Methodological Considerations for the Study of

Split Attention and Cognitive Load in Synchronous Web Conferencing

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Synchronous Web Conferencing and Split Attention

A particular condition in online education is that the use of synchronous web conferencing tools, such as Zoom, MS Teams, Google Meet, and similar, suffer from participants split attention (e.g Arevalo-Mercado et al., 2023).

Such attention split stem from a range of audiovisual disturbances occuring during the synchronous web conferencing situation, sound and visual cues that grab attention (Swenberg, 2024).

For instance, nonverbal cues, such as sounds and movements as part of the interaction/situation, contribute with attention split and cognitive drain (Fauville et al., 2023).

Here, a ***methodology*** is suggested, that adresses how to capture attention split in the synchronous web conferencing situation, and understand its causes, and effects on learning.

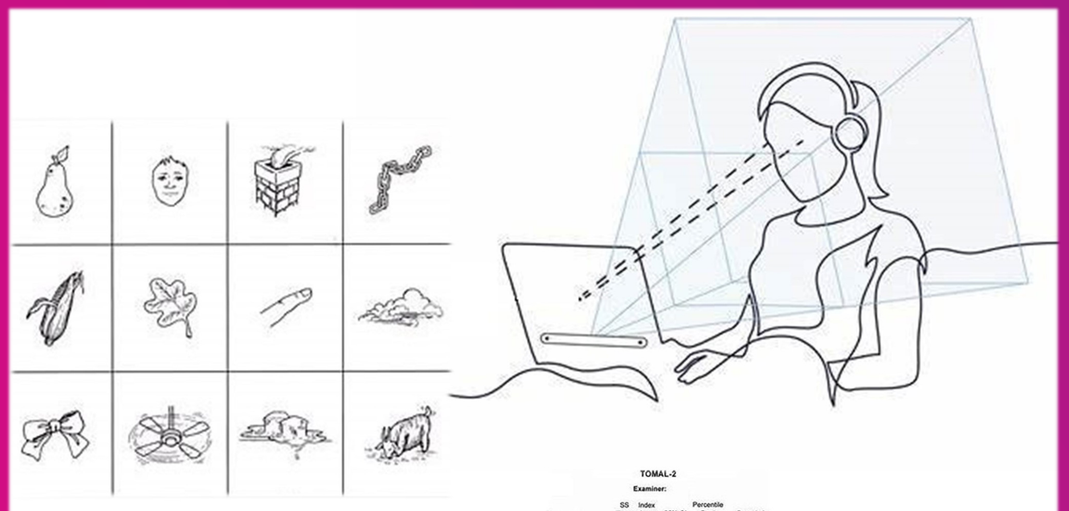
Eye-tracking Attention

An efficient and unintrusive method for discovering split attention and cognitive load is eye-tracking. Eye-tracking data presents gaze patterns that reveal confusion or distraction, and pupil dilation that indicates cognitive load.

In addition, it is easy to add complimentary data categories to an eye-tracking experiment, such as interview or questionnaire data, thus providing input on reasons for cognitive load or split attention.

Interaction and teaching tools can be assessed in regard to what students' find cognitively demanding in the online teaching situation, and when (Šola et al., 2024).

How micro-level disturbances split attention and affect cognitive load, understanding, and memory is studied by means of eye-tracking in other contexts, and makes a distinct impact that is possible to capture and measure (e.g. Swenberg & Eriksson, 2017).



Cognitive Effort - Cognitive Load

All learning entails cognitive efforts, and a mandatory workload – germane cognitive load (GCL), which is expected. The ideal state is that GCL makes the learner expel the outer world and enters into an immersed state of "flow" (Csikszentmihalyi & Nakamura 2010).

However, external disturbances catching the learner's attention – even on a micro-level – compete for attention, and cause extraneous cognitive load (ECL), that breaks the "flow", and counters learning (Arevalo-Mercado et al., 2023).

In addition, the instructional design may cause intrinsic cognitive load (ICL) via the complexity of the information presented, and tool configuration (Sweller, 1994).

A methodology for studying split attention in the synchronous web conferencing situation must be able to distinguish between GCL, ECL and ICL, as well as to point out different cognitive effects they create.

Cognitive Tests and Analysis

Adding a cognitive test to the method, e.g. the 2nd ed. of the Test of Memory and Learning (TOMAL-2), that is modified to the synchronous web conferencing situation, enables assessing how much of a presented content or an interaction is understood and remembered by its participants.

Thereby it possible to discover systematic correlations between (A) the synchronous web conferencing situation, and (B) memory and understanding.

Hence, the suggested methodology is a combination of:

- eye-tracking
- a TOMAL-2 test, and
- a qualitative open questionnaire

adapted for synchronous web conferencing, to link audiovisual disturbances, split attention, ICL/ECL, and the reasons for these.

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