Syracuse University
Newhouse School of
Public Communications

Enhancing Visual Learning through Interactive Image Comparison

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Today's Roadmap

- Reframing cinematography instruction
- Theory: Cognitive load, iconic memory, change blindness
- Case study: Canon AMLOS system
- Student response & outcomes
- Implications for the future


Does cinematography
instruction need reimagining?

The most common pedagogical practice in cinematography instruction is the **live demonstration**.

The live demonstration as a learning environment is **passive** and requires the participant to analyze, process, and retain nuanced changes very quickly.

Does this approach work?

There is a fine balance to be struck in interactive instruction as "the benefits of facilitating and simplifying mental processes may be outweighed by the increased cognitive load required to efficiently manage these interactive features"
(e.g. Conklin, 1987; Schnotz, Boeackler, & Grzondziel, 1999).

Interactivity can potentially increase extraneous cognitive load thereby making elaboration of new information and discovery more difficult.
(Sweller, Merrienboer, & Paas, 1998).

Three Key Barries to Visual Learning

- **Cognitive Load** Interactivity increases demands on attention.
- **Iconic Memory** Visual memory is brief and inconsistent.
- **Change Blindness** Major changes can go unnoticed by novices.

Barrier #1: Cognitive Load

"The benefits of facilitating and simplifying mental processes may be outweighed by the increased cognitive load required to efficiently manage interactive features." - Schnotz, Boeckheler, & Grzondziel (1999)

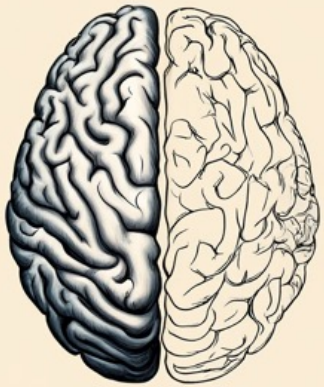
- **Lighting demos are sequential, linear, and fragmented.**
- **Students are asked to simultaneously track information about the lighting set-up, the intended aesthetics, and the technical considerations at play among many other factors.**
- **This increased task load reduces retention.**

Barrier #2: Iconic Memory

Defined as “the storage of visual memory that allows people to visualize an image after the physical stimulus is no longer present” (Neisser, 1967).

Tests conducted by George Sperling in 1960 show that the human visual system can retain information even if exposure to that information is brief. However, the duration of that retention is fleeting. (Sperling, 2018).

- **Students rely on momentary visual cues.**
- **No built-in reinforcement mechanism.**
- **Memory variance affects access to learning.**



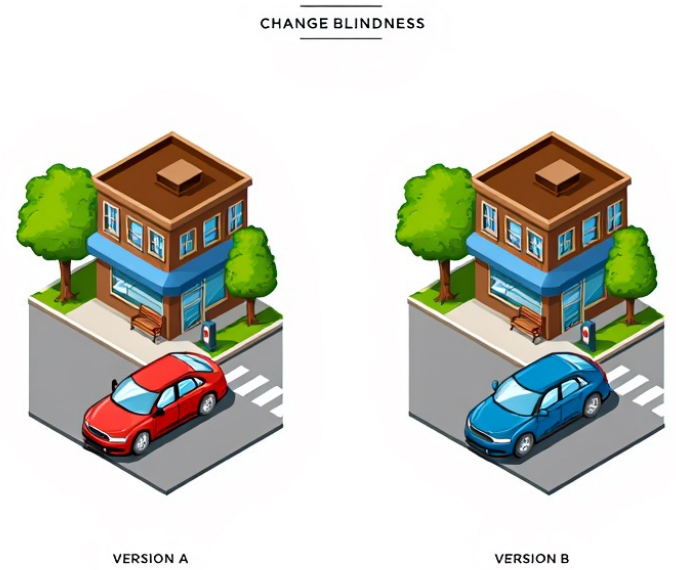
Iconic Memory compounds the observational challenges inherent in lighting/lensing demonstrations.

Barrier #3: Change Blindness

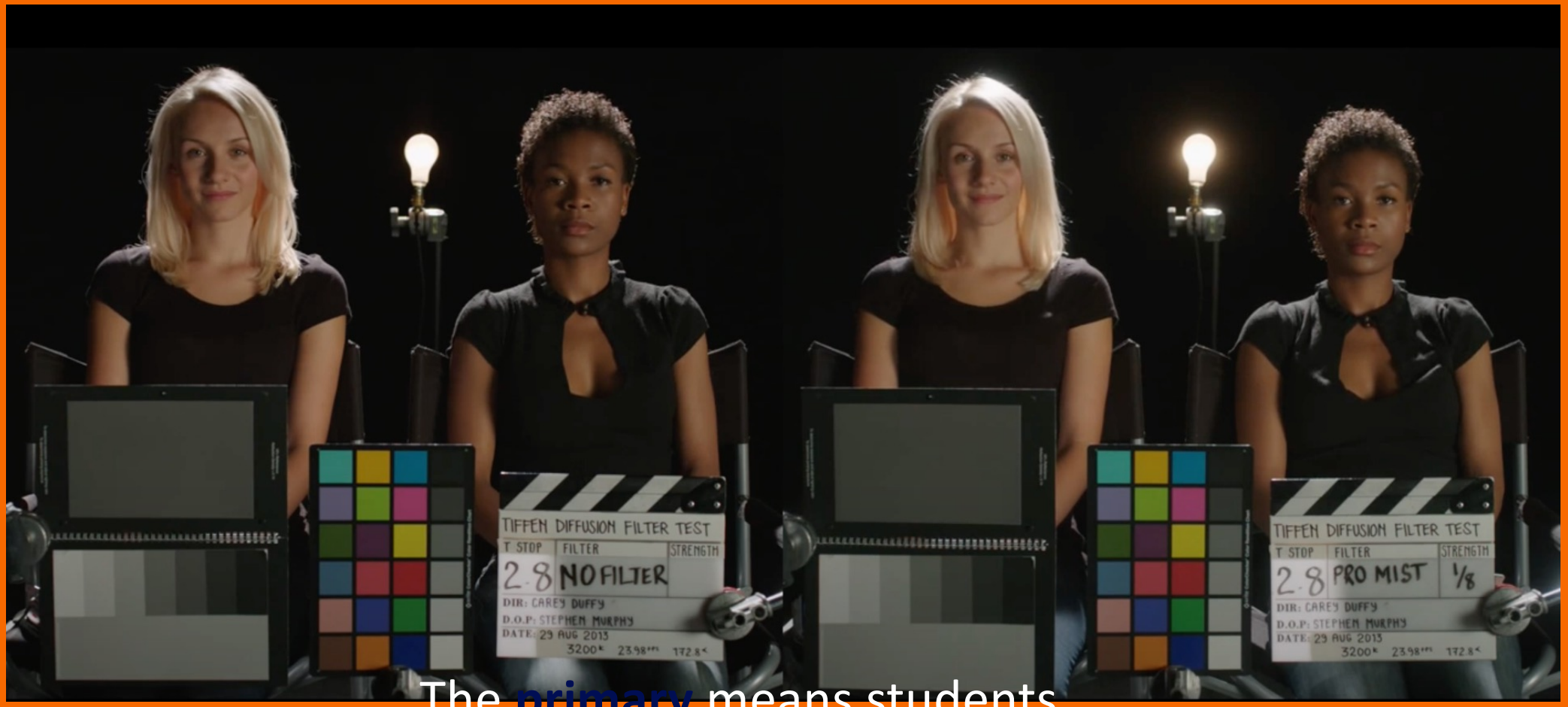
Change blindness “refers to the surprising difficulty observers have in noticing large changes to visual scenes” (Simons & Rensink, 2005).

The difficulties triggered by fleeting iconic memory and change blindness have been established by several comprehensive reviews of the subject area using different paradigms (Rensink, O’Regan, & Clark, 1997; Levin & Simons, 1997; Pearson and Schaefer, 2005).

- **Subtle lighting/lensing changes are hard to see and therefore missed.**
- **It is harder for novices to track real-time changes.**
- **Postproduction comparison tools are needed.**



The **primary** means students have available to observe changes made in lighting and lensing during a demo are **their own eyes and their memories**



The **primary** means students

To the novice eye, changes are often difficult to perceive and if there are difficult to perceive, they are certainly **difficult to be learned and retained.**

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In its broadest sense, Augmented Reality as defined by Milgram, Takemura, Utsumi, and Kishino (1994) refers to “augmenting natural feedback to the operator with simulated cues”.

Augmented Cinematographic Pedagogy

- Combines live demos with real-time image comparison
- Leverages tech to reduce cognitive load
- Empowers student agency and interaction

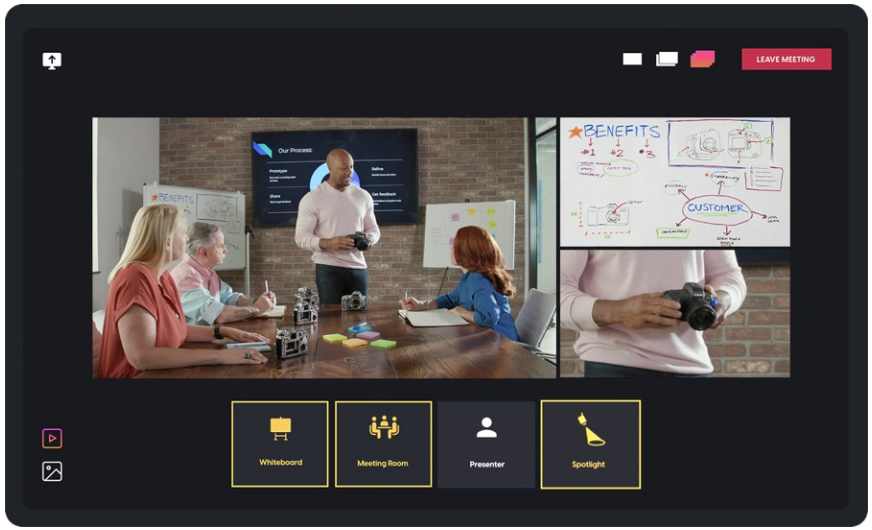
“A situation in which real-world context is overlaid with dynamic, coherent virtual information.” – Klopfer & Squire (2008)

Developing a better way….

Canon

AMLOS

ACTIVATE MY LINE OF SIGHT



SPOTLIGHT

CES
INNOVATION AWARDS
2023
BEST OF INNOVATION

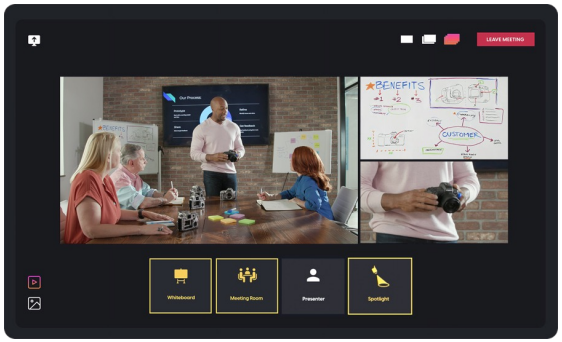
AMLOS was conceived as a remote collaboration tool.

User-controlled multi-view experience

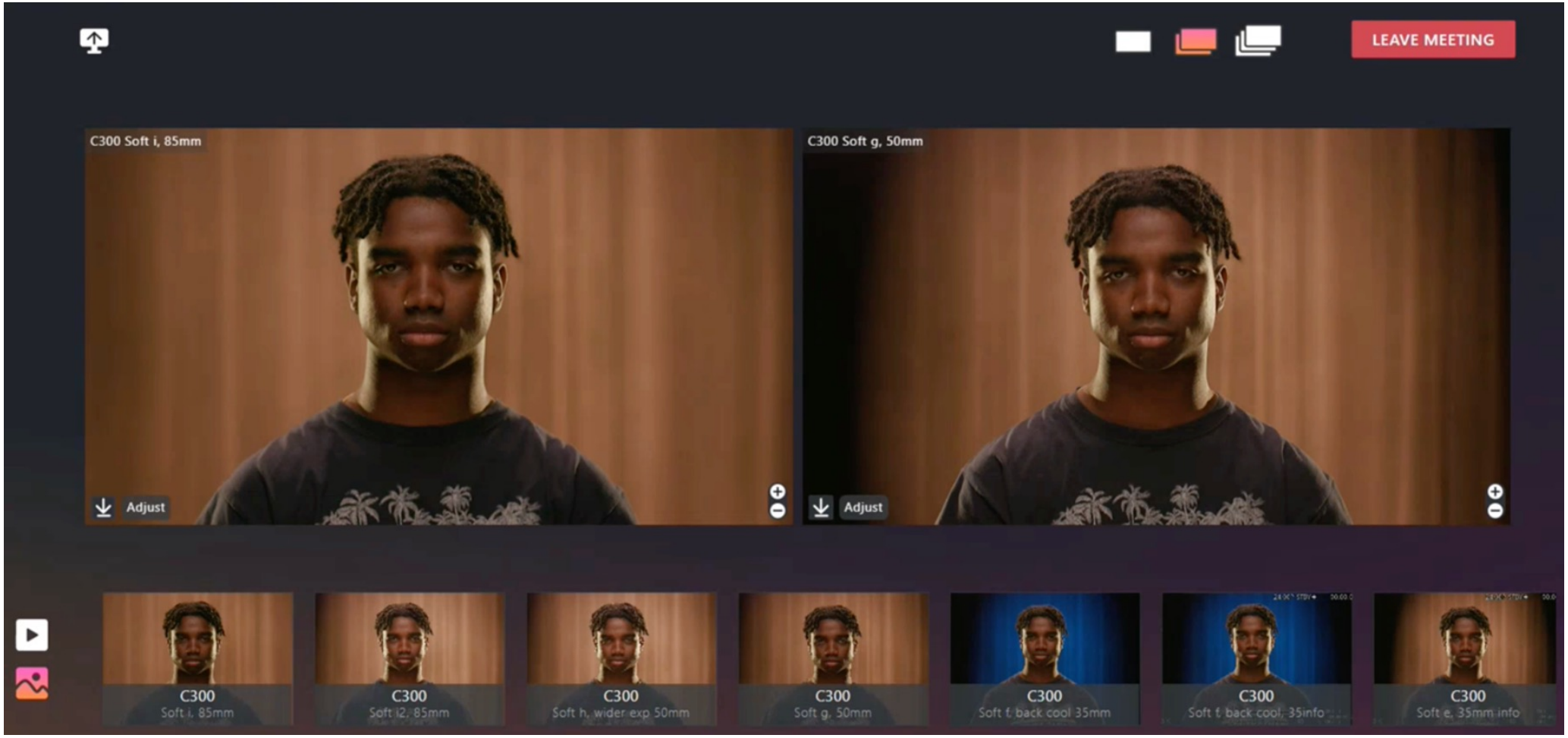
4K+ resolution live feed

Real-time image capture and comparison

System Modifications



An Augmented Experience




Canon Arlos Lighting
Demo

Student Feedback

- Students displayed a clearer understanding of the subject and asked better questions.
- Overwhelmingly positive response to the increased agency
- Students left session with useful documentation
- Remote students had similar reactions to the case study.

What's Next

- New lesson modules: diffusion, filtration, motion blur
- Quantitative Retention Testing
- Broader application across visual disciplines

Rethinking How We Teach

Traditional methods hinder visual learning

Interactive Image Comparison enhances clarity, accessibility, and retention

Pedagogical innovation is essential

The future of visual learning is not just what we see, but how we let students see it.

Questions, Ideas, Collaboration?

What could this mean in your classroom?

Where else could this model apply?