

THE DESIGN OF THE MODULAR SYSTEM OF THE WORKPLACE

Fedotkina A.I.

Didenko A.V., Davydova E.M.

Tomsk Polytechnic University

e-mail: sasha_fedotkina@mail.ru

Abstract. Now modular furniture is popular, especially when there is a need to create an interior, because it allows using the space of the room without a loss and making a style that is suitable for interior. This article will explain the development of a workplace for students in a classroom 305, Building 10 Tomsk Polytechnic University.

The aim of this work is to study materials and analogues, and development of a workplace with improved and functional design. It is necessary that the object has an additional function, for example, the possibility of transformation and of placing workplaces as traditional varieties, and compiling them together. The designed object must match the characteristics such as: ease of use, robustness, and simple assembly production, modularity, and attractive design. To achieve these goals these methods have been used: the method of analogues, the method of sketching and ergonomic analysis.

Keywords: workplace, ergonomic, ecology, concept, analysis, techniques, aesthetics, form, module, system, the audience, the students.

Analogue analysis. Traditional tables for students are designed for two people. They are made on the metal frame, which is mounted on the countertop (Fig.1.). The same table can be combined with a bench, this type is usually used at universities (Fig.2.).



Fig.1. Traditional tables



Fig.2. Table with a bench

Chairs as well as tables are made on the metal frame, and plywood is used for seats and backrest. Chairs that can be regulated to fit the height have an advantage (Fig.3.). Upper and lower parts of such chairs are fastened with screws. The upper part can be raised and lowered relative to the base and fixed with screws in place. When comparing analogues, it can be concluded that workplaces have a simple shape, but lack functionality and aesthetics.



Fig.3. Chair fitting the height

Development of the design object. The first step in the development of this project was producing various pencils on paper sketches, where different options of shape were considered (Fig.4.). This step helped determine the final shape. It has been decided to use streamlining, because the rounded corners help to make the interior more aesthetic, and they reduce the risk of injury (Fig.5.).

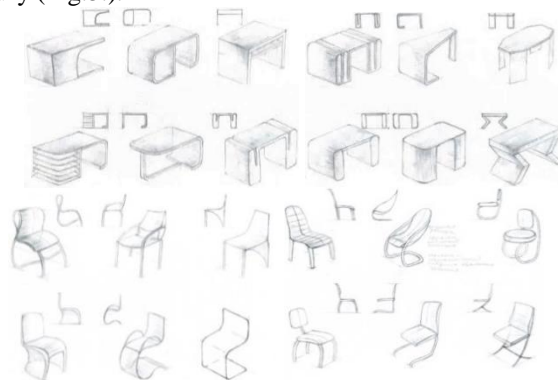


Fig.4. Sketching

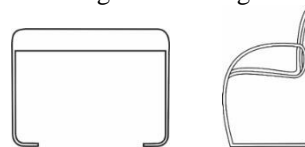


Fig.5. Variant of form

Sketching was vital to choose the final design solution. This method is indispensable, because it enables to select the rational design.

The design concept. The workplace consists of 6 storage systems. They can store designs, blueprints, drawings, stationary, colors. On the sides of each system there are holes to make the retrieval easier. Storage is closed with lids that have slots for fixing, as well as the holes in order to make it convenient to lift the cover (Fig.6.). Storage can be removed, thus creating a space for storing A2 format sheets (Fig.7.).



Fig.6. Storage system and covers of workplace



Fig.7. The modularity of storage systems

The workplace has an extra tabletop, which will be under the main tabletop. It is possible to pull it out and put between adjacent tables. Special connectors are provided along the edges for fixing an additional desktop, thus creating extra working place. (Fig.8).



Fig.8. Functionality of extra tabletop

The shape of the table has some space where you can put a bag (Fig.9.). The chair is very comfortable because it has armrests and a soft polyester sheathed seat. (Fig.10).



Fig.9. Place for bags

Fig.10. Chair

Therefore, it can be concluded that the modular systems workplace creates flexibility and allows students to use the space efficiently. For example, the modular system can be kept in the closet.

Ergonomics. The optimal size of the tabletop is 750x550 (Fig.11.). Dimensions are related with normal working posture, when there is no need to lean forward more than 10-15 °.

Hands make movement within the coverage area. To make these movements more economical and cause less strain, special working area is recommended for equipment.

Figure 12 shows the view from the top of the workplace, notably the coverage area:

1. Reach zone of the most important and frequently used controls (the optimal area of motor field). This is where storage area is located;
2. Reach zone of frequently used controls (a light area of motor field), this is storage area;
3. The area for placing infrequently used controls (reach zone of motor field). Bags, backpacks may be placed in this zone;

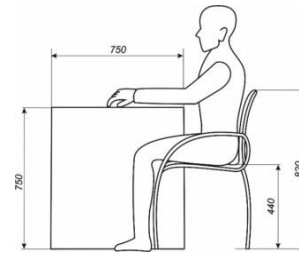


Fig.11. Size of the tabletop

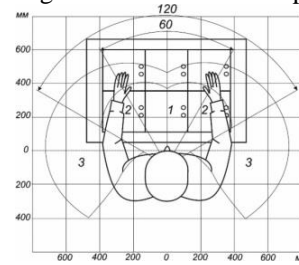


Fig.12. Coverage area

Conclusion. Through sketching stages, shaping, analysis of functional solutions, the selected option is suitable for the original concept and meets criterion such as aesthetics, flexibility and modularity. Another advantage is that the design suits the existing interior (Fig.13.).



Fig.13. Workplaces in the interior of the audience

References

1. Muller – Brockmann J. Modular systems in design. – Saint Petersburg.: Publishing - Studio of Artemiy Lebedev, 2014. - 150 p.
2. Papanek V.J. Design for real World. - Moscow.: Publishing - "Book world", 2008. – 416 p.
3. Forti A. Objects of desire. Design and Society since 1750. – Saint Petersburg.: Publishing - Studio of Artemiy Lebedev, 2011. - 316 p.
4. Zinchenko V.P. The basics of ergonomics. – Moscow.: Publishing – Moscow state university, 1979. – 179 p.
5. Unique Home Office Desk. URL.: <http://www.home-designing.com/2015/11/unique-home-office-desks> (date of the application 01.11.2015)
6. Proptimax. URL.: http://proptimax.ru/articles/review_of_school_furnitur_e.php (date of the application 22.01.2016)
7. The role of sketching in design. URL.: <https://virink.com/post/54410> (date of the application 25.01.2012)
8. Concept and design methods. URL.: http://www.taby27.ru/studentam_aspirantam/philos_design/referaty_philos_design/concept_design/konceptiya-i-metody-proektirovaniya-v-dizajne-abakumova.html (date of the application 28.10.2015)