Computer operation by primary school children in Japan

-- present condition and issues --

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1. Present condition of computer use by primary school children in Japan

Computer use in school education was encouraged by the new education teaching guideline which took effect in 1992 and introduction of personal computers into primary, middle and high schools throughout Japan has been promoted since then. Most personal computers used in schools are desktop types. Some schools, however use lap-top computers as well. We did a survey on the environment of computer operation for primary school children and found the following 2 points to be especially evident.

* One unit of work station is shared by 2 or 3 children. * At a glance, the size of the work station is too big compared to the size of the children.

2. Relationship between a child's body size and the dimensions of the devices

We measured the size of the child operating the VDT system and the dimensions of the equipment and drew diagrams of the postures of 20 children. As a result we found a huge mismatch, in general, between the child's body size and the dimensions of the devices. Figures 1 - 3 show examples of mismatch and measures to remedy them. In figures 1 - 3 a desktop type personal computer is placed on a standard office desk used widely in Japan (70 cm in height). The subject in the figures is an 11 year old 6th grader who is 143 cm tall. In figure 1 measurements were taken in a classroom. This figure shows a typical

relationship between a school child and a personal computer in a classroom situation. Here, the seat height is adjusted to match the popliteal height of the subject.

The viewing angle and the angle of the upper arm, in figure 1, both exceed there commended range found in any guidelines available. There are 2 possible ways to rectify these two angles so that they will stay within the recommended range. One way is to use a foot support which is shown in figure 2.

The other way is to remove the computer's CPU from under the display unit to somewhere else. This measure is shown in figure 3.

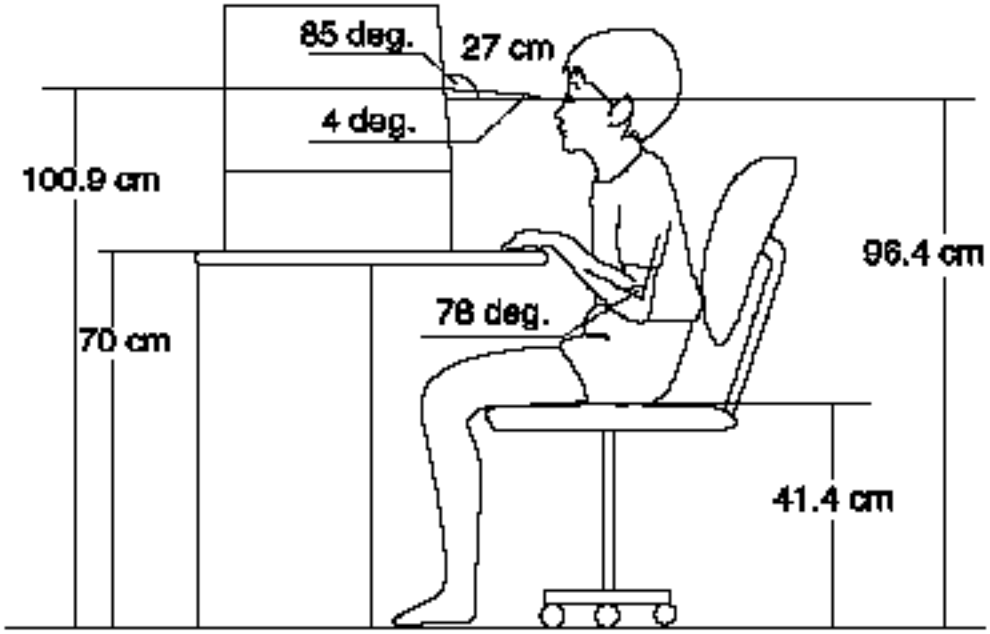

Figure 1. A typical relationship between a child and a personal computer in a classroom situation. Numerical values in the figure are actual measurements.

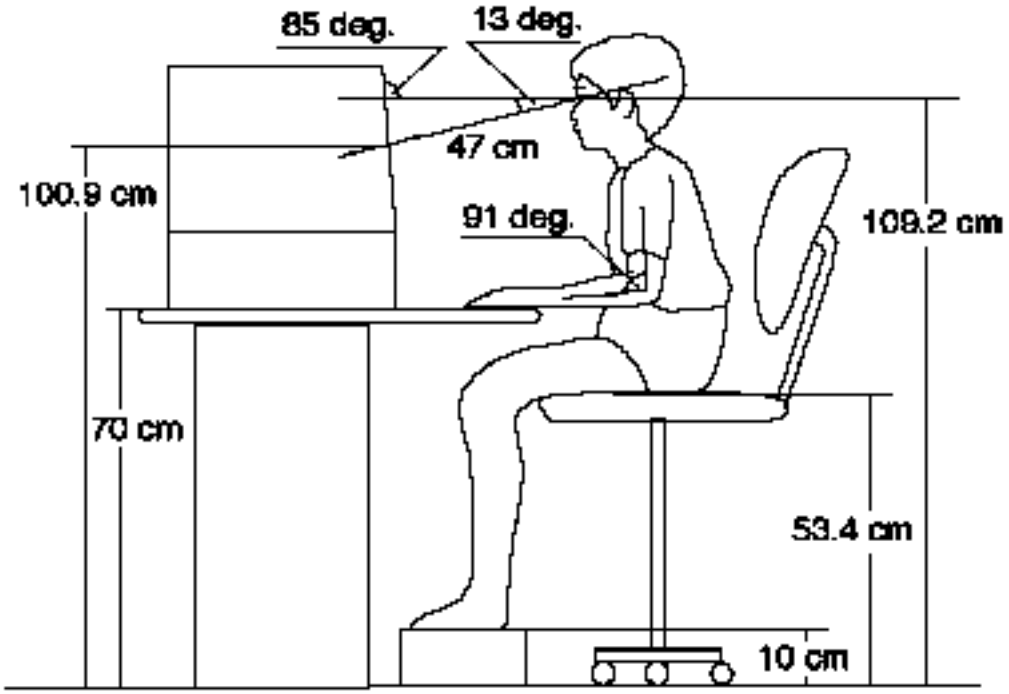

Figure 2. Measure 1.
Mismatch between the child's body size and the dimensions of the device is alleviated by the use of a foot support.

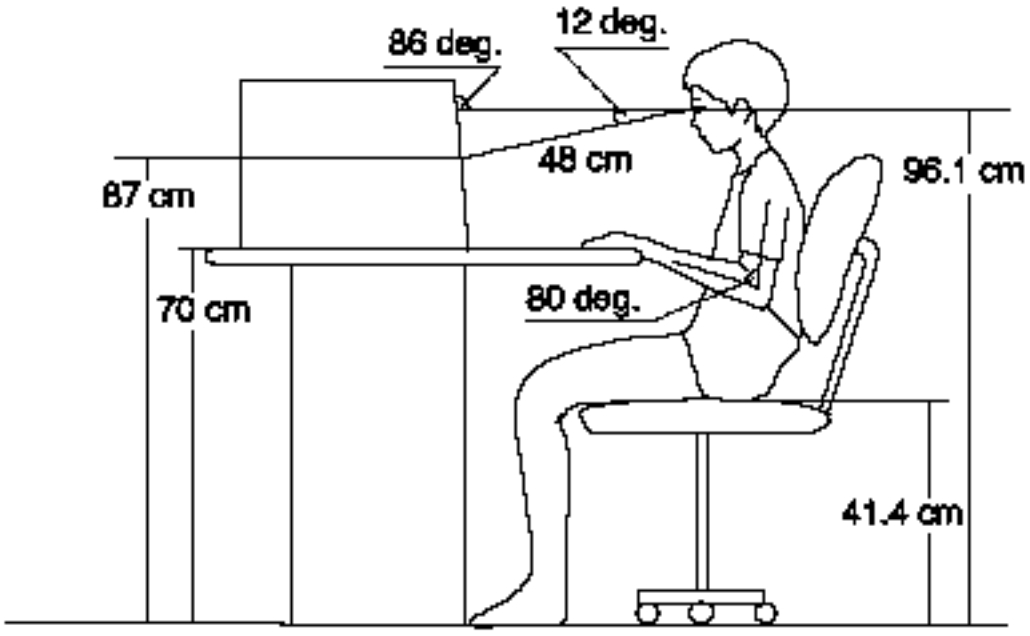

Figure 3. Measure 2.
Mismatch between the child's body size and the dimensions of the device is alleviated by removing the computer's CPU from under the display unit to another location.

3. Outline of the issues

* It was revealed that the present VDT operational environment is not suitable for children and that it is necessary to adjust the system according to the child's body size.

* The following measures are recommended as simple adjustment methods.

1) Take the display system off the main computer case and set it directly on the desk so that the display screen is lowered and hence the child's viewing Angle can be lowered.

2) In case the chair is too tall and the child's feet do not touch the floor, place a foot rest in front of the chair.

4. Suggestion : Develop a work station exclusively for children

No matter how much a work station for adult is adjusted, it is still merely a makeshift measure for most children. It is essential to develop a work station for children. Below is the design concept for the work station.

* Two sizes, one for the lower classes and the other for the upper classes of primary school are necessary. The standard adult size may suffice for the upper class students.

* Children's hand size and arm length should be taken into account especially when designing input devices (keyboard, mouse, etc.).

* It is essential that several children can share one or more VDTs. For example, it should be made possible that input to a single display screen can be made via several mouses and keyboards.

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