, the form of the room, the capacity and the openings in the 3rd semester studio have quite a gap to the 4th semester. From this, we found that students prefer studios with more capacity and openings, with the form that is less enclosed, as the studio's condition in the 4th semester.
- The zone configuration within the studio has the second highest score among other aspects, meaning the configuration can be accepted well by the students. Thing to be highlighted here is that the score in the whole P701 studio is lower than the average of 3rd semester studios, despite its spaciousness. From this score, we must reconsider the zone planning in the P701 Studio.
- The furniture layout in the 3rd semester studios has a higher score than the 4th semester, despite the fact that the 4th semester studio has larger and newer tables and chairs. This findings can support the previous point regarding the zone configuration. In furniture identification features, there is no gap between the studios.
- Privacy scores the lowest average in every studio. The gap between the 3rd semester and 4th semester studio in privacy is quite low also, which means, there is no significant improvement in privacy, from the student's point of view. This needs to be addressed well when planning for the next semester, or even a new studio.
- In accessibility features, the 'ease of doing activity' aspect is greatly increased on average by moving to 4th semester studio.
- The result of the outside view aspect differs greatly, especially in studio P710 and P701, despite the fact that both of the rooms opening are oriented towards the same direction and view.
- The 3rd semester studio is better than the 4th semester in furniture layout, zone, lighting intensity and acoustic performance. The average score of lighting intensity scores the highest among other parameters.

Interesting fact found from the responses, is that the studio P710 has the lowest score among the other studios, despite the fact that it has the same trait as P705, and has the same opening orientation as P701.

Table 4. Studio features

		3rd Sem			3rd Average	4th Sem	3rd and 4th Difference
		705	701	710		701	
Physical Condition	Form	3.94	4.33	3.5	3.92	4.28	-0.36
	Capacity	3.89	4.26	4	4.05	4.5	-0.45
	Openings	4.39	4.33	3.25	3.99	4.36	-0.37
	Furniture	4.28	4.28	3.75	4.10	4.16	-0.06
	Material	4.28	4.36	3.5	4.05	4.22	-0.17
	Colour	4.22	4.38	3.5	4.03	4.22	-0.19
	Avg.	4.17	4.32	3.58	4.02	4.29	
	Circulation	3.95	4.31	4.25	4.17	4.28	-0.11

Spatial Configuration	Furniture Layout	4.06	4.28	4.25	4.20	4.18	0.02
	Zone	4.22	4.46	4.25	4.31	4.17	0.14
	Avg.	4.08	4.35	4.25	4.23	4.21	0.02
Flexibility	Feel at ease	3.89	4.38	4.25	4.17	4.35	-0.18
	Privacy	3.56	3.67	3	3.41	3.6	-0.19
	Adequate space	4.11	4.49	3.25	3.95	4.14	-0.19
	Avg.	3.85	4.18	3.50	3.84	4.03	-0.19
Accessibility	Access	4.17	4.41	4.25	4.28	4.29	-0.01
	Furniture Identification	4	4.41	4.25	4.22	4.22	0.00
	Ease of doing activity	4	4.46	3.5	3.99	4.29	-0.30
	Zone Identification	4.17	4.23	3.5	3.97	4.02	-0.05
	Avg.	4.09	4.38	3.88	4.11	4.21	-0.09
Room	Facility	4.17	4.41	3.75	4.11	4.12	-0.01
	Avg.	4.17	4.41	3.75	4.11	4.12	
Room Performance	Lighting Intensity	4.28	4.44	4.25	4.32	4.31	0.01
	Room Temperature	4.39	4.26	3.25	3.97	4.33	-0.36
	Air Quality	4.39	4.38	4	4.26	4.33	-0.07
	Acoustic Performance	4.11	4.21	4	4.11	4.08	0.03
	Outside View	3.95	4.08	3	3.68	4.22	-0.54
	Avg.	4.22	4.27	3.70	4.07	4.25	
Satisfaction	Secure	4.22	4.56	3.75	4.18	4.31	-0.13
	Comfortable	4.06	4.44	3.25	3.92	4.19	-0.27
	Feel Like Home	3.94	4.26	3	3.73	3.95	-0.22
	Happy	3.83	4.38	3.5	3.90	4.14	-0.24
	Avg.	4.01	4.41	3.38	3.93	4.15	
Total Average		4.08	4.33	3.72	4.05	4.18	-0.13

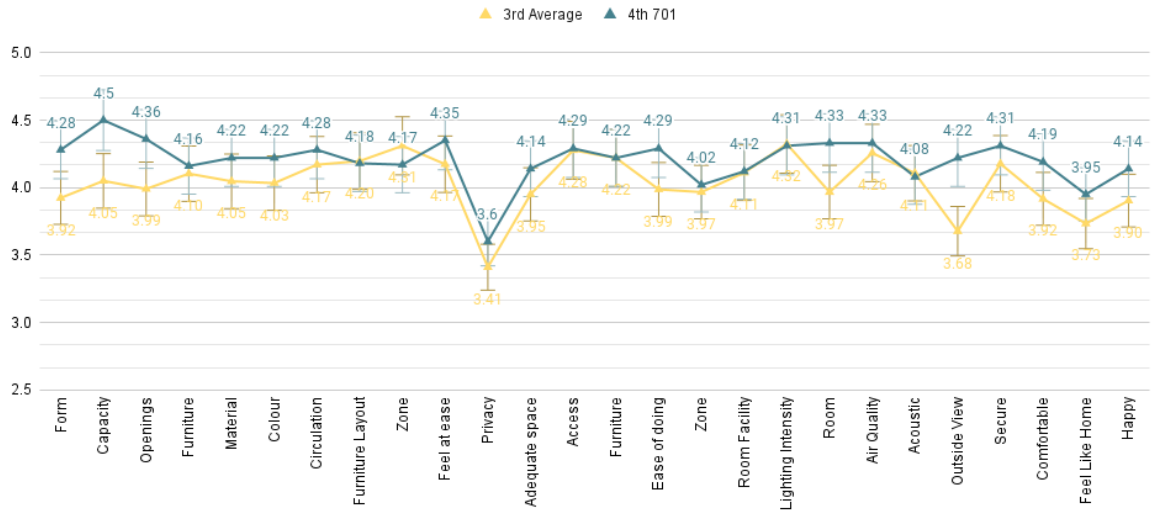


Figure 4. Studio Features Comparison

4.3. Well Beingness Comparison

From the questions about the wellbeing metrics, we ask the respondents to rate based on comparison between the 3rd and 4th semester studio, whether they feel more positive during the design process. From the student's answer, we found that the studio brought relatively high positivity to the students, as the score of fifteen aspect measurement of one's well being is above 3.5. The lowest score is 3.65 in supporting the concentration of the students. The highest score is in the ease of interaction (4.17) that brings the students closer to one another (4.04).

Table 5. The Wellbeing Parameters and The Comparison Score

Wellbeing Aspects	Studio Average (0-5 score)	Average Comparison	Cumulative
More Optimistic	3,82	1,040	78
Clearer Purpose	3,92	1,038	81
More Relaxed	3,85	1,013	79
Easier to Interact	4,17	1,397	109
Become Oneself	3,85	0,872	68
Easier to Solve Problem	3,85	1,043	49
Think Clearer	3,69	0,756	59
Feel more useful	3,77	0,859	67
Closer with Other People	4,04	1,231	96
More Satisfaction	3,95	1,192	93
Easier to Make Decision	3,85	0,910	71
More Valued	3,90	0,628	49
More Concentration at Targets	3,65	0,782	61
Control in Decision Making	3,85	0,744	58
More Energised	3,77	0,859	67

When being compared, the studio in the 4th semester brings more positive impact on a student's well being, especially in the interaction and relation. It brings more satisfaction too. Things to be improved in the future are regarding the means to support students to feel more valued, able to concentrate more, so that they can think clearer and make decisions, especially regarding their design more wisely.

4.4. Important supporting aspect in architectural studio

The last question in our questionnaire is an open end - non mandatory question, that asks the respondents to mention an important aspect that an architectural studio has to have for supporting their process in Architectural Studio. This question was answered by 132 respondents, leaving 23 respondents who skipped this question. When we classify the answers to six categories, which are: Ambience, Activity, Room Quality, Room Facility, Time and Personal Interaction.

Two of the most important room quality for Architectural design studios according to the respondents are lighting, temperature and followed by the noise. Most of the students also answered with keywords that were related to the studio's ambience: the character, mood, atmosphere or setting of an environment. The importance of the studio's ambience is manifested in the comfort that the students feel, also variation of layout, spaciousness and privacy. Students also highlight the quality of tables and chairs in the studio, as an important consideration when providing studio facilities.

Beside the physical environment, as the question was open ended, students also answer regarding the intangible aspects of studio, which are activity, time (schedule of the studio) and also interpersonal relation they build in the studio. In the activity category, the students demanded studio conditions that made the interaction at ease. They also wanted a variance of activity in the studio. Interpersonal interaction was found to be quite essential for the students, as they also answered that good interaction with partners and tutors also can be supporting their performance at the studio.

Table 6. Recapped answers regarding essential studio features

Ambience		**Activity**		**Room Quality**		**Room Facility**		**Time**		**Personal**	
Variable	Σ	Variable	Σ	Variable	Σ	Variable	Σ	Variable	Σ	Variable	Σ
Lively	1	Atmosphere	1	Lighting	22	Socket	6	Presence Control	1	Partner	9
Comfortable	16	Ease of Interaction	15	Temperature	22	Table	13	Time Management Planning	1	Tutor	9
Clean	5	Flexibility	5	Noise	15	Colours	3	Studio Duration	3	Opposite Gender	1
Spacious	9	Variation of Activity	9	Ambience	4	Materials	1				
Relaxing	2			Air Quality	2	Chair	11				
Conducive	2			View	3	Above adequate	2				
Quite	1			Odourless	1	Furniture	3				
Large	6			Opening	1	Discussion spot	2				
Openness	1					Sofa	4				
Room Layout	8					Storage spot	2				
Privacy	8										
Serenity	3										
Modern	1										
Total	63	Total	30	Total	70	Total	47	Total	5	Total	19

5. Conclusion

Architecture education has been going on since a long time ago. The pressure that the students face can be lessened, not limited to applying a thoughtful curriculum, but also a supportive learning environment. As the generation of architecture students changes, the learning environment can also be adapted to their specific needs.

The questionnaire's responses from the likert scaled questions and open-ended ones, confirmed certain important elements of the studio conditions from the gen Z students:

- Room performance's quality, especially lighting, room temperature and acoustic quality
- More capacity and openings, with the form that is less enclosed
- The clarity of zones, that is manifested in the arrangement of furniture. The quality of tables and chairs are also supporting their performance

Students felt the lack of privacy in the studios, while some of them also answered that privacy is essential to their performance in the studio.

In relation to well-being, the studio needs to provide a space to make gen Z students able to concentrate more, and feel more valued. This can be achieved by making a studio ambience that is comfortable and spacious in the form of room layout, and still considering an increased privacy. From the student's point of view, the relation between the students and also the tutors are also important, as well as the variance of activity. Therefore, designing a studio that is flexible and accommodates the ease of interaction between the users can be a highlight in designing future architectural design studios for students in generation Z.

6. References

[1] Ciravoğlu A 2014 *Procedia - Soc. Behav. Sci.* **152** 7-12
[2] Yang Z, Becerik-Gerber B and Mino L 2013 *Build. Environ.* **70** 171–188
[3] Mandala A 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **238** 012032
[4] Osman Demirbas O and Halime D 2000 *J. Environ. Psychol.* **20** 53-64
[5] Elnaklah R, Ayyad Y, Alnusairat S, AlWaer H and AlShboul A 2023 *Sustain.* **15** 1142
[6] Arshard W N R M, Kadir T A Q R A, Aziz T I S T and Mokhtar Z M 2023 *IOP Conf. Ser.: Earth Environ. Sci.* **1217** 012019
[7] Eldien H H and Bongwirnso U M 2021 *Proc. of INTER-NOISE 2021 - 2021 International Congress and Exposition of Noise Control Engineering* vol. 263 p 5847–5857
[8] Ruggeri K, Garcia-Garzon E, Maguire Á, Matz S and Huppert F A 2020 *Health Qual. Life Outcomes* **18** 192
[9] Cheeta S, Ruigt G, Van Proosdij J and Willner P 1997 *Biol. Psychiatry* **41** 419–427
[10] D'Aquila P S, Brain P and Willner P 1994 *Physiol. Behav.* **56** 861-867
[11] Ryan R M and Deci E L 2001 *Annu. Rev. Psychol.* **52** 141-166
[12] Watson K J 2018 *Build. Serv. Eng. Res. Technol.* **39** 232–243
[13] Kasasa 2021 Boomers, Gen X, Gen Y, Gen Z, and Gen A explained (https://offer.kasasa.com/blog/boomers-gen-x-gen-y-gen-z-and-gen-a-explained) accessed Sep. 15, 2023
[14] Schwieger D and Ladwig C 2018 *Inf. Syst. Educ. J.* **16** 45-54
[15] Sidawi B 2012 *Buildings* **2** 203-217
[16] Vowles H, Low J and Doron H R 2012 Investigating Architecture Studio Culture in the UK: A Progress Report *J. Educ. Built Environ.* **7** 26-49