

Design of ergonomic school furniture

Summary of a project presentation at NES 2008 - Nordic Ergonomics Society
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OBJECTIVES

The goal of this project is to link the creativity of the designer with the methodologies and the know how of the ergonomic experts. The result of the close cooperation of designer and ergonomists is a final product that meets a series of ergonomic characteristics and environmental aspects and that makes it stand out from the rest of the products currently available on the market.

To achieve this ergonomic excellence and to ensure the high usability of the furniture the direct interaction with the final users has been forced already in an early phase of the product development process.

In short it can be said that this approach is an excellent example of best practice in cooperation between the designers, the manufacturers and the ergonomic experts and in the interaction with the users in all phases of design, development and validation of the product.

METHODOLOGY OF EVALUATION

The furniture Tris-Tras is a combination of a chair and a desk for school students that can be adjusted to different body sizes and that complies with the basic environmental criteria. The first prototype of the Tris-Tras was designed in regard to the current regulations and standards as well as in regard to the latest scientific recommendations and to the knowledge and experience of an interdisciplinary expert team.

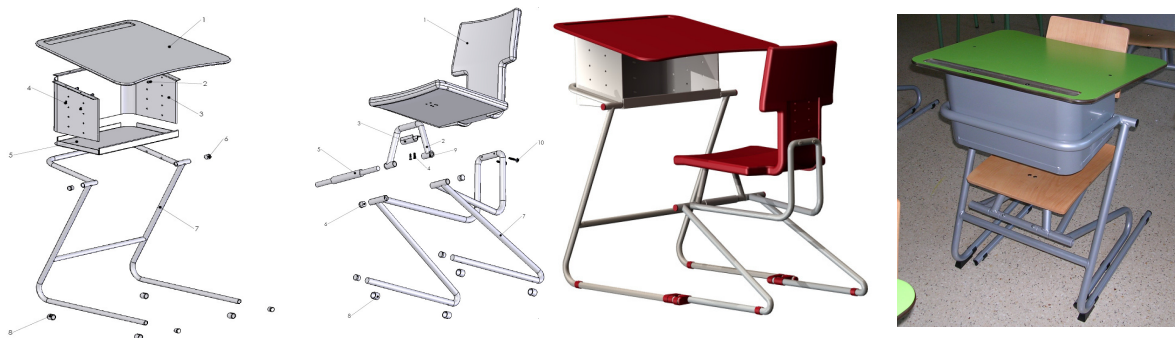


Figure 1: The first prototype of Tris-Tras.

Before the children had the prototypes in their classroom, a series of tests and discussions were performed so that the school children could be involved in the project. In a creative lesson the children developed a vision of their “ideal” furniture and during a “photo tour” the children captured their own impressions of body posture and sitting: sitting on the chair, on the floor, on the bike, in the armchair; lying down; climbing staircases; sitting at their desks, behind their computers and so on.

After the children had tested the new prototype of the school furniture the first posture evaluation was carried out by the use of the kohs.PIMEX.system and by running sonometric analysis of the posture and the motion of the students' back. In this way the body motion of the school children was captured under real conditions and without limitation of body motion.

A group of students aged between eight and fifteen years were nominated for this posture analyses. The sensors for measuring the posture and motion were placed on the students' backs and the measuring device was calibrated while the test person (students) was performing standardised body postures and gymnastic exercise.

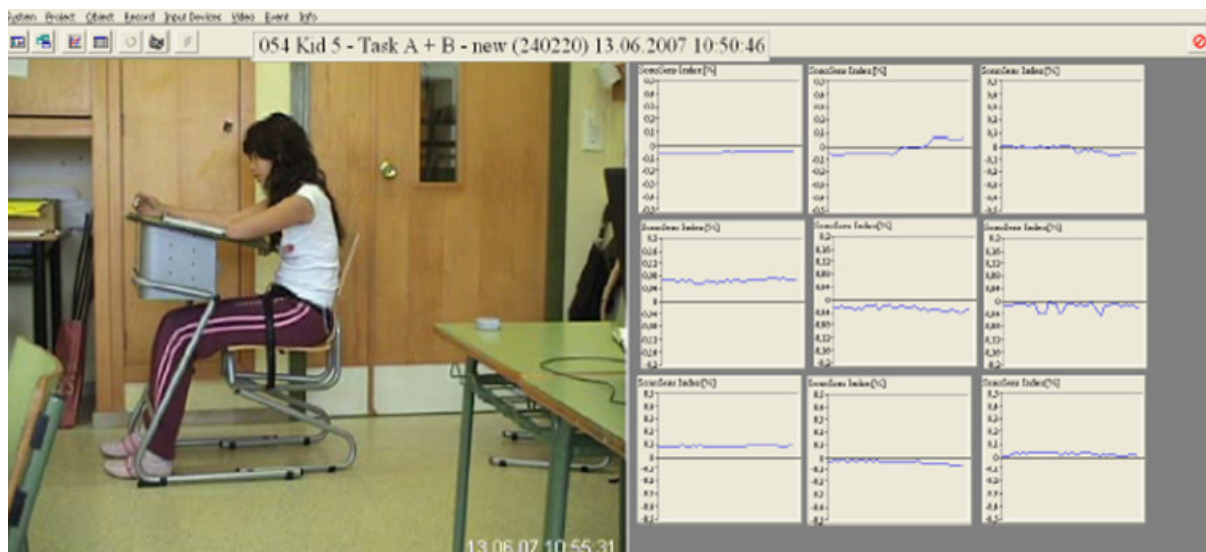


Figure 2: The body posture was analysed with the kohs.PIMEX.system in the class room and under real conditions.

The results of the biomechanical evaluation were used in the following redesign of the prototype of the school furniture.

CONCLUSIONS

The overall result of the evaluation of the school furniture Tris-Tras is very positive: it offers new alternatives to sitting positions; the users themselves show clear preference for it; certain elements (e.g. the aesthetics, the storage box, the feet bar, the back of the chair) have been widely accepted and praised by the users; the teachers – they had the mission to detect possible discomforts that due to use of the furniture – have rated the product with a “pass with merit”.