The Design of Internet Collaborative Learning System Based on Access Grid

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ABSTRACT

The collaborative learning approach has in the past decades gained significant recognition. It is a group instruction design which combines education theory and social psychology. The division of responsibilities between members of the group so they can learn from helping each other, the boosting of study results through group-based assessment coupled with spirit of competition between groups - these all foster an atmosphere of collaboration in study that improves the overall learning experience. Most web-based collaborative learning systems today provide a network environment that is conducive to the students ’ online study of theory based curriculums in a collaborative learning format. Few however examine how a network based collaborative environment involving the practical operation of instrumentation can be established. To transplant the six characteristics of traditional collaborative learning (including characteristics such as heterogeneous grouping, positive interdependence, positive face-to-face interaction, individual learning performance assessments, social skills and the group process) into the network collaborative learning environment, this paper proposes the design of a network collaborative learning system using remotely operated 3D virtual instruments and a learning management system with load-balancing function. The proposed web-based collaborative learning system does not only provide group members with direct personal experience of 3D virtual instruments operation (related 3D simulators include digital multi-meters, power sources, signal sources, oscilloscopes etc.), but also allow them to discuss and operate 3D puzzle games, building up the positive interdependence between the group members. Beyond the functionalities mentioned above, the system also provides additional functions including (1) face-to-face voice communications (2) real-time text chat (3) electronic whiteboard instruction (4) SCORM learning content sharing (5) recording of the group learning process (6) individual learning performance assessment. This means that the proposed system structure and functionalities are a true translation of traditional collaborative characteristics into an Internet-based collaborative learning environment. Keywords：Collaborative learning, virtual instruments, Access Grid

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