

The Design of 3D Virtual Cooperative Learning System

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ABSTRACT

The cooperative learning approach has in the past decades gained significant recognition; it is a group instruction design which combines education theory, social psychology, study with discussion, support, and cooperation of dividing the work between the members of group. Most web-based cooperation learning systems at present mostly offer a network environment of convenience, enable students to study theory course on-line, but seldom offer a cooperative learning environment to operate electronic instrument through 3D virtual reality in Internet. The main purpose of this research is to develop the cooperative learning system of 3D virtual reality in internet, combine 3D virtual reality technology, remote control parameter delivering technology, and the designs of PC Broker, construct an environment that can provide cooperative learning in Internet. The traditional cooperative learning has six characteristics (including characteristics such as heterogeneous grouping, positive interdependence, positive face-to-face interaction, individual learning performance assessments, social skills and the group process), and the designed system is to explore the characteristic of positive interdependence among six characteristics, and realize characteristics of traditional cooperative learning in the cooperative learning system in Internet. The proposed system not only offers the theory course material, but also provides learners to operate 3D virtual reality instrument (related 3D instruments include Multimeter, Power Supply, Oscilloscope, etc.) together through the network. The propose system also provides instant characters to discuss and control the 3D developmental game, trains the positive interdependence characteristic between students and group members, improve the learning interest effectively and the results of learning.

Keywords : Collaborative Learning ; Virtual Reality

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REFERENCES

- [1] 韋金龍、陳玉美，『突破常態編班教學困境之途徑:合作學習』，教育研究雙月刊，第35期，PP.59-65，1994年。
- [2] 陳淑絹，『指導合作學習，策略應用於國小閱讀教學之理論探討』，臺中師院學報，第11期，PP.65-111，1997年。
- [3] Johnson, D. W. , & Johnson, R.T. Learning together and alone: Cooperative, Competitive and individualistic learning. Boston: Allyn and Bacon. 1994.
- [4] 黃政傑、林佩璇，『合作學習』，五南圖書出版公司，1996年。
- [5] 呂淑艷、楊改學，『網路教育的由來及發展現狀分析』，<http://www.edu.cn>，2006年。
- [6] Johnson, D.W.& Johnson. R.T., The new circles of learning cooperation in the classroom and school, American: ASCD. 1994.
- [7] Mark H. Maier and Diane Keenan, Teaching Tools Cooperative Learning in Economics, Economic Inquiry, Vol.32 PP.358-361, 1994.

- [8] Rosenberg, M.J. E-Learning: Strategies for Delivering Knowledge in the Digital Age. New York, McGraw-Hill. 2001.
- [9] 董文風, 『合作學習理論在英語課堂教學中的運用』, <http://www.chinaetr.com/>, 2004年。
- [10] 施頂清, 『從合作學習小組討論模式談閱讀理解能力之提升』, 教育實習輔導期刊, 第24期, PP.70-76, 2000年。
- [11] 林達森, 『併用概念圖於國中學生合作學習歷程之研究』, 南華通識教育教育研究, 第2期, PP.39-67, 2005年。
- [12] Slavin. R.E. Learning to cooperate, cooperating to learn. N. Y. : Plenum. PP.147-172. 1985.
- [13] Parker, D.B. Learning Logic. Technical Report TR-47, Center for Computational Research in Economics and Management Science, Massachusetts Institute of Technology, Cambridge, MA, USA. 1985.
- [14] Nattiv, A. Helping behaviors and math achievement gain of students using cooperative learning. The Elementary school Journal, 94(3), PP.285-297. 1994.
- [15] 張景華, 『合作學習理論對英語課堂教學的啟示』, 聊城大學報哲學社會科學版, 第5期, PP.120-122, 2003年。
- [16] 劉秀嫻, 『合作學習的教學策略』, 全民訓育學報, 第7輯, PP.285-294, 1998年。
- [17] 陳協志、劉建人、柯菁菁, 『合作學習於資訊倫理教學之成效評估』, 高苑學報, 第10卷, PP.161-168, 2004年。
- [18] Fu-Chien Kao, Tien-Hsin Feng, Chia-Liang Kuo, The Design of Internet Collaborative Learning System with the Integration of 3D Virtual Instruments, IEEE 4th International Workshop on Technology for Education in Developing Country, PP.71-75, 2006.
- [19] Fu-Chien Kao, Kun-Yi Chiang, Chia-Liang Kuo, The Design of Load-Balancing Computer-Assisted Instruction System with Embedded 3D Virtual Instruments, The International Conference on Information Management and Business, 2006.
- [20] 賴志明、周宣光, 『3D Webmaster 一氣呵成』, 文魁資訊股份有限公司, 1999年。
- [21] Superscape, “ SDK 3D Webmaster for Window Reference Manual ”, Superscape Inc. 1996. Superscape, “ 3D Webmaster for Window User Guide ”, Superscape Inc. 1998.
- [22] 汪洋, 『Virtools Dev 2.5使用手冊』, 博碩文化股份有限公司, 2003年。
- [23] 劉明昆, 『Virtools Dev遊戲數位動力』, 文魁資訊股份有限公司, 2004年。
- [24] 高富建、郭家良, 『具嵌入式3D虛擬儀器之SCORM學習管理系統設計』, 第十六屆物件導向技術及應用研討會論文集, 2005年。
- [25] 蔡孟哲, 『com/activex 完全實作寶典』, 松崗電腦圖書資料股份有限公司, 2001年。