Ergonomic Investigation of Computer Laboratories of Çay Vocational and Technical High School in terms of Students

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ABSTRACT
Computers, which are at the center of our lives and which are an important product of necessity and in addition to many positives are threatening user health as a countermeasure against long hours usage. In this study, physical disorders caused by ergonomic problems arising by increased computer use were examined. For this purpose, this study was carried out in two different computer laboratories in the same school as the students of Information Technology Technologies in Çay Vocational and Technical Anatolian High School. With the measurement tools, the physical conditions of the laboratories, relative humidity and temperature, noise, desk and chair, monitor, keyboard etc. dimensions have been determined. A healthy computer usage simulation was shown to the students and a questionnaire applied to the students was tried to determine problems arising from the laboratory environment and equipment. As a result, much more complaints emerged than in the literature, and students were found to be uncomfortable with the physical conditions of the laboratories. According to the results obtained, it has been discussed which improvements should be made.

Keywords: Ergonomics, Information Technology, Computer Laboratory, Classrooms Conditions

1. INTRODUCTION
Computers, which are at the center of our lives and which are an important necessity product, poses many positives and threatens the user's health as a countermeasure for long hours usage during the day. These negative consequences of computers and their health-threatening aspects have been revealed in various studies. Technological developments have also affected education and teaching, and computers have become indispensable for schools as well. Problems such as eye disturbances, hand and wrist aches, waist, back and neck disturbances, headaches are encountered for a long time in front of the screen. These disturbances are caused by the fact that working environments are not designed according to ergonomic criteria. (Keser, 2005). For this purpose, it is aimed to determine what health problems that occur or are likely to occur on the students as a computer source are examined and how healthy the students use the computers.

Ergonomics; which provides the optimum design for the performance of the individual and the whole system, with practical and theoretical principles, data and methods, within the framework of human, machine and environment interaction (Kahraman, 2013). In other words, ergonomics is the whole of applications aiming to optimize design, working and living conditions for human use (Uluuysal and Kurt, 2001). The rapid increase in computer usage in the working population over the last 20 years brought with it the problem of occupational

musculoskeletal diseases due to computer use (Özcan et al, 2007). In the United States, business statistics show that the highest rate of computer use (64%) is related to work-related health problems, and an annual spending of $ 20 billion has been made on this issue. In addition, in the study conducted by Sommerich et al (2007) in USA on 11th and 12th grade students, the use of computers accounts for as much as 69%, causing the most eye-related problems.

In the last 20 years, the Ministry of Education has accelerated the establishment of Computer Laboratories in schools and nowadays almost every school has a computer laboratory established. In this framework, especially the vocational high school computer department is the area where computer laboratories are the most used areas. 9, 10, 11 hours of object lesson per day are taught in the Information Technologies workshops of the vocational high school. In these lessons, the students are sitting at the computers and applying by the general course structure. Students are interacting with the mouse, keyboard and monitor when they stay on the stool / chair for 130 minutes (valid for Çay technical and vocational high school sample, but many workshops have used stools) when the lessons are processed as a block.

Individuals who use computers can reduce health problems the most if they comply with some criteria. In this context, the table height is 58.4 - 73.6 cm, the gaze distance is 40.6 - 73.1 cm, the working space width is at least 71.3 cm, the viewing angle is 15 - 30 degrees, the chair seat width is at least 51 cm, knee-table distance must be at least 38.1 cm (Orhun, 2016). At the same time, the chair used must have adjustable back and arm supports, a five-legged and wheeled, height-adjustable and self-pivoting seat, as well as a footrest platform (Orhun, 2016).The front part of the sitting surface of the chair should be spaced between the knees and the front edge should be designed to reduce the pressure behind the thighs and be slightly downward sloping. In the sitting position, the body angle should be 90 degrees or more, the feet should be on the floor or foot support, and the waist and shoulders should be seated on the back support of the chair (Yücel et al, 2016). At the same time, the working center should be large enough so that the individual can change the sitting position and move freely in the sitting position (Ministry of Labour and Social Security, 2013). Computer operating ergonomics and seating position according to the mentioned criteria are shown in Fig.1

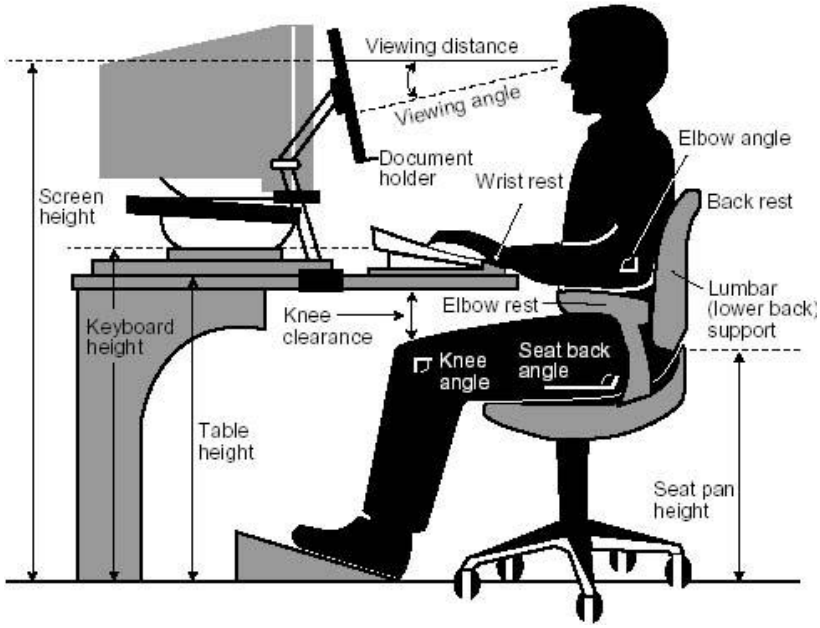

Figure 1. Proper Seating Position at the Computer (Web-6)

In addition to tables and chairs, as well as the Ministry of Labour and Social Security's (2013) Regulation on Health and Safety Precautions in Working with Displayed Vehicles, the screen display must be stationary the display should not vibrate and must be adjustable However, it is necessary to prevent reflection and glare which may disturb the user on the monitor. At the same time, the monitor should be in full contact so that the position is not tilted, the distance to the user should be at least 50-60 cm and the top edge of the monitor should be in the eye of the appropriate sitting person. According to the ergonomics principles of the keyboard, the surface should be up to 8-12 cm from 70-72 cm which is the standard height of the table, the surface should be at a height to allow the shoulders to relax. When using the keyboard, there should be no lengthening movement, the forearms should be parallel to floor and the angle of the elbow should be at least 90 degrees (Yücel et al, 2016).

2. METHOD

This research was carried out by applying 58 student questionnaires to determine the suitability of two computer laboratories for ergonomic principles of Çay Vocational and Technical Anatolian High School Information Technology Fields located in Afyonkarahisar Çay Town center. These 2 computer laboratories have a total of 30 computers, 15 stools, 15 chairs, 30 F keyboards, 30 computer desks and 2 interactive boards. The laboratory is located on the east side of the sun for the first half of the day, while the laboratory 2 is located on the northern front for some sun only in the morning and evening. The work was done on the last week of May and the heaters were not burning. The laboratory 1 is located on the east side and take the sun at the first half of the day, while the laboratory 2 is located on the northern and only take the sun only in the morning and evening. The work was done on the last week of May and the heaters were not burning.

In determining the physical properties of the laboratories, a tape meter for measuring the length, a hygrometer for measuring relative humidity, a thermometer for temperature, a noise meter for determining the amount of noise in the environment, and a water balance for keyboard tilts.

2.1. Data Collecting

The internationally accepted computer-based seating rules have been taken into account as a means of data collection in the survey, and it has been researched how well the students and the computer laboratory fit into the ergonomic rules. After physical and environmental condition measurements of laboratories the data collection phase was carried out on the questionnaire form.

2.2. Analysis of Data

Data obtained by systematic data collection method and evaluated by systematic data analysis method. The data collected through observation are summarized and interpreted under the thematic topics of the research. In the first step, the data are categorized under the following categories: physical characteristics of laboratories, humidity and temperature, noise level, working desk and chair, monitor properties, keyboard properties. In the second step, the data observed for the features in each theme and the standards and criteria proposed in the literature are collected in the same table and visualized. Finally, the data were interpreted in comparison with the criteria.

Before being answered by the students the questionnaire involving observations and ergonomics issues were watched sitting position simulation on the computer and they were provided with ready availability before the questionnaire.

Students are asked to fill in the expressions at the end of the questionnaire "type the problems you want to add here". The final questionnaire includes complaint areas of the body related to the literature review and the most complained computer-based work.

3. FINDINGS

3.1. Physical Properties of Laboratories

Kahraman (2013), Gök and Gürol (2002) stated that the per capita area for the physical characteristics of laboratories is $2m^2$, Dan (2000) and Neufert (2016) stated that it should be 1.5-2 m^2. For the per capita volume per student; Akgül and Yıldırım (1995) 4 m^3, Gök and Gürol (2002) 6 m^3, Kanawaty (2004) 10 m^3, and Neufert (2016) 12 m^3 had expressed.

Some researchers have stated that for ceiling elevation, it should be at least 3 m (Polat, 2007; Kanawaty, 2004) and some are 3-360 m (Kahraman, 2013). The ratio of the total window surface area of the laboratory to the floor area should be 1/5 (Akgül and Yıldırım, 1995), at least 17% (Kanawaty, 2004), 6% (Polat, 2007). Many researchers both agree on the preference of fluorescence as a means of lighting tool (Cengizhan, 2004; Polat, 2007; Yücel et al., 2016). The daylight, the main determinant of natural lightness, is uncontrolled in quantity and quality. Thus, controlling the class light with multiple buttons allows the environment to be adapted to the changes of the sunlight (Polat, 2007).

The physical properties of the laboratories obtained as a result of the measurements and the recommended values (reference value) are given in Table 1.

Table 1: Physical Properties of Laboratories

Physical Properties of Laboratories	Recommended Value	Lab 1	Lab 2
Area per student (m2)	Least 1.5–2	1.65	2.05
Volume of air per student (m3)	Least 4	5,61	6.97
Ceiling height (m)	Least 3	3.40	3.40
Window surface / floor area	0.2 (1/5)	0.12	0.11
Lighting tool	Fluorescent	Fluorescent	Fluorescent
Protective (curtain, blind, etc.)	Must Have	Yes	Yes
light control on buttons	should be	not	not
Status of electrical wiring and cables	hidden	open	open

Accessibility of students to electrical insurances	There shouldn't be	Being there	Being there

In table 1, it is seen that the results per measure are above the lowest recommended value per student. When the researches pertaining to the volume per student are examined, it is seen that Akgül and Yıldırım (1995) have a volume above the determined value (4 m^3). The suggested value for ceiling height is at least 3 m and both laboratories are suitable for criterion with ceiling height. The ideal ratio of the total window surface in the laboratory to the floor area is 1/5 and the data obtained from both laboratories is smaller than the recommended value.

This suggests that laboratories are inadequate in terms of daylight savings. To alleviate this negative situation, artificial lighting is required, where the light intensity will be between 300-500 lux. Fluorescence, which is recommended as a lighting tool, has also been preferred in two laboratories. A positive situation in the laboratories has also been reduced by means of light, curtains, blinds and similar tools coming from the window, preventing direct entry into the room. The screen reflections resulting from the violent light that may come from the window on this screen and the inconveniences that may occur in the detection of the screen have been removed.

Regarding safety in laboratories, electrical wiring and cables must be confidential, which can cause security problems in both laboratories where cables are exposed. However, electrical fuses should not be accessible to students. But in both laboratories the insurances are in a closed and sheltered box, although they are easily accessible.

3.2. Noise Levels of Laboratories

According to Osha (2016), the sound level up to 30 dB is very quiet, the maximum range we can call quiet is 50 dB, the range from this value to 60 dB will disturb the environment. In addition, it was stated that the noise level should be maximum 35 dB when there is no activity for "Environmental Hazard Assessment and Management Regulations" in the areas of education facilities (school buildings, laboratories etc.) (Ministry of Environment and Urbanization, 2015). The data obtained for the noise levels in the laboratory are given in Table 2.

Table 2. Results of Noise

Noise	**Recommended Value**	**Lab1**	**Lab2**
When no vehicle is running	< 35 dB	36.2	36.5
When all vehicles are in operation	< 50 dB	51.3	51.4

According to the obtained data on the noise levels in the laboratories (Table 2), it is seen that in both laboratories when no vehicle is operated, the "Environmental Hazard Assessment and Management Regulation" according to this situation, it can be said that the laboratories do not have adequate sound insulation. According to the measurements made by Branch and Beland (1970) in the measurements made when all the vehicles (computers, projection equipment, etc.) are in operation in the laboratories, the reference value in both laboratories is somewhat exceeding and uncomfortable.

Figure 1. Noise level meter and Lab1

3.3. Relative Humidity and Temperature of Laboratories

There are different suggestions for relative humidity for ideal working environments. Neufert (2016) stated that it should be between 40 and 60%, ANSI (2013) %30–60, Edi (1995) %50–60, Orhun (2016) %30–70, Kanawaty (2004) %40–65 says it should be at this interval. The recommends on the ideal temperature of working environment Yücel et al. (2016) 20-24 º C in winter and 22-26 º C in summer, Akgül and Yıldırım (1995) 19.4-22.8 º C, Edi (1993) for summer season 18-24 º C, 17-20 º C for winter season, ANSI (2013) 18-23 ° C.

Table 3 Relative Humidity and Temperature (measurements were made on the last week of May, the heater did not burn)

	Recommended Value	Lab1 Devices off	Lab1 Devices on	Lab2 Devices off	Lab2 Devices on
Relative Humidity	%30–60	51.8	46.7	53.3	48.9
Ambient temperature	18–23°C	23.1	24.2	22.6	23.5

The recommended relative humidity value in the laboratory environment was accepted as 30-60%, as specified by ANSI (2013) (Table 2). In laboratory 1 when all devices in the environment were closed, the humidity of the environment was 51.8%, when all devices were turned on the humidity of the environment decreased to 46.7%. Relative humidity has been identified when closed devices 53.3%, and when open 48.9% in laboratory 2. If the relative humidity of laboratory 2 is higher than Lab 1, measurements may have been made at different times, and Lab 1 may have been affected by more sunlight. However, it has the ideal humidity ratio in both laboratories.

The ambient temperature was taken as 18-23 ° C recommended by ANSI (2013) for computer laboratories (Table 2). According to this, the laboratory 1 when measured with all devices turned off temperature was 23.1 ° C, when measured with open devices the temperature exceeded the ideal temperature with 24.2 ° C.

In laboratory 2 measurements, when all devices were closed was at ideal values with 22.6 ° C, when measured with open devices the temperature exceeded the ideal temperature with 23.5 ° C. It can be said that Laboratory 1 is getting more sunlight, which causes higher values.

Figure 2. Humidity and temperature measuring instrument and Lab1

Table 4. Evaluation of the questions directed to the students about the physical conditions of the laboratories

Questions for Students	Yes	%	No	%
The keyboard should be 8-12 cm below the standard height of the table, 70-72 cm, at the height of the surface to keep the shoulders relaxed?	58	100	0	0
Is classroom lighting appropriate?	31	53,45	27	46,55
Is the seating width at least 51 cm?	29	50	29	50
Is the top edge of the monitor in the eye of the right person?	29	50	29	50
Does the used chair have adjustable back and arm supports?	0	0	58	100
Does the feet push the foot or foot support?	58	100	0	0
Does the waist and shoulders sit on the back support of the chair?	29	50	29	50
Is the screen image stationary?	58	100	0	0
Can the screen be rotated in any direction according to the need?	58	100	0	0
Is there reflection and glare on the monitor that could disturb the user?	0	0	58	100

The students were asked about the physical conditions of the computer laboratories in question 1, and the results in Table 4 were obtained. According to the answers given by the students, the most significant result was that the students were uncomfortable with the use of chairs and stools. Most notably, all students are complainants in the same situation. Below the form given to the students is the same situation and there are a lot of statements that "our efficiency will increase even more with a chair with a soft seating area and where we can stand."

The answers given to the 3 questions in the above questionnaire were common and a rate of 50% was obtained. This is the reason why research has been done in two different computer laboratories. In general, the physical condition of laboratory 1, established by the Ministry of Transport and Infrastructure, is favorable.

In answers to classroom lighting, students expressed distress to the screen when they were associated with a drop in brightness. There are also problems with the brightness of the morning sun class.

Students also expressed their complaints on the F keyboard. F can not be fast on the keyboard, they can not raise the applications in time. They have indicated that they are forced to use Q keyboards at home and in internet cafes when talking to one another.

The data emerged in the second part of the questionnaire are given in Table 5.

Table 5. How well students are able to work ergonomics in a computer lab

Questions for Students		Yes	%	No	%
Are you looking at the computer from 15 to 30 degrees?		44	75,86	14	24,14
Have you set the knee-table distance at least 38.1 cm?		58	100	0	0
When using the keyboard, no stretching should be done, the forearms should be parallel to the sides and the angle of the elbow should be at least 90 degrees. Do you follow this rule?		51	87,93	7	2,07
Is your computer view distance between 40.6 and 73.1 cm?		58	100	0	0
Is the body angle 90 degrees or more in the sitting position?		58	100	0	0
Which part of your body aches the most at the computer?	Neck	29	50	28	50
	Back	42	72,4	16	27,6
	Waist	58	100	0	0
	Other	50	86.2	8	13,8

In the second part of the questionnaire, students were asked about the extent to which their bodies could fit their ergonomic rules in computer laboratories. The students showed that they had better adjusted themselves to the answers given in part 1 of the questionnaire. The line of vision is that students have the most problems. This is due to the feature of the monitors in laboratory 1.

4. DISCUSSION

As a result of the study, it was determined that the physical characteristics of the laboratories per capita area, the ceiling height and the volume are above the recommended lower values. When the related researches in the literature were examined, it was seen that Akgül and Yıldırım (1995) had a volume above the determined value (4 m^3) per capita area, the ceiling height and the volume. The ratio of the total window surface in the laboratory to the floor area is less than the recommended value in both laboratories and these findings are better values than Tamer and Koç (2010) findings. This suggests that laboratories are inadequate in terms of daylight savings. It has been found that this adverse situation is resolved with the preferred fluorescence as a lighting medium and with a light intensity between 300-500 lux.

A favorable situation in the laboratories is that the preference of the screen is prevented from entering the sunlight directly from the window. So that the screen reflections due to violent light and the inconveniences that may occur in the detection of the screen have been removed.

Electrical wiring and cables in laboratories need to be hidden, which can cause security problems in both laboratories where cables are exposed. But in both laboratories the fuses are in a closed and sheltered box.

According to the obtained data on the noise levels in the laboratories, the reference value is somewhat exceeded in both laboratories when the vehicle is not working and when it is in operation, which is uncomfortable. These values are closer to the findings of Tamer and Koç (2010). According to this situation, it can be said that the laboratories do not have adequate sound insulation.

In laboratory 1, when all devices in the environment were closed, the humidity of the environment was 51.8%, when all devices were turned on the humidity of the environment decreased to 46.7%. Relative humidity in laboratory 2 were 53.3% when devices closed and 48.9% when open. There are different suggestions for relative humidity for ideal working environments. Akgül vs Yıldırım (1995) and Orhun (2016) 30-70%, Kanawaty (2004) % 40-65 respectively, while Neufert (2016) stated that it should be between 40-60%. If the relative humidity of laboratory 2 is higher than Lab 1, measurements may have been made

at different times, and Lab 1 may have been affected by more sunlight. However, it has the ideal humidity ratio in both laboratories.

The ambient temperature is slightly above the ideal temperature when both devices are turned on, while both instruments are in the ideal range while all devices are off. It can be said that laboratory 1 is getting more sunlight, resulting in higher temperature values.

One of the issues that students complain about is the use of F keyboard. The regulations on the use of the F keyboard have been read to the students and the students have been informed about why the F keyboard should be used. It has been emphasized that the use of F keyboards in students should not be seen as a difficulty forcing them in the laboratory.

While the students are not disturbed by the light especially in the north-facing computer lab; they complained about the cold due to the fact that the computer lab did not get sunshine. This affects the motivation of the students especially in the first hours of the morning. It was stated that the students would be dressed more tightly in the first lessons and that they would be able to overcome this situation with more comfortable clothes and aprons over the following hours. Students are disturbed by light from the east faced computer lab until noon. This means that the curtains of relevant laboratories must be replaced by light-shielded curtains.

It has been observed that the height of the monitor complained by the students is not caused by the table, the computer and the monitors in the standard scale, but the stress is caused by the height of the stools. Different standard and non-standard stools affect the eye-to-eye distance of students with the monitor. In addition, the answers given by the students' questionnaire "Do you have adjustable backrest and armrests?" And "Is the chair seat width at least 51 cm?" are among the topics most frequently complained by the students. In the article reviews, the back and the back pain of the people working on the computer are the main factors. Our work is consistent with the researches of Akbaba and friends (2009). However, the answers given by all the students in Çay Vocational and Technical Anatolian High School Studies to the question "Which organ is the most painful at the computer desk?" Is much more than the complaints of Akbaba and his colleagues (2009). This indicates that the stool and chair equipment of this laboratories should be renewed. The findings of Uluuysal and Kurt (2011) are less complaints of students. In this study, it is seen that students generally complain about computer laboratories; the result is that they adjust their body movements according to the position and condition of the computers.

5. CONCLUSION

The result is that only good technological equipment does not increase the efficiency of the students in the classroom, but the ergonomic rules can only provide efficient training with suitable furniture. Even though the computers in the computer laboratories of Tea Vocational and Technical Anatolian High Schools are technologically good, it is seen that other equipments should have contemporary requirements and ergonomic elements. The results and suggestions obtained are shared with the school management.

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REFERENCES

Akbaba, Y.A. et al., Effect of Gender on Spinal Pain in Office Workers, Cerrahpaşa Journal of Medicine, 40,121-128 (2009).

Akgül, M.K., Yıldırım, F., The Significance of Ergonomic Measurements in the Use of Training Tools, 5 th Congress of Ergonomics, İstanbul (1995).
ASHRAE /ANSI Standard 55–2013, Thermal Environmental Conditions For Human Occupancy, American Society of Heating, Refrigerating and Air-Conditioning Engineers Inc., Atlanta (2013).
Cengizhan, C., Investigation of Computer Labs in Istanbul Anatolian Side Primary Schools in Terms of Layout Plans and Ergonomic Criteria. 10th National Ergonomics Congress, Uludag University Bursa (2004).
Dan, B., Classrooms. National Clearing House for Educational Facilities, 4, 1-3 (2000).
Edi, Ö., Factors Of Physical Environment Affecting Efficient And Effective Work In Enterprises, Istanbul University Social Sciences Institute, İstanbul (1993).
Gök, H., Gürol, M., Usage status of primary school buildings in terms of time and ergonomics (Elazığ province example). Fırat University Social Sciences Magazine, 12(2), 263–273 (2002).
Kahraman, MF., Ergonomic Workplace Design Office in Turkey by Anthropometric Data, Occupational Health and Safety Specialty Thesis, T.C. Ministry of Labour and Social Security, General Directorate of Occupational Health and Safety (2013).
Kanawaty G., Akal, Z., İş etüdü, Milli Prodüktivite Merkezi Yayınları, 29, Ankara (2004).
Keser, H., Human-Computer Interaction and Health Impact, Ankara: Nobel Publishing House (2005).
Koca, B., Akın, G. and Gültekin, T., Hand Anthropometry And Data Analysis In Ergonomic Design, 8th National Ergonomics Congress. Dokuz Eylul University, İzmir, 240-248 (2001).
Ministry of Environment and Urbanization, Assessment and management of environmental noise regulation, Official Gazette, Issue: 29536 (2015).
Ministry of Labour and Social Security, Regulation on health and safety precautions when working with screened vehicle. Official Gazette, Issue: 28620 (2013).
Neufert, E., Building Design Knowledge, 39. Zeitschriftenartikel aus Bauwelt, Germany, 109–262 (2016).
Özcan, E., Esmaeilzadeh, S. and Bölükbaş, N., Occupational Musculoskeletal Disease Prevention and Ergonomics in Computer Usage. Nobel Medicus, 27,12-17. (2007).
Polat, Ç. Design of a Standard Computer Laboratory for Every Direction. Gazi University Graduate School of Natural and Applied Sciences, Ankara (2007).
Sommerich C. M., Ward R., Sikdar K., A Survey of high school students with ubiquitous access to tablet PCs. Ergonomics. 50(5), 725 (2007).
Tamer S.L., Koç M., Evaluation of Computer Laboratories in Terms of Physical Ergonomic Criteria: Süleyman Demirel University Example, International Journal of Human Sciences 7-1 (2010).
Uluuysal, B. Kurt, A.A., Ergonomic Analysis of Primary School Computer Laboratories: Eskişehir Province Example, Ahi Evran University Faculty of Education Journal, Kırşehir 12, 271-285 (2011).

Web sites:

http://www.populermedikal.com/saglikguvenlik/bilgisayar.asp, Orhun, H.H., Are computer screens threatening our health? (2016).
http://saglik.tr.net/ak_05_0203.shtml Yücel, A., Vaizoglu, S. and Güler, Ç., Computer ergonomics (2016).
http://www.kurumsalhaberler.com/bilgikurdu/bultenler/bilgisayarkullanimi-ile-ilgili-saglik-sorunlari, İnandı, T., Akyol, İ., consulted 25 April 2016.
https://www.osha.gov/SLTC/computerworkstation/index.html
https://www.osha.gov/SLTC/noisehearingconservation/standards.html, United States Department of Labor
http://www.populermedikal.com/saglikguvenlik/bilgisayar.asp., (22.12.2014)

http://www.resmigazete.gov.tr/eskiler/2003/12/20031223.htm (20.12.2014)
http://www.mevzuat.gov.tr/Metin.Aspx?MevzuatKod=7.5.17288&sourceXmlSearch=&MevzuatIliski=0 (20.12.2014)