A SYNCHRONOUS COOPERATION SYSTEM FOR LEARNING ENTITY-RELATIONSHIP DIAGRAM

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ABSTRACT. Collaborative e-learning via Internet is becoming popular because it certainly improves learning effectiveness. Moreover, real-time communication further enhances the efficient sharing of knowledge and experiences within a collaborative group. Therefore, this paper proposes a premier synchronous collaboration system for learning entity-relationship model, called SCLERD, to enable students to learn data model in the database field in a real-time cooperation manner. This paper first describes the design methodology of SCLERD, including network protocol and software architecture. Then system performance and educational evaluation are conducted to verify the system’s feasibility and efficiency. The results of performance evaluation show that current devices and bandwidth can easily afford the needs of SCLERD. The results of educational evaluation unveil that most of students in the experiment group have better learning achievement than those in the control group. Also, all evaluated items receive positive feedback from the results of questionnaire.

Keywords: Entity-relationship diagram, Real-time communication, Cooperative learning

1. Introduction. Due to the increasing number of computers and Internet users, computer-assisted learning via the Internet have been utilized extensively in academic education [1-19]. One of the efficient learning styles is Computer Supported Collaborative Learning (CSCL) [1,2]. Collaborative Learning means that two or more than two students work together for achieving a certain goal by means of face-to-face interaction and team cooperative techniques; meanwhile, the members’ learning efficiency and cognition can be improved during the learning process [20,21].

On the other hand, Entity-Relationship model is a data modeling method in database management, producing the conceptual schema or semantic data model of a relational database [22]. An ERD (Entity-Relationship Diagram) is a critical tool in the design of database schema, helping users to achieve a better understanding of the database schema by displaying the structure in a graphical format [23]. Although, there are several software tools for drawing ERD, e.g., Avolution Abacus [24], CA ERwin [25], Datanamic DeZign [26], Embarcadero ER/Studio [27], Oracle Designer [28] and Sybase PowerDesigner [29]. These products intend for business purpose instead of education aim so that they are merely suitable for the database professionals (e.g., database administrator). Also, they are short of providing a cooperative learning environment, causing that students solely learn ERD in a self-explored way. Under such circumstances, one way to attain the goal of collaboratively learning ERD is that a member may export and disperse an incomplete