

Identification of Student Types based on their Knowledge and Their Interests When Learning with Computer Simulations

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Problem Statement: Using new media in the teaching - learning process, especially when complex subjects are treated, has recently become very important. Among the various new media environments, computer simulations have a special value, as they offer high potential for interactive learning. Combining a high degree of clearness and autonomy, computer simulations are expected to support learners both cognitively and emotionally, and thus lead to increased learning gains. In order to convey complex biological subject matter, this study used a computer simulation and evaluated its effects with regard to cognitive and motivational learning characteristics. The focus was on knowledge gain as a cognitive learning characteristic and interest as a motivational learning characteristic.

Purpose of the Study: The study aimed to characterize students according to their knowledge and their interests and to evaluate to what extent computer-based simulations change knowledge structures and interest in complex biological subject matter.

Methodology: Our study was conducted in Germany at four schools in Schleswig-Holstein. The random sample group consisted of 167 secondary school pupils in grades 11 to 13. The data was collected in a pre-test/ post-test design with intermediate, computer-based intervention. The pupils completed a test on knowledge and a questionnaire regarding interests in particular topics. Questions on subject-related interests were divided into two domains: questions regarding interests in aspects of human biology and questions regarding interests in biochemical aspects. A latent class analysis was carried out concerning subject-specific interests and developing structures of knowledge.

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Findings: According to their interests and their knowledge structures, four classes could be identified: Class 1, as the biggest group, contains 45.3 % of all test persons. The characteristics of this class can be summarized as "clueless - interested in human-related issues". Class 2 contains 21.8 % of all test persons. The characteristics of this group can be summarized as "experts - highly interested". Class 3 contains 17.4 % of all test persons. This group could be characterized as "experts - interested in human-related issues". Class 4 contains 15 % of all test persons. This group can be characterized as "clueless - not interested".

Keywords: student types, simulation, respiratory chain, knowledge gains, interest, latent class analysis