Group Modeling Method in Web-Based Collaborative Learning Environment

Jianhua Zhao & David McConnell

Department of Educational Studies
The University of Sheffield
388 Glossop Road, Sheffield, S10 2JA

Abstract

Collaborative learning (Damon, 1984; Gabbert et al. 1986; Johnson and Johnson, 1989; Johnson et al. 1991; Kadell and Keehner, 1994; Kaye, 1991; Klemm, 1994; Webb, 1982) is the idea that small, interdependent groups of students work together as a team to help each other learn. So small learning group plays a very important role in collaborative learning process, especially in web-based collaborative learning environment. Many collaborative learning methods were explored and introduced by some researchers (Slavin, R., Sharan, S., Lazarowitz, R. H., Webb, C., and Schmuck, R., 1985; Slavin, R. E., 1995). To utilize collaborative learning approach in classroom-based environment also got a considerable success. But how to find an optimal approach to simulate collaborative learning process in web-based learning environment already became a question. Some researchers (Aiken, M. W., 1993; Klemm, W. R. & Snell, J. R., 1996; Dillenbourg, P., 1999; Tsoi, M. F., Goh, N. K. and Chia, L. S., 2000) already did a lot of works for it. The purpose of this research was focused on how to find an approach to simulate learning group in web-based collaborative learning environment.

In this paper, we mainly introduce how to simulate the procedure of small learning groups in web-based learning environments based on different collaborative learning method. We try to find one common approach, which can be modeled and abstracted, to realize this objective. This method can be used to simulate small learning group based on different web-based collaborative learning purposes. The ideal situation is any small learning group can be simulated, but it is quite difficult to realize. The sophisticated approach is that the user can compile and edit the procedure of small learning group, that is, some special collaborative learning methods also can be utilized by some tools in relevant environment.

To achieve this objective described above, two approaches were introduced to realize group modeling method in web-based collaborative learning environment. The first is to simulate some procedures for existed small-learning-group-based collaborative learning methods. Collaborative learning methods we would choose to simulate include STAD (Student Teams-Achievement Divisions) (Slavin, R. E., 1978, 1986), TGT (Teams Grames tournaments) (DeVries and Slavin, 1978; Slavin, 1986), TAI (Team Assisted Individualization) (Slavin, Leavey, and Madden, 1986), CIRC (Cooperative Integrated Reading and Composition) (Madden, Slavin, and Styevens, 1986; Stevens, Madden, Slavin, and Farnish, 1987), Jigsaw (Aronson, E., 1978), GI (Group Investigation) (Sharan, and Sharan, 1976), and Jigsaw II (Slavin, 1986). For clearly to introduce how to simulate

collaborative learning method, STAD method could be chosen as an example.

The second is to provide a compile and edit tool, which the user can use it to create some new procedures based on some special collaborative learning methods. It can be considered as an authoring tool, which it is a component-based environment. The components which the system provides for user to organize the new procedure of small learning group are the basis of collaborative learning methods. They can be got from existed and efficient collaborative learning methods. In this paper, we also describe a framework to explain how to design and model this authoring environment.

References

Aiken, M. W. (1993). Advantages of Group Decision Support Systems. *Interpersonal Computing and Technology: An Electronic Journal for the 21st Century.* ISSN: 1064-4326, July, 1993, Volume 1, Number 3.

Aronson, E., Blaney, N., Stephan, C., Sikes, J., and Snapp, M. (1978). Beverly Hills, CA: Sage Publications, Inc.

Damon, W. (1984). Peer education: the untapped potential. *Appl. Develop. Psychol.* 5, 331-343.

DeV\ries D. L., and Slavin, R. E. (1978). Teams-Games-Tournament (TGT): Review of Ten Classroom Experiments. *Journal of Research and Development in Education*, 12, 28-38.

Dillenbourg, Pe. (1999). *Collaborative Learning Cognitive and Computational Approaches* (p. 17). Elsevier Science Ltd. United Kingdom: Oxford.

Gabbert, B., Johnson, D. W., and Johnson, R. (1986). Cooperative learning, group-to-individual transfer, process gain, and the acquisition of cognitive reasoning strategies. *J. Psychol.* 120, 265-278

Johnson, D. W., and Johnson, R. T. (1989). *Cooperation and competition: Theory and research.* Edina, MN: Interaction Book Co.

Johnson, D. W., Johns, R. T., and Smith, K. A. (1991). Cooperative learning. Increasing college faculty instructional productivity. Washington, D. C.: *ASHE-ERIC Higher Education Reports. Report #4.* The George Washington University.

Kadel, S., and Keehner, J. A. (1994). *Collaborative learning. A sourcebook for higher education*, Vol. II. University Park, Pa.: National Center of Postsecondary Teaching, Learning, and Assessment.

Kaye, A. R. (1991). Collaborative learning through computer conferencing. *The Najaden Papers.* Berlin: Springer-Verlag.

Klemm, W. R. (1994). Using a formal collaborative learning paradigm for veterinary medical education. *J. Vet. Med. Ed.* 21, 2-6.

Klemm, W. R. & Snell, J. R. (1996). Enriching Computer-Mediated Group Learning by Coupling Constructivism with Collaborative Learning. *Journal of Instructional Science and Technology,* Volume 1 No 2, March 1996.

Madden, N. A., Slavin, R. E., and Stevens, R. J. (1986). *Cooperative Integrated Reading and Comparison: Teacher's Manual.* Baltimore: Johns Hopkins University, Center for Research on Elementary and Middle Schools.

Sharan, Y., and Sharan, S. (1976). *Small-group Teaching.* Englewood Cliffs, NJ: Educational Technology Publications.

Slavin, R. E. (1978). Student Teams and Achievement Divisions. *Journal of Research and Development in Education*, 12, 39-49.

Slavin, R. E., Sharan, S., Lazarowitz, R. H., Webb, C., and Schmuck, R. (1985). *Learning to Cooperate, Cooperating to Learn.* New York: Plenum Press.

Slavin, R. E. (1986). *Using Student Team Learning* (3rd ed.). Baltimore: Johns Hopkins University, Center for Research on Elementary and Middle Schools.

Slavin, R. E., Leavey, M. B., and Madden, N. A. (1986). *Team Accelerated Instruction: mathematics.* Watertown, MA: Charlesbridge.

Slavin, R. E. (1995). *Cooperative Learning: Theory, Research, and Practice (2nd Ed).* Massachusetts: Allyn & Bacon.

Stevens, R. J., Madden, N. A., Slavin, R. E., and Farnish, A. M. (1987). Cooperative Integrated Reading and Composition: Two field experiments. *Reading Research Quarterly*, 22, 433-454.

Tsoi, M. F., Goh, N. K. and Chia, L. S. (2000). *Modeling of Group Investigation in e-learning environment. Proceedings of Learning and Instruction in Information Era*, Asia-Pacific Chapter of UNSCO & South China Normal University.

Webb, N. M. (1982). Student interaction and learning in small groups. *Rev. of Educ. Research.* 52, 421-445.