Cognitive Interfaces: the Potential of Digital Informational Environments

Abstract

Parallel to the development of the Industry 4.0 or the so-called "Internet of Things", the use of digital media should also be rethought in all areas, where knowledge work (knowledge acquisition, comprehension, knowledge construction, knowledge exchange, problem solving, and decision making) occurs. The traditional concept of teaching entails that learners have to process a lot of information in order to expand knowledge in their heads. If one considers the cognitive limitation of the human knowledge system (e.g. limitations of processing information in working memory) and analyzes the potential of digital technology, then it makes sense to demand a new division of labor between "knowledge in the head" and "knowledge in digital resources". Accordingly, an information environment must be set up for such a division of labor. It includes knowledge in digital resources of "reliable quality". Additionally, the digital resources have to feature a high level of customizability to offer the learner a wide variety of configuration options. To bring all these together there is a need for a "cognitive interface" which allows the interplay of acquired expertise and knowledge with "knowledge" made available and interactively usable in digital resources. In general, the concept builds on the high availability of digital resources and new forms of customized interactive use of relevant information.

Biography

Friedrich W. Hesse studied psychology at the Universities of Marburg and Duesseldorf, received his doctorate at the RWTH Aachen and qualified as Professor of Psychology at the University of Goettingen. He was a research fellow at the Learning Research and Development Center (LRDC) and at the Carnegie Mellon University in Pittsburgh. He was the Head of the Department of Applied Cognitive Science at the German Institute of Research for Distance Education (DIFF) and for two years was the director at the Laboratoire Européen de Recherche sur les Apprentissages et les Nouvelles Technologies (LERANT) in Frankreich funded by CNRS.

Friedrich Hesse is the Founding Director of the Leibniz-Institut für Wissensmedien (IWM) and at present head of the Knowledge Exchange Lab. He is the Scientific Vice-President of the Leibniz Association (an umbrella organization for 91 research institutes in Germany) and is holding the Chair of the Department for Applied Cognitive and Media Psychology at the University of Tuebingen. Friedrich Hesse has been the initiator and speaker for the first Virtual Graduate School Knowledge acquisition and knowledge exchange with new media funded by Deutsche Forschungsgemeinschaft (German Research Society DFG), the DFG-Priority Programme Netbased Knowledge Communication, the DFG-Research Group Analysis and Promotion of Effective Processes of Learning and Instruction and currently the first Leibniz-ScienceCampus Cognitive Interfaces.