



An Analysis of the Impact of Spatial Ergonomics on Student Performance was conducted in an Undergraduate Studio at Chaudhary Devi Lal University

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Abstract

The spatial ergonomics of a work setting must take into account the interaction between the built environment and human behaviour. Therefore, it is essential that the comfort and practicality of design studios at Indian educational institutions are correctly balanced in order to promote studio culture and enhance student performance. The psychological relationships between ergonomics in the workplace and its potential good or bad effects on the users of the space were covered in this study, depending on how successfully ergonomic and spatial design principles were applied. The ergonomic and interior design elements that can be combined to properly balance comfort and functionality in an architectural design studio are also covered in this study. A survey was done among undergraduate architecture students in The Bells University of Technology to determine the condition and quality of the adopted design studios and to find out how it affected their work performance. The results were compiled, presented in a clear and straight forward form and explained to back up the theory that design studios in the institution are not up to standard. This research also provides recommendations based on the results of from the respondents on how to better improve the quality of design studios in order to improve studio culture.

Keywords: Spatial ergonomics, design studio, performance

Introduction

Architectural departments across several institutions in India have accommodated thousands of students collectively, and one prevailing struggle they have all had in common was to provide adequate materials and essential mediums to aid and ease the burden of students aiming to take the course. This could be as a result of location, funding and even not finding the effort worthwhile due to very few students applying for the course at certain times, leading those in charge to believe the expenses are not worth such a small number of students (strategy to save cost). To add to this, institutions that manage to provide at least most of these essentials still have cases of students failing and I believe this has a direct connection to the immediate learning environment they are subjected to, among other factors.

According to (z. akbarzadeh, 2020), Achieving educational goals requires an appropriate place to create relevant behaviors, so the effective role of the environment in improving students' learning and development cannot be ignored. One of the environmental capabilities according to them was the layout of the classroom.

An architecture student spends at least 60 percent or more of his or her time working in the design studio, this is as a result of the immense and intense workload given to students offering Architecture as a course is very competitive and

demanding in the field, because so much of the student's time is spent in the studio, the studio is often referred to as the "second home". The design studio is where students are encouraged to express their creativity towards their work, it is where the students put heads together to tackle architectural problems, where students sleep overnight to meet deadlines for projects (if allowed in their respective institution), where the students are expected to have fun and relax doing their various work. It is a sacred space for students to feel comfortable working within the institution.

Being in the Architectural Studio is Fine

The design studio should be inclusive of an interactive and personal space for students. Unfortunately, as stated before, the design studios focus mostly on the cost, which in turn leads to office-like layouts without putting into consideration the psychological implications on the students making use of the space. The office like layout becomes less interactive and hinders the required level of creativity expected of students. The same can be said for the undergraduate (100 level-400 level) design studios of Bells University of Technology. Apart from undergraduate studios not having their stand-alone building, the spaces are also shared in close proximity with other departments which create a lot of inconveniences of their own. They follow the office like layout and have over

the years become bland in the cases of students. The spaces do not take into consideration the required measurements to account for each drafting table per student, instead the provided spaces are crammed with as many drafting tables as they can fit into the spaces with as little navigation space as possible. This condition among many others can cause working in the studio to be immensely frustrating and uncomfortable for students, most times it also diminishes the chance for privacy in the working environment.

(Shaqour, 2021) asserts that there are three key elements that can help a sustainable design studio come up with the best design solution. They are

- i) Possessing a flexible personal and private area.
- ii) An interactive multipurpose space.
- iii) A lovely natural environment

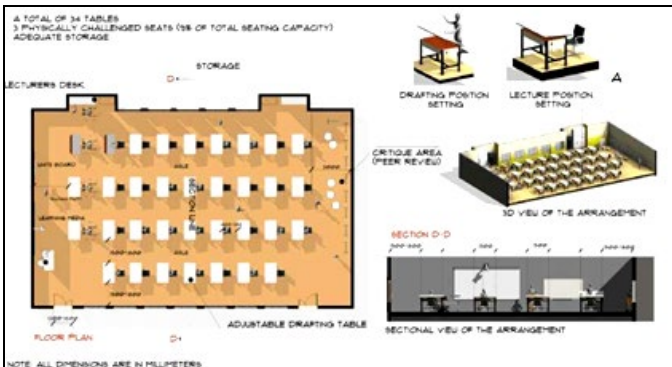


Fig 1: A well-spaced and ergonomic studio. Source,

A well-organized studio should always appear like the image above. In order for pupils to work comfortably, each drawing table should have between 1500 and 1600 square metres of space. The studio is not overcrowded, and there is plenty of room between each row for navigation, as can also be seen from the image. Even while this example uses a layout that resembles an office, the same concepts may be used to any type of arrangement in the design studio, whether it be a semi-circular arc or a setup where both sides of the workstations are facing one another.

General Interior Design Principles to Consider When Planning a Design Studio

(Abbas, 2020) asserts that by understanding the fundamentals of interior design, anyone can make any area look beautiful. You are familiar with the sensation of entering a well-designed space. You can tell that everything is well-organized and harmonious. Everything feels right. With a rudimentary understanding of design concepts, you may create that impression in any area. Combining that information with practise and experimentation will help you design a well-organized space. These ideas are just as crucial when organising a design studio. The guidelines provide a solid foundation for designing a well-balanced space. They should be used correctly based on the local climate, surroundings, and even culture.

There are seven principles that are considered in interior design. They are:

- i. Balance.
- ii. Rhythm.
- iii. Harmony.
- iv. Emphasis.
- v. Proportion and scale.
- vi. Unity.
- vii. Details.

Questionnaire Design

My questionnaire was split into four sections (A-D).

- i) Section A covered the general information of the students, for example, age, gender, current level, last grade and so on.
- ii) Section B covered their opinions on the principles of interior design principles applied to their design studios.
- iii) Section C covered their opinions on the spatial ergonomics of their architectural design studio space. This section also asks for suggestions for ways they would improve the state of their studios.
- iv) Section D was to determine the relationship between the design studio spaces and the student’s performance.

**Questionnaire: Section 1
General Information of Respondents
Gender**

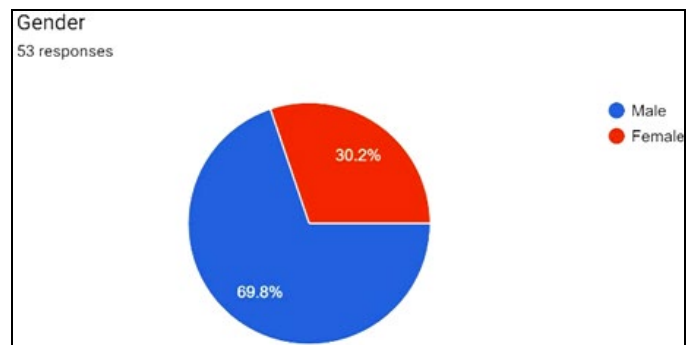


Fig 2: 69.8% of the respondents were male. 30.2% were female.

Age

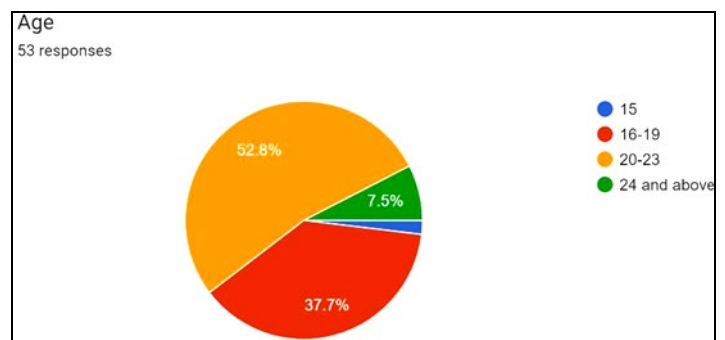


Fig 3: The age of 15 were 1.9%, 16-25 years were 37.7%, 20- 23 years were 52.8% and 24 years and above were 7.5% of the respondents

Current Level

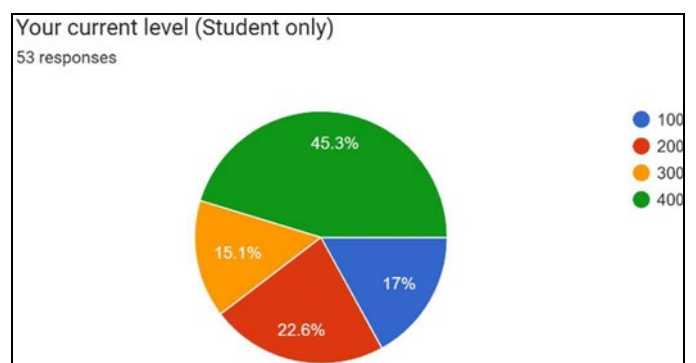


Fig 4: 100 level were 17%, 200 were 22.6%, 300 were 15.1% and 400 were 45.3%.

Questionnaire: Section 2

To Highlight Proper Interior Design Principles Implemented in the Design Studio

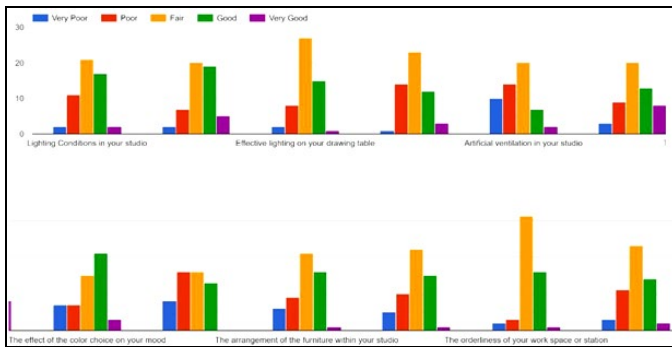


Fig 5

The respondents were asked to comment on how successfully the principles of interior design were used in this part. They were asked to rate their opinions from very poor to very good and from poor to fair to good. First, the majority of respondents thought that the natural lighting was in fair condition, and they also thought that the illumination's impact on the drawing table was fair. Most people agreed that both natural and artificial ventilation were fair.

Conclusion

This study provided evidence for the use of user-assimilated data in the development and planning of appropriate design studio spaces. The use of behavioural sciences and their use into studio space design is encouraged by this research. It is crucial that we take into account factors that make a design studio habitable and bearable for students and apply them as best we can when planning such spaces in order to ensure the comfort of students, which in turn promotes studio culture. The design of a design studio can be affected by a lack of knowledge or disregard for human behaviours, attitudes, and values.

Understanding how people and the environment interact is crucial to the creative process of architecture. Particularly in the area of architectural education, the kind of research presented here should be supported.

The study's findings led to the following deductions:

The physical characteristics of the architectural design studio have both favourable and unfavourable psychological effects on the students, which can have both direct and indirect effects the way they performed while they were studying. It may be possible to boost students' cognitive capacities and, as a result, assure a rise in improved academic performance if adequate steps are done to construct the studios with all demands satisfied. The conditions of studios at Bells University of Technology and other schools must be greatly improved, and the administration must interact with students to make sure they are following the appropriate course.

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