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Ergonomiczna kultura pracy jako warunek wstępny dla zdrowej pracy z komputerem pod względem jakości życia

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Tekst jest udostępniony do wykorzystania w ramach dozwolonego użytku.
ERGONOMIC WORK CULTURE AS A PREREQUISITE FOR HEALTHY COMPUTER WORK TOWARDS QUALITY OF LIFE

Abstract

Ergonomic culture can be explained as a component of general safety culture related to ergonomic working environment on the one hand, and computer users’ attitudes towards ergonomically safe computer use, defined by work safety regulations, on the other hand. Both those aspects are important components within general safety culture. The article analyses various factors of ergonomic culture in different environments in Latvia, as well as partially in the Czech Republic and Slovakia.

Introduction

According to EUROSTAT data in 2010 information technologies (IT) were available to approximately 70% of all households throughout European Union (EU), however in such countries as the Czech Republic (CZ), Latvia (LV) and Slovakia (SK) the availability of IT was respectively 64, 50 and 64% out of all households. Meanwhile the number of individual computer users aged 16 – 74 in 2010 reached 67% LV, 69% CZ and 78% SK, but in 2011 – 74%, 78% and 83% respectively, which confirms very rapid growth in computer use. Compared with average value in EU, 78%, all three countries are approx. on EU-average level

of computer use by 16-74 y. o. individuals, although they lag behind countries such as Sweden and Norway (each 96%) and Iceland (97%)\(^2\). But given the fact that in today's schools children start using computers at a very early age, sometimes even pre-school age, it must be assumed that the percentage of users is even larger.

Since the computer, or rather working on the computer, is recognised as a serious health risk factor, those in charge of educating new users must teach their students how to use their computers and organise their work stations ergonomically. Moreover it is essential to inform users about various potential health risks, the most serious of which are loss of hearing, computer vision syndrome, E-thrombosis, generalized anxiety disorder, and back problems\(^3\), as well as teach them methods how to prevent and reduce those health disorders.

Among other health problems caused by neglecting the basic demands for healthy computer use Carpal tunnel syndrome (CTS) is mentioned as one of the most serious, although, as it has been stated by J. F. Thomsen, F. Gerr, and I. Atroshi, there is insufficient epidemiological evidence that computer work causes CTS\(^4\). Neck pain and headaches are frequent among users who spend long hours by their computers\(^5\). The conclusion, therefore, is that computer users have to be educated regarding appropriate working practices and possible risks through neglectful attitude towards working ergonomics.

However, is equally important to ensure that all computers users, regardless of age and working intensity, have not only acquired the theoretical basis for ergonomically appropriate computer use but also put them to practice on a daily basis. Although the work\(^6\) reveals that even among students who have acquired the fundamentals of ergonomics only a half practically observe those demands.

Certainly each country issues its own regulations regarding safe working practices. However, experience apriori reveals, that users, for various – mostly subjective – reasons, fail to observe even the basic demands. Moreover working safety legislation in Latvia and many other countries refers only to employees, forgetting about university and school students. Those laws do not apply also in situations when employees use computers at home – mostly for entertainment and leisure. It is very difficult to detect to what extent, if any, computer


users observe the demands for safe working in their homes, although the problem itself is serious.

The goal of this research is to summarise the available data, including the results of recent (2010-2012) pilot researches in Latvia, the Czech Republic and Slovakia regarding the ergonomic working culture among different groups of computer users. The data obtained form the questionnaires as well as from previous publications have been processed using the SPSS program.

1. The concept of ergonomic culture as a component of safety culture

In order to evaluate the ergonomic culture of computer users, it is first necessary to establish what is meant by the concept in the context of this article. Provided that: Ergonomics is the scientific discipline concerned with the fundamental understanding of the interactions among humans and other elements of a system ... in order to optimize human well being and overall system7, and bearing in mind that ergos (from Greek) means work, the fundamental aspect is work done by man. Further on we could talk about the concept of the culture of work which is usually defined as a set of tools, methods, guidelines, samples and standards of behaviour inherent in a particular group of people working together employed8. The culture of work equally depends on the contents of this work and the technical equipment, on how the working process is organized as well as on employees – their level of education, professional skills and life experience. In this context the concept of the culture of work is closely related to the notion of organizational culture.

The concept of organizational culture, in turn, includes the component of safety culture, which is defined as follows: The safety culture of an organisation is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisation’s health and safety management. Organisations with a positive safety culture are characterised by communications founded on mutual trust, by shared perceptions of the importance of safety and by confidence in the efficacy of preventive measures9.

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9 Successful health and safety management (1997), HSE books, – http://www.hse.gov. uk/pubns/books/hsg65.htm (Retrieved 01.03.2012.)
The design of every individual working place, on the one hand, and the demands for healthy working practices on the computer, on the other hand, are to a great extent regulated by the general ergonomic demands; which is why we can and should be discussing employees’ ergonomic culture as a component of the culture of work as far as it corresponds to ergonomic regulations maintained by the rules of work safety. This is the particular context in which the article discusses ergonomic culture.

The concept of the ergonomic culture, related to teachers work, has been analysed by L. Sidorchuk, and she considers teachers' ergonomic culture as necessary set of universal ideas and values, professional guidance and ergonomic qualities of the individual, universal ways of learning and teaching activities of ergonomic technology. The presence of such a culture allows the teacher to examine and diagnose the level of students, to understand them, to enter into the world of culture, to organize joint etc.10

It has to be noted that neither scientific nor normative sources have yet extensively analysed the concept of ergonomic culture. R.T. Smith points out that: The concept of an ‘ergonomics culture’ is one where everyone understands and bears some responsibility for ergonomics. This implies that all members of a work organization are informed and empowered to make improvements appropriate to their level of assigned responsibility11. This work provides a broader overview of various types (5 in total) of ergonomic culture12. R. Pater wrote "ergonomic culture" is,..., one where most organizational members pay attention to small changes that could build up – either those that further or those that harm safety and performance13.

2. The elements of ergonomic culture in practical computer use

The factors characterising computer users’ ergonomic culture are varied. First of all those are: the posture assumed while working, organization of work and management of time spent by the computer – how varied the activities carried out on the computer, how lengthy the periods of work, how frequent the breaks and activities during those are, etc. The manifestations of ergonomic culture based on these factors mostly depend on the understanding and attitude of a particular computer user as well as on their psycho-emotional state. It is those

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10 Сидорчук Л.А., Формування ергономічної культури вчителя в системі його професійної подготовки. Наукові записки/ Сер. Педагогічні науки, 2009, вып. 82 (2), с. 68-73.
manifestations that characterises each user’s individual ergonomic culture which, in turn makes up the ergonomic culture of the group.

Table 1. Work safety briefing for different computer users, per cent

<table>
<thead>
<tr>
<th>№</th>
<th>Groups of respondents</th>
<th>Number of respondents</th>
<th>Last briefing during</th>
<th>It has not happened</th>
<th>I do not need it</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Teachers, LV⁴</td>
<td>40</td>
<td>0</td>
<td>12.8</td>
<td>12.8</td>
<td>48.7</td>
</tr>
<tr>
<td>2</td>
<td>Students, LV, 1st year students monitoring 2004-2011</td>
<td>154</td>
<td>0</td>
<td>16.7</td>
<td>10.6</td>
<td>31.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2004/2005</td>
<td>132</td>
<td>16.7</td>
<td>10.6</td>
<td>31.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2008/2009</td>
<td>251</td>
<td>8.0</td>
<td>12.0</td>
<td>31.5</td>
</tr>
<tr>
<td>3</td>
<td>Students, pilot research, Autumn term 2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LV</td>
<td>62</td>
<td>0</td>
<td>16.7</td>
<td>35.2</td>
<td>38.9</td>
</tr>
<tr>
<td></td>
<td>CZ</td>
<td>70</td>
<td>23.4</td>
<td>14.1</td>
<td>29.7</td>
<td>20.3</td>
</tr>
<tr>
<td></td>
<td>SK</td>
<td>57</td>
<td>19.3</td>
<td>8.8</td>
<td>24.6</td>
<td>28.1</td>
</tr>
<tr>
<td>4</td>
<td>Employees, LV, unpublished data (2009/2010)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Office workers</td>
<td>188</td>
<td>2.2</td>
<td>26.6</td>
<td>28.3</td>
<td>29.3</td>
</tr>
</tbody>
</table>

Notes: ⁴ LV – Latvia, CZ – Czech Republic, SK – Slovakia

One such manifestation of ergonomic culture is each individual computer user’s attitude to work safety trainings better known as work safety briefings (Table 1). However, due to those briefings being conducted by work safety experts instead of computer users themselves, the absence of safe computer use briefings might be explained by unsatisfactory management of work safety in general. Although quite many respondents have noted that they have never attended such briefings or – what is equally significant – part of them do not believe such briefings are necessary at all. (Table 1).

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17 Celmina Z., Qualification Paper, Riga, 2010. [Unpublished]
Table 2. Breaks and activities during breaks, per cent

<table>
<thead>
<tr>
<th>№</th>
<th>Groups of respondents</th>
<th>Number of respondents</th>
<th>Yes. regularity</th>
<th>No the work is complete</th>
<th>Irregularly.</th>
<th>Walking</th>
<th>Exercises</th>
<th>Computer games</th>
<th>Other activities</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Teachers, LV&lt;sup&gt;1&lt;/sup&gt;</td>
<td>40</td>
<td>30.0</td>
<td>2.5</td>
<td>22.5</td>
<td>45.0</td>
<td>65.0</td>
<td>7.5</td>
<td>0</td>
<td>45.0</td>
</tr>
<tr>
<td>2</td>
<td>Students, LV, 1&lt;sup&gt;st&lt;/sup&gt; year students monitoring 2004-2011</td>
<td>138</td>
<td>26.0</td>
<td>3.9</td>
<td>11.0</td>
<td>59.1</td>
<td>52.0</td>
<td>57.1</td>
<td>1.6</td>
<td>8.7</td>
</tr>
<tr>
<td></td>
<td>2004/2005</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2008/2009</td>
<td>251</td>
<td>26.3</td>
<td>3.5</td>
<td>9.7</td>
<td>60.6</td>
<td>48.7</td>
<td>6.0</td>
<td>1.5</td>
<td>59.2</td>
</tr>
<tr>
<td></td>
<td>2011/2012</td>
<td>237</td>
<td>39.4</td>
<td>1.3</td>
<td>8.2</td>
<td>51.1</td>
<td>64.6</td>
<td>18.1</td>
<td>0</td>
<td>46.4</td>
</tr>
<tr>
<td>3</td>
<td>Students, pilot research, Autumn term 2010</td>
<td>62</td>
<td>29.3</td>
<td>1.7</td>
<td>1.7</td>
<td>67.2</td>
<td>66.1</td>
<td>0</td>
<td>11.3</td>
<td>46.8</td>
</tr>
<tr>
<td></td>
<td>LV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CZ</td>
<td>70</td>
<td>17.6</td>
<td>8.8</td>
<td>23.5</td>
<td>50.0</td>
<td>31.4</td>
<td>17.1</td>
<td>4.3</td>
<td>68.6</td>
</tr>
<tr>
<td></td>
<td>SK</td>
<td>57</td>
<td>26.3</td>
<td>12.3</td>
<td>15.8</td>
<td>45.6</td>
<td>35.1</td>
<td>15.8</td>
<td>3.5</td>
<td>50.9</td>
</tr>
<tr>
<td>4</td>
<td>Employees, LV, unpublished data (2009/2010)</td>
<td>218</td>
<td>20.9</td>
<td>1.6</td>
<td>9.1</td>
<td>68.4</td>
<td>70.5</td>
<td>1.1</td>
<td>0.3</td>
<td>18.6</td>
</tr>
<tr>
<td></td>
<td>Office workers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: see Table 1

Another factor indication at the level of ergonomic culture is the observance of mandatory breaks and engagement in suggested activities during those (Table 2). The table shows that slightly over ¼ of respondents have indicated that they observe breaks regularly (exception – 1<sup>st</sup> year students during the autumn semester in 2011; 39.4%). Most popular activities during breaks are: walking, eating, doing home chores, etc., whereas specific suggested exercises are taken relatively rarely.

Given the popular attitude towards safety briefings and observance of breaks (Table 1 and 2), it is no surprise that a large part of respondents spend 4 or more hours continuously working on their computers daily (Table 3). For example, among teachers 40% do so at work, while every fifth (or 20%) do this at home. Among Latvian respondents-students around 1/3 spend over 4 hours a day by their computers.

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21 Celmina Z., Qualification Paper, Riga, 2010. [Unpublished]
Among office workers 75% of respondents work on their computers over 4 hours a day; moreover almost one out of ten of them spend over 4 hours daily by their home computers as well (Table 3).

![Table 3. Time spent at computer, per cent](https://example.com/table3)

As to other important aspects characterising ergonomic culture, those are working station design, including the computer (its construction, technical parameters, etc.), furniture, accessories (mouse pad, screen filter, and so on) and a range of other factors; however these aspects are more or less constant and not so much depending on users’ understanding and attitude. In the long run, they undergo little change; therefore their effect on the computer user’s ergonomic culture is relatively smaller, at least in the context of individual ergonomic culture.

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3. Discussion

While evaluating computer users’ ergonomic culture we have to take into account that a considerable proportion of respondents have not had work safety briefings and even do not believe them to be necessary. This obviously is one of the reasons why only around ¼ of users observe regular breaks while working on their computers. There are far more users who take irregular breaks or stop for a pause only when a particular work is completed. What is more – many respondents work on the computer over 4 hours a day either at home or at work (Table 3). While respective sources state that: computing 4 or more hours consecutively without taking a break associate with 87% increased health risk.26

It has to be noted though, that during the autumn semester of year 2011 in the respondent group of Latvian students almost 40% maintained that they took regular breaks (Table 2). This could be evidence of better ergonomic culture awareness and consequently – a higher level of ergonomic culture as compared to students from previous years. However, in order to reach unequivocal positive conclusions, it is necessary to continue monitoring students as well as other respondent groups.

Users rarely take the recommended special exercises while taking a break, although questionnaires reveal that practically all of them (92-98%) have agreed the computer and working on it affects health, and one of the ways to make working on the computer healthier is taking those specific exercises.

This bring us to the conclusion that ergonomic culture is at lowest among the long-time-workers and those who fail to observe regular breaks and to take exercise. Obviously those users have paid insufficient attention to ergonomic work demands regarding computer use. Since among Latvian respondents there are many such people in all groups, we can conclude that ergonomic culture in Latvia is not highly developed.

If compared to their Czech and Slovakian peers, Latvian students do not differ much. Latvians more often use computers at the university, while Slovakians – at home. Besides that, work safety briefings for Latvian students are organised far less frequently.

We have to bear in mind that the fundamentals of work safety demand not only for a single training session on work safety principles, but on recurrent briefings, depending on the features of each specific occupation. Observing those demands could serve as an important step towards an increase in overall ergonomic culture among computer users.

Conclusion

The results of pilot researches carried out from 2010 to 2012 and the analysis of respective scientific sources have revealed that, alongside general work culture, which certainly includes work safety, it is useful to focus also on the concept of computer users’ ergonomic culture and the manifestations of it among various groups of respondents. The attitude to work safety as such, and to safety while working on the computer in particular, is based in thorough understanding of ergonomic culture which, in turn, affects how each particular user views their computer as an integral component of their work and leisure. Having realised the risks the computer poses to their health, users modify their attitude towards their current and future living quality, thus invariably raising their level of ergonomic culture.

Bibliography


