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(USBET) 2023**

**SUSTAINABLE BUILT
ENVIRONMENT**

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ANTHROPOMETRIC CONSIDERATIONS FOR STUDIO CHAIR AND TABLE DESIGN IN ARCHITECTURE STUDIO UITM SERI ISKANDAR PERAK

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ABSTRACT

Architecture students' working spaces differ from those of other art and engineering students' workstations. The activities architecture students engage in include drawing and modelling. This study aims to identify discrepancies between the studio furniture, such as adjustable chairs or banquet chairs, and table dimensions, in relation to the anthropometric characteristics of architecture students who use these workstations. The focus of this study is a studio for semester 05 architecture students, equipped with a complete set of workstation furniture. The primary goal is to determine suitable furniture for architecture students in their studio workspaces. The chosen methodology is qualitative, relying on observations from semester 05 architecture studio at UiTM Seri Iskandar. The findings of this study indicate that the furniture used by architecture students is unsuitable from an anthropometric perspective, considering the human body's sitting posture with the chairs and tables. Therefore, the design of the furniture must incorporate a study and measurements of the anthropometric aspects relevant to the working style and lifestyle of architecture students.

Keywords: *Anthropometric, architecture student, chair, adjustable*

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INTRODUCTION

Architecture studio spaces differ from other art studios, and the furniture in architecture studios varies widely based on the needs of the working students. Limited space within the studio can hinder students' ability to focus, ultimately impacting their performance. It's essential to ensure that both the architecture studio and its furniture are comfortable to promote good work performance and productivity among students. As noted by Davis et al., (2020), an uncomfortable workspace can lead to sudden onset body pain, which might result in more severe issues in the future, depending on the type of furniture used. Anthropometric measurements of the human body's size often do not align with the criteria and dimensions of the chairs and tables in the classroom (Abdullah & Ahmad, 2020).

LITERATURE REVIEW

Successfully applying ergonomic concepts in natural settings can be achieved by taking inspiration from ergonomic principles used in workstations. Designers in this field could propose creating chairs and tables that harmonize with the spatial architecture of a studio. Arshard, W. N. R. M., Hassan Naziri Ahmad Faiz, and Mustapa, (2021) discovered in their study on work from home (WFH) environments that reducing furniture in smaller houses can make residents, particularly students working from home, feel more comfortable. Another study focusing on anthropometric measurements from a group of engineering students established standardized criteria and dimensions for adjustable chairs and tables (Taifa & Desai, 2017).

The researchers have explored various aspects of furniture design, but there is a lack of research regarding furniture designs for engineering colleges or schools in India (Oyewole et al., 2010). Anthropometric principles, the mainstay of designing various products, differ based on the intended user and the type of product (Taifa & Desai, 2017). Figure 2 illustrates anthropometric measurements of human body size and positions while standing, sitting, and positioning arms, ensuring a suitable ergonomic design for the human body.

Anthropometric Working Space

Anthropometric furniture design is pivotal in architectural studios, ensuring that workspaces are tailored to the physiological requirements of occupants. This approach involves considering human body measurements and proportions to create furniture that promotes ergonomic well-being and enhances user experience. Research by Pheasant (2017) underscores the significance of anthropometry and ergonomics in workspace design, emphasizing the need for furniture that aligns with users' physical characteristics.

Studies such as Reisinger and Haslam (2009) and Lang and Ayalon (2016) highlight the effects of seat height and posture on musculoskeletal load during work, illustrating the tangible impact of furniture design on user comfort and health. By incorporating anthropometric principles, architects and designers can create spaces that accommodate diverse body types, potentially improving productivity and creativity. This approach is echoed by Horgen and Kara (2017), who emphasize the connection between user satisfaction and ergonomic furniture design. Ultimately, applying anthropometric insights to architectural studio furniture design, as supported by Aghazadeh and Jalali (2012) and Kim and Park (2017), results in enhanced work environments that align with the unique needs and dimensions of individuals.

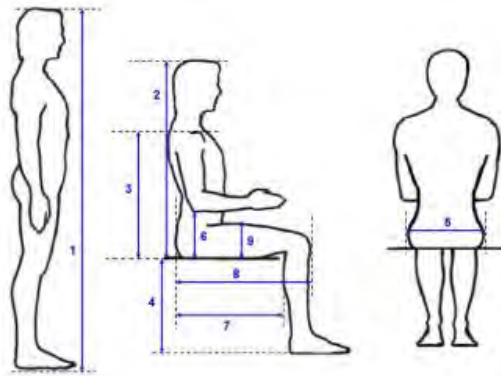


Figure 1 : Representation of anthropometric measurements: (1) stature; (2) sitting height; (3) sitting shoulder height; (4) popliteal height; (5) hip breadth; (6) elbow seat height; (7) buttock popliteal length; (8) buttock knee length; (9) thigh clearance (Source : Dianat et al., 2013)

METHODOLOGY

The approach involved observing and measuring the anthropometrics of architecture students in their fifth semester at UiTM Seri Iskandar. The observations took place in Studio Architecture Building Annex 1. A student from the 5th year architecture class was selected as the model for anthropometric measurements of furniture, including a chair and an adjustable workstation within the studio. The furniture used for anthropometric measurements was provided by the university as part of the architecture studio setup.

FINDINGS

The findings from the observations and anthropometric measurements in the fifth-semester studio revealed the following insights. Referencing Figure 2, the measurements of workstations in the fifth-semester studio are depicted. This studio accommodates 30 students simultaneously within the workspace. Each workstation offers a narrow clearance space of 2400mm and is divided into compartments for four persons each.

Figure 3 displays three distinct types of chairs available in the architecture studio. These include two variations of adjustable chairs and one type of banquet chair, all of which are utilized by students within the studio. Each adjustable workstation is equipped with a small side table.

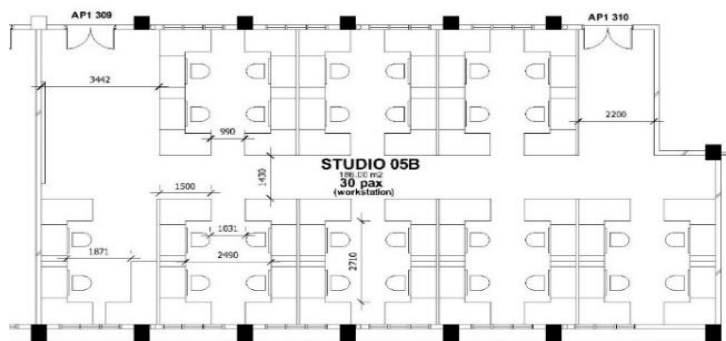


Figure 2: Studio 5th year (Source: Arshard W.N.R.M.)



Figure 3: Three types of chair position drawing on board

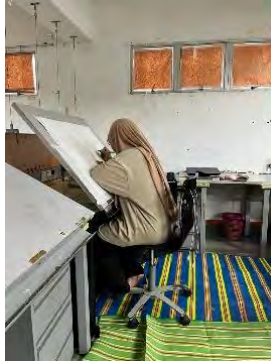


Figure 4: Model student's position on studio architecture

In this fifth-semester studio, adjustable chairs have been provided, and students also make use of banquet chairs. Figure 4 depicts a student working at a workstation, engaged in drawing. The student's body is positioned comfortably in the adjustable chair, facing the table. The height of the student is an important criterion as observations show that students with a height of less than 150cm find the sitting position suitable, aligning well with the drawing board. If the chair is lowered, the student must stand up and cannot sit comfortably.

CONCLUSION

This study underscores the significance of anthropometric measurements in the design of chairs and adjustable workstations within the architecture studio environment. Anthropometric measurements, when applied to furniture design in architecture studios, involve precise assessment and analysis of human body dimensions and proportions. The study highlights the importance of considering human body positions, such as sitting, standing, and working at various distances. Notably, student height plays a crucial role in determining the appropriate chair type to ensure optimal comfort and functionality. Currently, students using improperly adjusted chairs, which are shorter than banquet chairs, experience discomfort while working at their workstations.

To address this issue, future designs of adjustable chairs must incorporate criteria based on human height and table dimensions. This approach would ensure that the chairs accommodate a wide range of users simultaneously, thereby enhancing overall usability and comfort. Anthropometric data serves as a guide for determining appropriate dimensions, angles, and shapes of furniture elements, enabling them to cater to a diverse range of individuals and support their various activities within the studio environment.

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Sekian, terima kasih.

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