

# The Developing Comfort and Efficiency with Effective Visual Ergonomics

Lamya Al Harmoudi\*

Department of Occupational Safety, Stanford University, California, USA

## DESCRIPTION

Visual ergonomics refers to optimizing the design and arrangement of visual elements in a workspace or environment to ensure comfort, reduce strain, and enhance productivity. It encompasses several factors, including lighting, screen display quality, workstation arrangement, and vision care. The modern workplace, characterized by an increasing reliance on digital devices, has made visual ergonomics a vital aspect of occupational health. Neglecting visual ergonomics can lead to a range of adverse effects on both health and performance. This essay explores the various effects of visual ergonomics on human health, productivity, and overall well-being. One of the most significant effects of poor visual ergonomics is on eye health. The human eye is not naturally designed to focus on digital screens for extended periods, leading to several vision-related problems. The most prevalent condition associated with poor visual ergonomics is Computer Vision Syndrome (CVS), also known as Digital Eye Strain (DES). This condition affects 50% to 90% of individuals who work at computers.

Many digital devices emit blue light, which penetrates deep into the eye and can lead to retinal damage over time. Prolonged exposure to blue light, especially during nighttime, has been linked to disrupted sleep cycles, as it interferes with the production of melatonin, the sleep hormone. While short-term effects include eye discomfort, long-term exposure to poor visual ergonomics can lead to more severe consequences, such as myopia progression (nearsightedness) and the exacerbation of pre-existing eye conditions. Visual ergonomics directly influences body posture. Poorly arranged workstations can cause workers to adopt awkward postures as they try to get a better view of their screens or documents. These posture adjustments can lead to discomfort and, eventually, to more serious musculoskeletal issues. When a screen is positioned too high or too low, workers tend to extend their heads forward, causing forward head posture. This posture puts strain on the neck and shoulders, leading to conditions like cervical spine misalignment and tension headaches. Improper visual ergonomics, such as glare on the screen or poorly positioned monitors, can cause individuals to hunch forward or lean awkwardly. Over time, this leads to

chronic shoulder and back pain, particularly in the upper back and shoulders.

Visual ergonomics is often tied to overall workstation design. Poor placement of monitors can cause workers to repeatedly adjust their posture or strain their hands and arms, leading to repetitive strain injuries. Common RSIs include carpal tunnel syndrome and tendinitis, which are exacerbated by poor workstation ergonomics, including improper screen and keyboard placement. Visual ergonomics plays a crucial role in worker productivity. Poorly optimized visual conditions can lead to frequent breaks, reduced concentration, and slower task completion. On the other hand, a well-designed visual environment can enhance focus, accuracy, and efficiency. Good visual ergonomics reduces the cognitive load on the brain by ensuring that the visual environment is easy to navigate and process. For instance, proper lighting reduces glare, while high-quality screens with adjustable brightness prevent strain, allowing the brain to focus on the task at hand rather than compensating for discomfort. Visual fatigue from poor ergonomics can cause mental fatigue, which directly affects accuracy and attention to detail. Employees are more prone to making mistakes when their vision is strained, leading to reduced productivity. Conversely, clear visibility of the screen, documents, and workstation setup promotes sustained attention and better work performance. When employees experience visual discomfort, they often need to take frequent breaks to rest their eyes, which can interrupt workflow and reduce overall efficiency. Good visual ergonomics minimizes these disruptions, enabling workers to stay focused for longer periods without the need for constant breaks. Visual ergonomics also affects an individual's psychological well-being. The cumulative effect of visual strain, discomfort, and reduced productivity can lead to stress, anxiety, and burnout. When employees experience discomfort due to poor visual ergonomics, they are more likely to become stressed, particularly if they are working under deadlines. Stress can stem from both physical discomfort (eye strain, headaches) and reduced productivity, as workers may struggle to complete tasks efficiently. Poor lighting and inadequate visual conditions can negatively impact mood and energy levels. Low lighting or excessive screen brightness can lead

**Correspondence to:** Lamya Al Harmoudi, Department of Occupational Safety, Stanford University, California, USA, E-mail: lamya.harmoudi@gmail.com

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to feelings of fatigue and irritability. On the other hand, optimal lighting, screen brightness, and ergonomic design can help maintain a positive mood and prevent energy depletion. As previously mentioned, blue light emitted by digital devices can interfere with the body's natural circadian rhythm by suppressing melatonin production. Prolonged exposure to blue light, especially late in the day, can lead to sleep disorders and insomnia, which in turn affect mental health, leading to chronic fatigue, anxiety, and depression.

Implementing proper visual ergonomics can help mitigate the negative effects on health, productivity, and well-being. Here are key strategies to optimize visual ergonomics in various environments. The top of the screen should be at or just below eye level, and the screen should be about an arm's length away from the viewer. Tilting the screen slightly upward (about 10-20 degrees) can help reduce glare and strain on the eyes. For individuals using two screens, placing them side by side and at equal heights helps maintain balanced posture and eye

movements. It's important to have even, non-glaring ambient lighting in the workspace. Avoid placing screens directly in front of or behind windows, as this can cause glare.

## CONCLUSION

Visual ergonomics is a critical aspect of workplace design that significantly impacts health, productivity, and well-being. Poor visual ergonomics leads to a range of adverse outcomes, from eye strain and musculoskeletal pain to reduced productivity and increased stress. Conversely, optimizing visual ergonomics can enhance cognitive performance, prevent long-term health issues, and contribute to a positive and comfortable working environment. By implementing appropriate strategies such as proper screen positioning, lighting adjustments, blue light management, and regular vision breaks, individuals and organizations can improve both their physical health and workplace efficiency.