

# WORKSTATION FOR STUDENTS OF INDUSTRIAL DESIGN UAEM

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## ABSTRACT

Having completed the first two stages of the research project entitled "Aulic workstation for industrial design students", registered at the Secretaría de Investigación y Estudios Avanzados de la Universidad Autónoma del Estado de México (UAEM) Folio 2510 / 2007U, which altogether allowed us to get the anthropometric information needed to design the object in question was possible to make the creative and experimental stage. As regards to this last stage, all the work was done by reference to the design method introduced by Bernd Löbach, reaching a furniture design appropriated for industrial design students at UAEM, which allows a theoretical and practical activity for training in a healthy sitting position.

**Keywords:** industrial design, furniture, healthy posture.

## Resumen

Habiéndose concluido las dos primeras etapas del proyecto de investigación titulado "Puesto de trabajo áulico para el discente de diseño industrial", con registro ante la Secretaría de Investigación y Estudios Avanzados de la Universidad Autónoma del Estado de México (UAEM) folio 2510/2007U, que en conjunto permitieron obtener la información antropométrica necesaria para diseñar el objeto en cuestión, fue posible realizar la etapa creativa y de experimentación. Al respecto de esta última fase, todo el trabajo fue realizado tomando como referencia el método de diseño establecido por Bernd Löbach, alcanzándose a diseñar un mobiliario pertinente para los estudiantes de diseño industrial de la UAEM, el cual permite realizar actividades teóricas y prácticas de la formación, en una posición sedente sana.

**Palabras clave:** Diseño industrial, Mobiliario, Postura sana.

## **1.- INTRODUCTION**

Way back in ancient Greece, specifically in the act of the old school of Aristotle, the teaching process brings to mind the image of that teacher who shared his knowledge while walking outdoors accompanied by a small group of disciples. And where necessary to make the act of sitting by the teacher, his companions gathered around him, sitting where and how they could.

Over time, during the nineteenth century, the concept of school was consolidated, it was now time to seek to provide students a learning process through homogeneous groups in age, and in the best cases, enclosed spaces where coexist seats and desks that lets you take notes without difficulty generating the walking and do even more ... without mishap.

Today, the classroom, in a simple conceptualization, is defined as the space where the coexistence tables, chairs and desks, routed to a board, which is characterized by which all things being equal, being aligned with each other, and the spacing between them, allow the free movement of teachers and also facilitate dynamic developing in favor of education. Besides this, the tools have changed too, so that pen and paper have given way to specialized tools and laptops.

It is a fact that the pedagogical dynamics has tried to correct, moving from a traditional model to a critical and active type. However, the conduct of this action have hardly turned his eyes to the furniture. Just enough to observe any classroom that is said to belong to a quality school, to confirm that these objects remain almost intact in formal settings, perhaps, to change color or material. And if this is added that, given the growing demand for national education classrooms previously housed 30 students in favorable conditions for teaching and is now expected to accommodate 45 or more, you can set the school furniture is outdated and therefore, could be questioned in a way, the relevance of the teaching process.

From the above, and after multiple discussions among teachers of industrial design at the University Center Zumpango, under the Autonomous University of Mexico State, was the need to design furniture that would make both theoretical and practical activities within a classroom for training students in the graduate education program in industrial design.

## **2.- DEVELOPMENT**

Having identified the main needs coexisted around the furniture in the classrooms of the CU Zumpango industrial design, was established at first objective: to design a courtly job for industrial design students at UAEM. After that, and with the intention that the proposed design not only be functional for the educational area in question is determined to make an anthropometric survey of industrial design students UAEM headquarters located in Toluca, Valle de Chalco and Zumpango course. Activity which produced several anthropometric tables, where it was feasible to identify all critical dimensions to begin designing the job.

Once they had anthropometric parameters, devoted himself to work aimed at the analysis stage of existing products, and interesting design that is, to good solutions, but in all cases, avoiding plagiarism of ideas. So, after obtaining

information regarding the shop fittings used by industrial design students, most of the institutions visited, both public and private, it was observed that the misnamed drawing table or drawing tables were all similar, ranging in size from The 120cm long, 90cm wide and 90cm high, counting in all cases to support seated in a height range 60cm, and are commonly known as lab benches.

During this activity, it was observed that the students interact in the drawing boards, they tended to adopt a sitting position where the natural curvature of the spine is lost (Fig. 1), and that without being a professional in orthopedics Certainly cause in the future, a serious injury in bones. Thus, while ratifying the low efficiency of school furniture for drawing, now laid bare more of a problem ... to promote a healthy posture for the design student. So it was necessary to stop on the way to check what's sitting on and what could be called healthy posture.



**Figure 1.** Posture of an industrial design student.

About the ultimate grounds, must be within the field of industrial design, "say many professionals, " the conceptualization of an article for the sitting of the people has been one of the more difficult is artifacts. To a large extent, both the object used to support the sitting, as the bottom of it, were created for a specific purpose, but which over the years, have served for many other secondary purposes.

Elaborating, the object to which reference is made and that most people identify as a chair or variations of it, came up with the intention of being a symbol of power or hierarchy-recall here the ancient Egyptians thrones, elements that be used in Western civilization, they adopted the role of serving as an object to support multiple sedentary. For its part, the buttocks are mostly formed by the gluteal muscles that have until now, the task of participating in the movement of the human body via a small lever arm. As far as that of Antonio Bustamante (2004), instead of being called buttocks, should be identified as walkers.

In this regard, it is envisioned that the biggest mistake-if you can call it that, is not in the proper design of the chair, but rather in the position that this object will induce, as an individual sitting in all buttocks, being given static use an item that was made for the dynamics.

However, properly analyzing the position an individual adopts when perched on a chair or similar object in its function, it is influenced by five effects:

- *Biomechanics: where the position will depend on the relationship that the dimensions of the object vs. complexion and stature of the user.*
- *Action: referred to the position will be determined by that object with the individual in front of him during the development of a task.*
- *Cultural: establishes that the position will be the result of design style furniture, which in the vast majority has been set thinking more about the use of materials and cost reduction in the functionality and potential user.*
- *Humor: mention that the position will be in readiness with the mood of the user.*
- *Starring where the position adopted is derived from the social context in which the user is laboring.*

Concerning the design activity itself and based on the method of Bernd Löbach, it first saw the return of fellow studying Modesto Marisol (2009), where're the anthropometric tables of industrial design students from the campus Toluca, Valle de Chalco and Zumpango. As second generation was proposed designs for two-dimensional and three-dimensional way, arriving at the proposal called ADN001 constructed (Figure 2), which after a study of use (Figure 3) was identified that there was feasible to generate discomfort in the area of the ball joints and a bad foot position, and prevents rapid user access and egress, to occupy too large an area, excessive weight to present and create a negative visual impact on users.



**Figure 2.** Courtly job called ADN001.



**Figure 3.** Analysis ADN001.

Being clear about the negative aspects of ADN001 and objective of the project, was determined to separate the structure, so that the graphic support was

independent sitting support to thereby speed up user access and egress in an emergency or simply to interact in the classroom. With regard to support sitting, three prototypes (Figures 4, 5 and 6), which were tested with three different body dimensions of students, which identified the average size of elbow support. Similarly, data that was compared with anthropometric study.



**Figure 4.** Prototype 08-A



**Figure 5.** Prototype 16-A



**Figure 6.** Prototype 11-A

Because of adjustments in dimensions and trim, was performed a functional model of graphic support, the same as evidence to a difference of height with current CU drawing board (Figure 7).



**Figure 7.**

Existing drawing board (left) and functional model (right)



Having determined the dimensions of the support chart and established aspects of style and unity among the components, we proceeded to generate a first prototype called PTA001 (Figure 8), which like its predecessors, was tested during a working session in the Unit Descriptive Geometry learning. The findings suggest that the object met the requirements for the student to interact in both the drawing room as in a traditional classroom (Figure 9 and 10).



Advantages PTA001 prototype is the deck is 16 gauge steel, something that gives firm support and provides more stability and allow the student has a secure base for cutting activities without affecting the surface and thus generate a low quality of stroke during future sessions. As for the seat, which only provides the necessary support in the area of the iliac, improve seating posture and preventing the user to bow down his spine and developed malformations or musculoskeletal pain. While the height of the graphic support, allowing review of documents or sheets of drawing standing.

### **3.- CONCLUSIONS**

So far above it was possible to confirm that, to design an object intended to maintain a sitting posture is not easy, as this requires constant testing and analysis work. In addition to facing the problem of the pairing order and culture, which derives from being for many years a person accustomed to a concept, and the refore it tends to reject even if the benefits are noticeable when using it.

Finally, commenting that the industrial design, in addition to solving a problem through an object is, and should be a trigger of culture, so it is expected that the allylic job for students UAEM design is a starting point for generating more school furniture, which has a priority to promote healthy posture.

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