IEA International Ergonomics & Human Factors Association

IEA Visual Ergonomics TC

Visual Ergonomics Digest

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Editorial

Sanjram Premjit Khanganba

Designing for Visual Comfort

Welcome to the first 2026 issue of the newsletter, where we continue our mission of exploring how visual environments shape human performance, health, and experience. This edition opens the year with a curated selection of emerging research findings that push the boundaries of how we understand visual comfort, digital strain, and adaptive design. From advances in display technologies to insights into workplace lighting and screen behavior, these studies offer practical implications for designers, researchers, and everyday users seeking more sustainable visual habits across diverse contexts and industries worldwide today and beyond. We also examine the compelling idea that seeing is thinking, arguing that the visual environment is not merely a backdrop but an active component of the cognitive system. By linking perception, attention, and decision making, this perspective reframes design as a cognitive partnership between people and their surroundings. The discussion invites readers to reconsider how layouts, colors, and spatial cues influence reasoning, creativity, and wellbeing in both physical and digital spaces. It also highlights interdisciplinary research connecting neuroscience, design practice, and human factors in meaningful, actionable ways for professionals. We encourage our readers to share global snapshots of events and conversations shaping the field, from international conferences to regional workshops and collaborative forums. These gatherings reflect a growing recognition of visual ergonomics as a critical discipline in technology, healthcare, and education. We hope this issue informs, inspires, and connects our community, encouraging thoughtful engagement with the visual worlds we create and inhabit every day. We also highlight upcoming opportunities for participation, knowledge exchange, and networking across continents, supporting a more inclusive and forward-looking professional community worldwide today.

From Sight to Insight

Hillevi Hemphälä

Why Visual Ergonomics Matters to Me?

My interest in visual ergonomics started very early in my career as an optometrist. In fact, it began during my very first week working in a clinic.

A patient came to see me because she suffered from severe headaches. She had undergone several medical examinations without anyone finding a clear explanation for her symptoms. During our consultation it became clear that she was extremely sensitive to light. As a simple experiment, I suggested that she try wearing a hat indoors for a couple of weeks to reduce the amount of light reaching her eyes.

When she returned for a follow-up visit, something remarkable had happened: her headaches had disappeared.

That moment made me realize how strongly the visual environment can affect our health and well-being. As an optometrist I had been trained to examine the eyes and vision, but I also realized that understanding vision alone was not enough. To truly help people, I needed to understand light and the environments in which we see and work.

This insight led me to study lighting design, exploring how lighting conditions influence visual comfort, performance and health. Through this work I discovered the broader field of visual ergonomics, where vision science, lighting, human factors and the built environment intersect. Eventually, this path led me to pursue a PhD in visual ergonomics.

Visual ergonomics is inherently multidisciplinary. It connects fields such as optometry, ophthalmology, ergonomics, neurology, lighting design, architecture, building engineering, luminaire development, electrical engineering and human–computer interaction. In our increasingly digital world, many visual tasks occur in front of screens, making collaboration with HCI researchers essential to understand how people interact with digital systems and visual interfaces.

Today our environments are highly visual dominated by screens, artificial lighting and complex visual tasks. Yet many people remain unaware that light, glare, flicker and visual load can significantly affect comfort, productivity and health.

For me, visual ergonomics is about bringing these disciplines together to design visual environments that support health, performance and well-being—and about increasing awareness that the visual environment truly matters.

Prachi Verma

Seeing is Thinking: Why the Visual Environment is Part of the Cognitive System?

Over the years, I have observed people work in visually demanding environments, one thing becomes clear very quickly. We often assume that seeing is just about the eyes. But the more time you spend watching people interact with screens, dashboards, documents, and digital systems, the more you realise that what we see quietly shapes how we think, remember, and decide. The visual ergonomics is usually discussed in terms of lighting, screen clarity, or eye comfort. These are important. But the impact goes much deeper. The visual environment is not just something we look at. It is something we think through.

When information is scattered across multiple screens, when layouts are dense, when alerts compete for attention, people are constantly forced to shift their focus. These shifts seem small, almost invisible. But they add up and result in attention fragments interrupting tasks. Mental effort increases without us even noticing.

In many professional settings today, especially those that rely heavily on digital systems, the day is filled with visual multitasking. A person looks at one screen, then another. They scan a list, then return to a previous task.

The difficulty emerges from their combined density. Attention is pulled in multiple directions. Small shifts in focus accumulate. Mental effort increases quietly. This continuous movement of attention becomes part of the job. Over a period of time, it shapes how information is processed.

When the visual field is crowded, the mind has to work harder to find what matters. Searching for the right number, the right message, or the right cue takes effort. What looks like simple visual activity is, in fact, cognitive work. It is rarely counted, but it is always present. When information is poorly organised, the mind must compensate. They demand working memory resources. They increase cognitive load. They fragment task continuity.

Over time, this fragmentation has consequences. Performance slows. Errors increase. Mental fatigue builds. What we sometimes label as “inattention” may actually be an overloaded visual system struggling to support cognition.

Cognition does not happen only inside the head. It is distributed across the person and the environment. Layout guides attention. Contrast supports discrimination. Spatial grouping reduces memory demands. Visual cues act as external reminders. In this sense, the environment becomes part of the cognitive system. This is where the link between visual design and memory becomes visible. Much of our daily functioning depends on remembering to do things later. Follow-up on something, return to a task, or check something at the right time. These small acts of remembering are supported by cues in the environment. A note on a screen. A highlighted item. A visual marker. But when the environment is cluttered, these cues get lost. Important information starts to look like everything else. The mind is pulled in too many directions. Things that were meant to be remembered quietly slip away. Not because people are careless, but because the system is not supporting memory. This is where visual ergonomics intersects directly with psychology. Attention is selective and limited. Working memory has capacity constraints. Decision making deteriorates under overload. These are well-established cognitive principles. Yet they are rarely applied systematically when designing visual environments.

Visual Human Factors and Ergonomics helps us understand this connection and offers a way forward. It invites us to move beyond asking people to concentrate harder or remember more.

Instead, it asks: Does the environment support the limits of human attention? Does it reduce unnecessary cognitive load? Does it guide perception in a way that aligns with how the mind naturally processes information? These questions matter because the world has become deeply screen-centred.

People spend long hours interacting with visually dense material. Over time, discomfort, fatigue, and overload can affect focus, learning, and productivity. What may look like a small visual issue can gradually influence how well someone concentrates, processes information, and stays mentally engaged. When we begin to design with these questions in mind, the shift is profound. We move from blaming individuals for lapses to redesigning systems that reduce them. We acknowledge that sustained attention is not only a personal skill but also an environmental outcome. Seeing, then, is not a passive act. It is intertwined with interpretation, selection, comparison, and anticipation.

When we begin to see the visual environment as part of the cognitive system, the perspective changes. Instead of asking people to pay more attention or remember more, we start asking whether the environment is helping them do so. Clear layouts reduce search. Good contrast supports reading. Thoughtful organisation guides attention. Simple visual cues help memory. These are not cosmetic improvements. They shape how smoothly the mind works. In this sense, visual ergonomics is not only about preventing tired eyes. It is about supporting clear thinking, sustained attention, effective learning, and better decision making. As work becomes more digital and visually complex, this connection will become even more important. Designing better visual environments is not just a matter of comfort. It is a way of supporting how people think, remember, and perform in their everyday work.

Webinar: Conversation on Plain Language and Document Design

Prof. Dr. Claudia Mont'Alvão, PUC-Rio, International Institute for Information Design (IIID) World Regional Representative who is also a member of the executive board, IEA Visual Ergonomics Technical Committee is initiating a webinar. In this online meeting, experts will discuss Plain Language and explore the IIID document on Document Design. The goal is to clarify what Plain Language is (distinguishing it from Easy Language) and the contribution of Information Design in this context. The proposal is for a light, conversational exchange, but with useful content for those who want to learn more about the subject, better understand the difference between Plain Language and Easy Language, and update the Brazilian Society of Information Design (SBDI) community on the topic.

For those interested in the outcome of this webinar and issues related to plain language and document design, please write to cmontalvao@dad.puc-rio.br

Hillevi Hemphälä

Visual Ergonomics Research at Lund University

In Sweden, at Lund University, Institution of Design Sciences, they conduct multidisciplinary research in the field of visual ergonomics, bringing together expertise from several disciplines to better understand how visual environments influence health, comfort and performance.

The research group includes Hillevi Hemphälä, PhD and optometrist, whose work focuses on visual ergonomics, visual strain, lighting conditions and how visual environments affect health and productivity in modern workplaces. She combines expertise in vision science with ergonomics and occupational health. Another key researcher is Johannes Lindén, PhD and physicist, who specializes in light measurements, flicker analysis and the physical properties of lighting systems, particularly LED lighting.

One research area focuses on recommendations for computer work. This project compared muscular load and eyestrain when working with different computer screen setups, including a 49-inch curved screen, a single 27-inch screen, and two 27-inch screens positioned either in a V-formation or an L-formation. The study combined expertise from optometry, biomedical engineering, physiotherapy, engineering and eye-tracking technology. The results indicate that the 49-inch curved screen should preferably be placed at approximately 90 cm rather than 70 cm, and that two-screen setups should be arranged in an L-formation rather than a V-formation to reduce strain and improve ergonomics.
https://www.tandfonline.com/doi/full/10.1080/00140139.2025.2507089

Another line of research investigates non-visual flicker, Temporal Light Modulation, from LED lighting. Using functional MRI (fMRI) they examined how flicker that is not consciously perceived can still affect brain activity. The study demonstrated that non-visual flicker influences blood flow in the brain, even in healthy individuals, and even more strongly in people suffering from migraine. These findings suggest that non-visual flicker from LED may contribute to discomfort or pain. This project involves collaboration between optometrists, physicists, biomedical engineers, neurologists and psychologists.
https://www.tandfonline.com/doi/full/10.1080/15502724.2025.2583961

A method to assess the visual environment, VERAM, Visual Ergonomics Risk Assessment Method have been developed. VERAM is designed to help identify and assess risks in the visual work environment, including factors such as glare, flicker, lighting design, illuminance levels, screen settings and visual workload. The majority of the workplaces assessed had severe problems with glare and together with the subjective rating of glare a correlation between glare and problems such as eyestrain, musculoskeletal strain, and headache was found. The method supports systematic risk assessment of visual environments in workplaces and has been developed through collaboration between experts in optometry, biomechanics, physiotherapy, statistics, lighting design, occupational medicine and clinical practice.
https://www.sciencedirect.com/science/article/pii/S0169814118305869

https://link.springer.com/chapter/10.1007/978-981-96-8904-0_80

Together, these projects illustrate how visual ergonomics depends on strong collaboration across multiple scientific disciplines. The visual environment is influenced by many factors—lighting technology, screen design, visual physiology, brain responses and workplace conditions. By combining expertise from optometry, physics, engineering, ergonomics, neurology and occupational medicine, we can better understand how these factors interact. This multidisciplinary approach allows us to identify risks in visual.

Call for Entries

Dear Members,

Have something worth sharing? Let us know!

Deadline: 15th of the month prior to publication

The Newsletter of the IEA Visual Ergonomics TC, Visual Ergonomics Digest is published online 3 times a year (April, August, and December).

Your Contributions Welcome

- Conference reports
- Seminar / webinar summaries
- Meeting highlights
- Announcements (events, calls for papers)
- Awards & recognitions
- Recent publications
- Job opportunities

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Release of the Next Issue:

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What is Visual Ergonomics?

Visual ergonomics is the multidisciplinary science concerned with understanding human visual processes and the interactions between humans and other elements of a system. Visual ergonomics applies theories, knowledge and methods to the design and assessment of systems, optimizing human well-being and overall system performance. Relevant topics include, among others: the visual environment, such as lighting; visually demanding work and other tasks; visual function and performance; visual comfort and safety; optical corrections and other assistive tools. A description of the how the definition was developed is included in a Letter to the Editor published in Applied Ergonomics: "A definition of visual ergonomics", available online 8 April 2014. An easy-to-read article explaining the practical implications of visual ergonomics was developed by this Technical Committee and published in WORK (2014): 47: 419-420. https://doi.org/10.3233/wor-141820

Dear Members,
Do you have any news?

Call for entries closes on the 15th day of the preceding month of the scheduled publication of the newsletter.
If you have any news or announcements for the newsletter, please send the details to us.

Items of interest include but not restricted to: Reports about conferences Reports about seminars Reports about meetings Reports about webinars

If you have attended activities related to visual ergonomics, the newsletter is the right place to highlight your work. Announcements about up-coming conferences related to visual ergonomics, call for papers for journals on the topic of visual ergonomics, details about awards you (or someone else) may have received, articles you have recently published related to visual ergonomics, interesting jobs openings etc. are welcome. If you have photos, accompanying your texts inputs, it is highly appreciated.

The executive board reserves the final decision related to the inclusion of information in the newsletter.