

A.R. Hurson
Department of Computer Science
Missouri S&T
Rolla, MO 65409
USA
hurson@mst.edu
<http://cs.mst.edu/hurson/>

PERCEPOLIS: Pervasive Cyberinfrastructure for Personalized eLearning and Instructional Support

For the past 800 years, educational systems have relied heavily on a traditional course delivery environment, which has a lecture-based (one-instructor-to-many students) model and a discrete, linear course structure. Advances in databases, distributed computing, computational intelligence, and especially pervasive computing, which allows transparent, non-intrusive, “anytime, anywhere” access to information, provide fertile ground for radical changes in pedagogy and instructional design.

Direct observation of forty schools of engineering and examination of 100 accreditation self-study reports served as the basis for evaluating the state of undergraduate engineering education in the United States manifested in Educating Engineers: Designing for the Future of the Field report. This report identified “linearity” and “static trajectory” of the dominant curricular as contradictory model to the body of knowledge on how students learn. A networked model and personalization of trajectory have been proposed as potential solutions (personalized learning has been recognized as one of fourteen Grand Challenges for Engineering by the National Academy of Engineering). Cyberinfrastructure leveraging recent technological advances can yield improvements in both instruction and learning, through personalization and support of networked curricula.

This talk is an attempt in that direction. It introduces PERCEPOLIS (Pervasive Cyberinfrastructure for Personalized Learning and Instructional Support) an innovative, practical, and comprehensive alternative to the traditional linear curriculum and lecture-based static pedagogy. PERCEPOLIS leverages a collection of enabling technologies, including intelligent software agents, distributed and heterogeneous databases, and global information sharing processes to facilitate transformative changes to higher education, by enabling the effective use of learning technology and the personalization of courses and curricula. The principal conceptual framework behind PERCEPOLIS is discussed, and its implementation and its effect on curricular are addressed in depth.

Short Bio

Ali R. Hurson is a Professor of Computer Science at the Missouri University of Science and Technology (S&T), after having served as department chair from 2008 to 2012. Before joining Missouri S&T, he was a Professor of Computer Science and Engineering at the Pennsylvania State University. His research for the past 30 years has been on the design and analysis of general, as well as special-purpose computer architectures. His research has been supported by NSF, DARPA, the Department of Education, the Air Force, the Office of Naval Research, Oak Ridge National Laboratory, NCR Corp., General Electric, IBM, Lockheed Martin, Pennsylvania State University, and Missouri S&T. He has published over 300 technical papers in areas including multidatabases, global information sharing and processing, applications of mobile agent technology, object-oriented databases, mobile and pervasive computing

environments, sensor and ad-hoc networks, computer architecture and cache memory, parallel and distributed processing, dataflow architectures, and VLSI algorithms. He has served as a member of the IEEE Computer Society Press Editorial Board, an IEEE Distinguished speaker, editor of the IEEE Transactions on Computers, editor of the Journal of Pervasive and Mobile Computing, and as a member of the IEEE/ACM Computer Sciences Accreditation Board. He is currently serving as an ACM distinguished speaker, area editor of the CSI Journal of Computer Science and Engineering, and editor-in-chief of Advances in Computers.