

ANALYSIS OF SCHOOL FURNITURE USED IN COMPUTER CLASSROOMS

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Abstract

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With the respect to the fast development of new computer technologies, it is unconditionally necessary that school furniture reflected this trend and adapted to it. Our use of computer technologies and utilities in teaching is increasing. Therefore, it is necessary to improve school desks so that they would be fit for new computer technology. Creation of a compact set of information relative to the issue concerned, which would comprise of needs and requirements for individual pieces of furniture, represented an important step undertaken. The goal was to assess current conditions of school furniture used in computer classrooms. The analysis aims to stipulate requirements related to the actual type of furniture, in which many influencing factors are taken into consideration. History of school furniture is interesting as well. A survey on the state of school furniture intended for computer classrooms is the main output. The analysis presents foundations for development of closely specialized furniture.

school furniture, school desk, PC

School furniture has had a long tradition and history, however, with the increasing demands it always has to be adjusted to pupils' and students' needs. History seems to be the best proof for this. The influence of furniture on students is indisputable and yet, still new furniture is not chosen according to its functionality, ergonomics or materials used; the principal decisive factor in a purchase of new school furniture is its price, predominantly.

If we have a close look at the afore mentioned issue of computer technologies at schools, it is obvious that the present furniture equipment is not always suitable for work with computers. In most cases, the furniture does not comply with the needs for ergonomics, it is not adjusted for cable distribution systems, connections etc. This is one of the reasons why greater attention should be paid to school furniture intended to use with information technologies. Another aspect lies in the fact that yet younger pupils encounter and work with computers. Therefore, it is necessary to produce furniture that will comply with not only the aesthetic needs but needs for better ergonomics as well (ability to adjust its height, size of the workplace, suitability for both left- and right-

handed pupils), health requirements and safety, solidity and easy reparability, lifespan, greenness, recyclability and affordability of the product.

The aim of the study

The study aimed to assessment of the current state of school furniture used in computer classrooms. A survey on the state of school furniture intended for use in computer classrooms in the Czech Republic was the main output. The goal of the survey was to create a basic overview of the age of the computers utilized, age of the furniture used and materials that it is made of, what institution is this furniture modified and what plays an important role in new furniture choice. The results of this study were processed into well arranged diagrams and charts.

Methodology

The analysis forms a self-contained set of information and is divided into chapters. The first part focuses on the history of school furniture that is very inspirational. Apart from that, the reader will find here an outlook of the current state of school furniture in computer classrooms at Mendel Univer-

sity in Brno. An analytical study represents a survey directed to the conditions of school furniture used in computer rooms in the Czech Republic. The collected data were processed through Microsoft Office Excel 2003 and Statistica CZ 9 software. After completion of the survey assessment, a research analysis of the data was used alongside with descriptive statistics, tests for two choices and ANOVA. The results are clear about the existing state of forms and shapes of the furniture and its material. The methodology used for creation of the survey is described in Analysis of the state of the school furniture used in computer classrooms.

History

Searching for historic references to furniture used in classrooms with pupils and students was not an easy task as the literature that deals with it is highly specialized and not very numerous indeed. This is caused by the fact that today, references to school furniture appear very scarcely in literature. Thus the main source of information were collections of Comenius Museum in Přerov and Schulmöbel-Museum (Museum of school furniture) in the German town of Tauberbischofsheim.

The main topic of the Tauberbischofsheim exhibition called „School furniture in the 20th century” is research in school furniture and its direct impact on child prosperity. The museum displays an international scope of history and development of school furniture from the beginning of the 20th century to present (Fig. 1). Here we can see educational, ergo-

nomic and most of all historical-cultural aspects of studying in the past.

What follows is an example of a few school desks from the beginning of the 20th century and various kinds of frameworks (Fig. 2, Fig. 3). Their appearance is of high quality – many a today's product could learn from history.

Current state at Mendel University in Brno

Based on an analysis of current state of ergonomic, shaping and material solution, a documentation of computer furniture in the premises of Mendel University was carried out. It is obvious from the following pictures what kind of furniture for computer work is to be found at Mendel University in Brno.

There are both minor and major layout and implementation flaws in each of the classrooms shown here. The furniture in information centre (Fig. 4) is absolutely unsuitable for computer work. There are flaws concerning safety measures, too: computer connecting cables hang uncontrollably and chaotically basically everywhere. The relatively new classroom B41 (Fig. 6), furnished in 2006, is carried out in a combination of chipboard and metal. The greatest flaw of this classroom, though, is ergonomics. There was a great effort to save as much space as possible, which shows itself in the cutout in the work desk. This cutout does not allow the user to sit perpendicularly towards the computer screen and the white board, which from the perspective of ergonomics is wrong. Nearly correct ergonomic style of school furniture for computer work can be found in the



1: A historical photograph of a classroom – School furniture in the 20th century, permanent exhibition in Tauberbischofsheim



2: French Art Deco, 1930 – School desk designed for children aged 6–8. And very simple furniture – school desk from solid beechwood and of classical design with four legs. 1936. Fab. Casala. (md 6/1998)



3: These chairs were made of smoothly curved steel tubes. 1950 (md 6/1998)

classroom T413 (Fig. 7). The classroom Q4 (Fig. 8) is equipped with atypical furniture, where computer screens are connected to the server via a computer terminal. The classroom is not intended as a proper

classroom where teaching is conducted; rather than that, it is used for testing. On the other hand, the classroom Q5 (Fig. 9) is unfortunately a typical example of the use of office furniture that is not suit-



4: Information centre on the ground floor of the building „A“



5: Study on the ground floor of the building „A“



6: Computer classroom in the building „B“ – B 41



7: Computer classroom in the building „T“ – T 413



8: Classroom in the new building „Q“ – Q 4



9: Classroom in the new building „Q“ – Q 5 (this type of furniture prevails and it is used in the study located in the same building)



10: A new classroom in the building „B“ – B46

able for use in schools and lessons. Computer cables are laid on the table towards the bushings in the corner of the workdesk. In contrary to this, the classroom B46 (Fig. 10) can be considered good as the new furniture, though based on office furniture, is suitably arranged accordingly with the needs of education environment. The whole concept idea is elevated by elegant and clean installment of electric lines and network connection into the table. Also, there is significantly less cables on the table thanks connection of individual computer screens into the terminal.

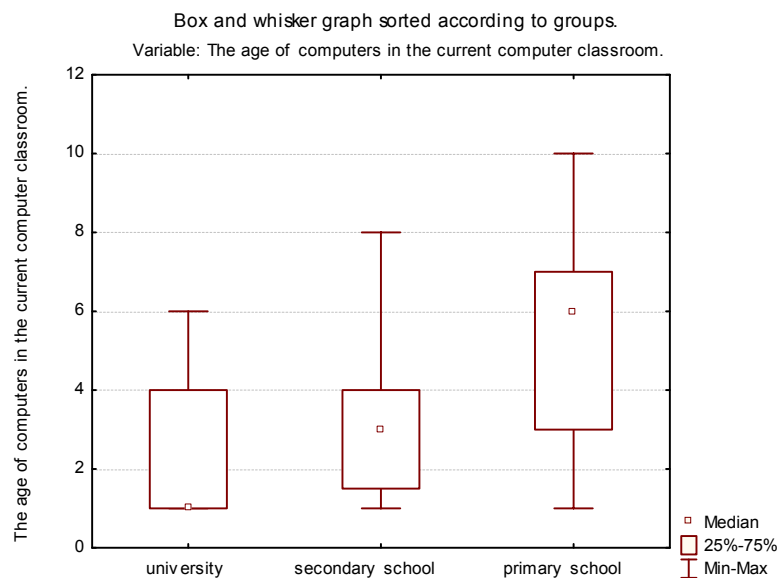
Analysis of school furniture used in computer classrooms

An electronic survey was used for an analysis of the current state of school furniture intended for use in computer classrooms in the Czech Republic. This survey was created in virtual laboratory ReLA (Research Laboratory), which is a system that allows a very effective execution of research through electronic data collection. The ReLA project is carried out at Department of Marketing and Trade, Faculty of Business and Economics of Mendel University in Brno.

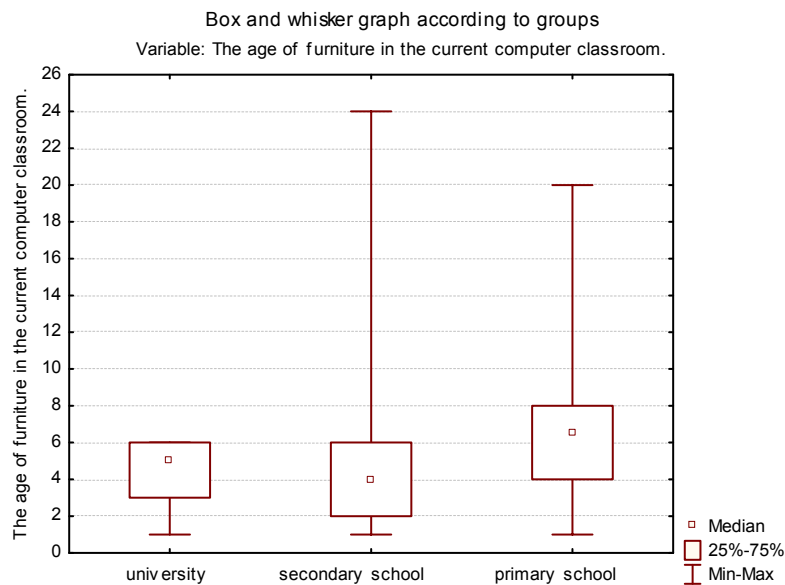
The completed electronic survey was subsequently sent to individual respondents. 448 respondents, including primary schools, secondary schools and universities, were asked to complete the survey, however, only 104 of them actually completed it. Responses of the respondents to individual inquiries of the electronic survey were processed statistically and the results were tabulated.

Survey results

In consideration with the results of descriptive statistics and research survey of the data, moment characteristics of position (median) and others were chosen to be the files representatives. Differences in data for various types of schools were determined regarding the age of computers (Fig. 11), furniture (Fig. 12) and the period of computer upgrade or change. Multiple comparisons of computer and furniture age and the period of computer upgrade/change were carried out and differences were proven always between primary and secondary schools. Differences between primary schools and universities were determined only in the age of computers. Zero hypothesis on identical mean value of the sampling file (SF) was not rejected in the case of



11: The year when computers in the current computer classroom were purchased



12: The year when furniture in the current classroom was purchased

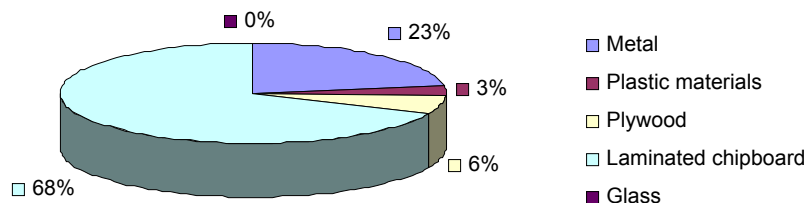
comparison between secondary schools and universities. Dissimilarity between secondary schools and universities in all SF values compared was therefore not established.

When asked how often do they buy a new computer and its equipment, the respondents of the survey answered that most often that is done in 5 years; for furniture they indicated a period of 10 years. However, the differences between development of computers and furniture are beyond comparison. Due to the fact that schools have been equipped with computers for, let us say, 15 to 20 years, the change of furniture is impossible to process statistically. It was verified that computers get upgraded more often than furniture itself, and in this respect, there are vast differences to be seen among various types of schools. Development of personal computers is very fast so it would be good in practice to choose variable furniture that will possess the ca-

capacity to be altered or adjusted by replacement of its individual parts.

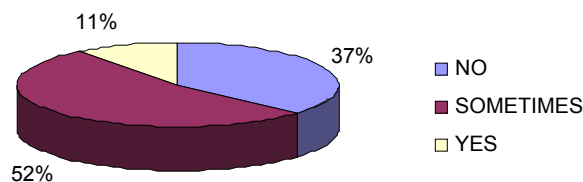
When it comes to materials that the current school furniture in computer classrooms is made of, it is laminated chipboard (68%) and laminated chipboard combined with metal (23%, see Fig. 13) that is most often represented. This means that for school furniture, laminated chipboard is used in 91% of all the cases. Other materials are used only in mere 9%; these materials are plywood and plastic materials. However, it is important to mention that not all the respondents partaking in the survey were able to determine what kind of agglomerated material their furniture was made of. Therefore, it is possible that a confusion between laminated MDF and laminated chipboard etc. takes place here and so it is necessary to take into account that the result of individual materials representation may contain inaccuracies caused by a low level of respondents' expertness in the furniture-making field.

What is the material of the furniture in the existing computer classroom?



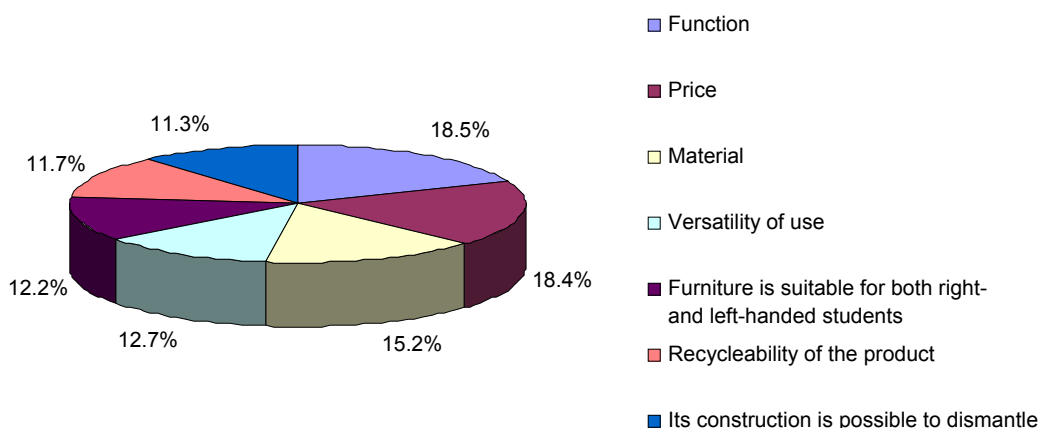
13: Assessment of the survey inquiry number 6

Does the change of computer require a change or adjustment of the furniture in the classroom?



14: Assessment of the survey inquiry number 9

What is important when choosing new furniture meant for PC classrooms?



15: Assessment of the survey inquiry number 10

The afore shown graph indicates that more than half of all the furniture must be adjusted due to the computer change (Fig. 14). The original furniture is used only in 37% of the cases. Relative to the issues discussed, this state of affairs is not satisfactory, out of which arises a need of certain versatility or compatibility of the furniture with continually developing computers and computer technology.

Figure 15 presents factors that the respondents deemed more or less important relative to the choice of new furniture and that they assessed with points ranging from 5 to 1. Respondents determined function (18.5%) and price (18.4%) to be the most important factor acting in their decisions about the choice of new furniture. The third place was taken by material used with the furniture (15.2%) and then versatility of use (12.7%). Suitability of the furniture for left- and right-handers, recyclability of the product and possibility to dismantle the furniture construction was indicated to be less important in decisions regarding purchase of new furniture.

DISCUSSION

In order to determine current conditions of school furniture used in computer classrooms in Czech schools, an electronic survey, which was sent to 448 respondents (primary schools, secondary schools and universities) was utilized. The collected data were assessed statistically. Moment characteristics of position (median etc.) were chosen to be the representative characteristics of files. The survey ascertained differences in data for individual types of schools regarding the age of computers and furniture, as well as time for upgrade of computers. When multiple comparison was carried out, it was evidenced that differences always existed between primary and secondary schools. Differences in all the compared values of the sampling file for secondary schools and universities were not verified. The results for universities are burdened by a certain shortage of data acquired from the respondents. Differences between computers and furniture were proven. Computers are upgraded and changed more often than furniture in computer classrooms; the oldest computer equipment used is – according to the survey – ten years old but the average age of

computers themselves is three years. Nonetheless, the oldest computer furniture has been used for 24 years though the average value of the furniture age is five years. We can infer from this that furniture in computer classrooms is changed more often than it would be necessary regarding its actual lifespan. This assertion was verified upon completion of the survey inquiry number 9: the respondents participating on the survey claimed that on change or upgrade of computers, the original furniture remains unaltered only in 37% of the cases. Therefore, it is obvious that furniture design should have versatile qualities and should be compatible with incessantly developing computers and computer technologies.

The research survey also showed that concerning materials used with furniture for computer classrooms, it is laminated wooden composite materials that have the greatest share (91%). Respondents indicated only laminated chipboard in the questionnaire. Nevertheless, it is important to stress the fact that not all of them were able to exactly determine

the nature of the agglomerated material used. Therefore, it is possible that they have confused laminated chipboard for laminated MDF or currently very popular laminated honeycomb panels etc. The final information acquired from the respondents indicates which product properties are considered important regarding choice of new school furniture for computer classrooms. Function and price (18.5% or 18.4%, respectively) was considered the most important factor. It was followed by material used (15.2%) and versatility of use (12.7%). Price is the most important factor decisive upon purchase of new school furniture for schools usually have limited budget. Thus school furniture is necessary to design in such a way that all parameters mentioned – if possible – should be maintained and special attention should be paid to the price of the final product. This represents the means of procuring the developed school furniture among contemporary furniture production of similar purpose and function.

SUMMARY

The executed research survey ascertained the following: the age of computers and furniture used, the interval of change of computers and furniture, materials used for furniture applied in computer classrooms and factors, on basis of which users choose new furniture to be used in their computer classrooms.

The data and information acquired by the survey shall become the cornerstone for development of quality school furniture designed for use in computer classrooms. The results of this survey can be applied in practice. The data about the current condition of school furniture, as ascertained by this survey, can be made use of by companies focusing on this problematics. Similarly, conclusions of the current state analysis should become clues and guidelines for end users as to them, it may shed some light on what criteria and requirements should furniture have that they will equip their computer classrooms with. On the example of today's situation at Mendel University in Brno, in which basic flaws and strengths of individual classrooms are described, it is obvious that there are vast differences in qualities of furniture in computer classrooms.

Acknowledgements

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