T1_7 INNOVATIVE TEACHING AND LEARNING SZENARIOS USING INTERACTIVE SIMULATIONS

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In recent years computer based simulations have morphed into an interactive interface for student exploration. The purpose of an educational simulation is to motivate the learner to engage in problem solving, hypothesis testing, experimental learning, schema construction and development of mental models. Learning with computer simulations is closely related to a specific form of constructivistic learning, namely scientific discovery learning. Learners are able to manipulate the parameters of the virtual environment within the simulation and construct new understanding of the underlying concepts through inferring and predicting possible outcomes. Tightly structured tasks play an important role in improving pupils' learning performance by guiding their work and helping them to stay on task and to concentrate on important issues. The design and structure of the learning environment should optimize the interaction of the pupil with its learning object. Teachers have to develop "adaptive coaches" that support active exploration in an open learning environment by providing tailored support. The paper presents examples of flexible software products available on the internet for teaching and learning physics (focus: hydrostatic pressure and buoyancy) which were used in the classroom. By the author simulations are not conceived as substitutes of the real laboratory experiences, but their use as a complement of experimentation is assumed to be highly effective for learning physics concepts. The simulations were used in different ways and the different approaches were evaluated by means of action research: first, as presentation aids for teaching a topic to the pupils, then to anchor and stimulate classroom discussions and finally encourage pupils applying and practicing new concepts and skills on their own. Experiences have been made in grade 6 (with 11- to 12-year old pupils) are reported. The use of technology seems to effectively enhance pupils' learning. Pupils are actively engaged in learning as they make predictions, take measurements, analyze their data and make decisions about presenting their work.