

IS1404 E-READ: Evolution of Reading in the Age of Digitization

Position paper

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WG(s): 4) Ergonomics of reading

Human mental workload (MWL) is gaining momentum as an important design concept in human-computer interaction (HCI) and is key in considering the interaction of people with computers and other technological screen devices. It has been extensively documented that both mental overload and underload can negatively affect performance (Xie and Salvendy, 2000) thus affecting reading and . At a low level of MWL, people may often experience annoyance and frustration when processing information. On the other hand, a high level can also be both problematic and even dangerous, as it leads to confusion, decreases performance in information processing and increases the chances of errors and mistakes. Hence, designers and practitioners who are ultimately interested in system or human performance need answers about operator workload at all stages of system design and operation so that design alternatives can be evaluated (Hart, 2006). A wide range of ad hoc definitions of MWL can be found in the literature. It can be intuitively defined as the amount of mental work necessary for a person to complete a task over a given period of time. However, 'it is not an elementary property, rather it emerges from the interaction between the requirements of a task, the circumstances under which it is performed and the skills, behaviours and perceptions of the operator' (Hart and Staveland, 1988). Although MLW has been extensively applied in the human factors discipline with a plethora of applications in the aviation and the automobile industries, it has a lack of application in modern human-computer interactive systems and education.

This proposal is aimed at understanding the cognitive implications of digitization employing the construct of human mental workload and applying state-of-the-art models for mental workload assessment. The emphasis is on primary research with experiments in human-computer interaction and ergonomics aimed at testing the impact of traditional paper-based reading and digital reading to human mental workload.

1. **Potential research contribution** in light of, or linked to

A. WG interest and Scientific programme:

Interest in the WP 4: ergonomics of reading. The research contribution lies in the application of state-of-the-art models of mental workload assessment for the validation of screen reading, the impact of digitization on reading compared to paper-based reading.

B. Alignment with Action objectives (pages 7-10 in the MoU):

- to provide evidence-based recommendations to educational practitioners and policy makers;
- to provide recommendations for optimal text/content design for educational publishing;
- to facilitate exchange of researchers, prioritizing juniors and early career researchers;
- to provide a solid platform for strong and competitive education policies and pedagogies built on empirically derived knowledge of the effects of technology on reading.

2. Interest in

A. Organizing (hosting) and participating in short-term scientific missions with an emphasis on primary research and empirical experimentations. The researcher is open to explore avenues of collaboration internationally with the members of the COST action.

B. organizing and/or participating in a **Training School** (please indicate what kind of training [theoretical; methodological; technical]).

Optional: linked to what objective(s) of the Action:

Organizing and participating in training schools in the field of HCI and education with theoretical seminars on the construct of mental workload applied to reading and digitization as well as technical demos aimed at showing how this construct can be applied in practice for design purposes.