

VISUALIZATIONS, ANIMATIONS AND SIMULATIONS FOR COMPUTER ENGINEERING EDUCATION: IS HIGH TECH CONTENT ALWAYS NECESSARY?

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Multimedia learning and all its facets (e.g., E-Learning, M-Learning, X-Learning) offers promising tools for Life Long Learning (LLL) and Continuing Engineering Education (CEE). Modern information technology is both, increasing in sophistication and, simultaneously, making it easier to build Learning Objects (LO) containing “high-tech” visualizations, animations and simulations for educational purposes. However, before starting development, it is always necessary to first ascertain, whether “high-tech” content has the potential to enhance the learning processes of the targeted end-users, and to what extent it has the potential. Today, we are facing a large body of empirical studies reporting contradictory results concerning the superiority of “high-tech” Learning Objects in relation to rather “Spartan” textbook lessons. Pedagogical and psychological theories report both pros and cons regarding the efficacy of such objects. Questions include which factors contribute to the success or failure of multimedia Learning Objects. An interesting factor might be the time a learner needs to acquire certain knowledge with different types of Learning Objects. This factor, however, was investigated by only few empirical studies to date. Especially within the scope of Life Long Learning and Learning on Demand (LoD) the learning speed is of special importance because learning increasingly is an integral part of today’s work process. Based on experiments, in this paper we raise the question whether appropriate multimedia Learning Objects (i.e. animations) enable learners to learn more in less or equal time in comparison to “Spartan” Learning Objects (i.e. purely textbased instructions). Moreover, we exemplify the importance of Human-Computer Interaction (HCI) in instructional design. The empirical results of our study indicated that animations can facilitate the learning process in the domain of engineering education. The results are discussed regarding the perspective of Human-Computer Interaction with a view to Life Long Learning, regarding their theoretical foundation, and regarding design implications.

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