

Research Suggests Mid-Level Computer Screen Displays Can Minimize Musculoskeletal Strain in Schoolchildren

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A new study by human factors researchers in Australia suggests that students' posture is affected by the height at which they view classroom learning materials. The researchers cited computer screen displays positioned at mid-level as causing less musculoskeletal strain than high- and book-level displays. Their findings were published in the February 2008 issue of *Human Factors: The Journal of the Human Factors and Ergonomics Society*.

The rapid increase in computer use by children over the past few years, say the authors, "has outpaced the development of knowledge about the ramifications for the health of children." For example, data from the Australian Bureau of Statistics indicate that in 2006, 80% of children aged 5 to 14 years used a computer at home.

Children are physically and behaviorally different from adults; for example, children's heads are proportionately larger than those of adults. This makes research conducted on adults inadequate to address computer-related discomfort in children.

Because research on what constitutes the optimal display height for children is limited, Leon Straker and colleagues conducted a study in which they presented an interactive task to 24 children of normal height age 10–12. The children's movements were recorded with an optical capture system while they read from a book and wrote on paper or read

from a computer display and used a mouse and keyboard to enter data. The researchers measured 3-D posture and muscle activity in the neck and upper limb for the high-, mid-, and book-level displays. The authors state that the study is unique in that it captures 3-D posture and muscle activity under conditions that are commonly observed in schools.

The high display resulted in mainly upward bending of the upper neck. As the visual target was lowered, head and neck downward bending increased. The mid-level display was found to promote a more upright and symmetrical posture and lower average muscle activity than either the high- or the book-level position. Of the three positions, the low (book-level) display was found to cause the most strain on muscles and joints.

Straker and colleagues note, "The data collected in this study provide the first detailed description of 3-D head, neck, and arm posture and the associated muscle activity of children reading and entering data with computers and reading and writing with paper." Despite some limitations of their study, they believe the findings can aid in the development of guidelines for computer use by children.

Source: National Health and Medical Research Council of Australia

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