A FUNDAMENTAL STUDY FOR EFFICIENT IMPLEMENTAION OF ONLINE COLLABORATIVE ACTIVITIES IN LARGE-SCALE CLASSES

Ryuichi Matsuba[1], Yusei Suzuki[2], Shin-Ichiro Kubota[3] and Makoto Miyazaki[4]

[1]*Institute for eLearning Development, Kumamoto University, Japan*
[2]*Department of Clinical Psychology, Shigakukan University, Japan*
[3]*Department of Computer Science and Systems Engineering, University of Miyazaki, Japan*
[4]*Faculty of Education, Kio University, Japan*

ABSTRACT

We study tactics for writing skills development through cross-disciplinary learning in online large-scale classes, and particularly are interested in implementation of online collaborative activities such as peer reviewing of writing. The goal of our study is to carry out collaborative works efficiently via online effectively in large-scale classes with more than one hundred students. In this short paper we describe our recent progress of a survey of relevance between a peer reviewing activity and students' characteristics with the perception obtained from investigation of earlier studies regarding the grouping method. We conduct questionnaire surveys regarding the learning style, students' characteristics and adaptability of peer activities, and recognize the perception can adapt to most of students we supposed. Also from the perception if we employ an online collaborative activity in the large-scale classes by using our supporting tool, we consider that it is better to group students arbitrary under a certain condition. We propose a grouping method in which a student pairs with peers who submit his/hers assessment report around the same time as the student hand in own report. We think the grouping may powerfully act the group formation in large-scale classes we supposed, because the grouping need not to demand any additional task for instructors such as preliminary survey of students' characteristics or learning styles widely used in any collaborative learning.

KEYWORDS

Computer-Supported Collaborative Learning, Learners' Characteristics, Group Formation for Peer Activities

1. INTRODUCTION

As is well known collaborative learning activities make a significant contribution to progress of students' deep learning (Beetham and Sharpe 2013). Particularly, it is considered that reviewing or grading among peers whether blind or un-blind plays a significant role of progress in learning of technical writing skills and thinking (Boud, et al. 2001). It unfortunately has specific difficulty to carry out successfully, because there are troublesome tasks for instructors, for example if we conduct blind peer grading, we need to deliver a submitted report by a student to blind peers, then back marks with comments from the peers to the student. Also the activities have subliminally troubling aspects. If we make a group composed students who are dislike or strange collaboration among others, then a collaborative activity may not perform as intended.

There are many researches of computer-supported collaborative learning (e.g., Wessner and Pfister 2001). It supports not only to save the troublesome task, but also to be helpful for students to facilitate both knowledge and skill refinement, since peers more than instructors may be required for the refinement (e.g., Cho and MacArthur 2010). Recently many instructors may recognize that the computer-supported peer activities provide an alternative to the traditional approach of practices with feedback from an instructor or a teaching assistant. In fact, a computer-based grading with peers has been practiced even in some large-scale writing classes of MOOCs (Massive Open Online Courses, Balfour 2013). There also are reports for student grouping in collaborative learning (e.g., Alfonseca et al. 2006). The reports discuss relationships between students' performance in collaboration and the composition of a group depending on students' characteristics including learning style (Zurita et al. 2005, Deibel 2005). Most of them are based on empirical practices or

heuristics testing. It is considered that a grouping method shown in a report may depend on circumstances such as number of students in the class, subject matter, etc., so that the method cannot always work well in any class.

We study tactics for writing skills development through cross-disciplinary learning, particularly are interested in online large-scale classes, like MOOCs. We conduct the study in two aspects: One is development of a supporting tool for peer activities via online which provides relieving care of instructors to expense for both receiving and delivering essays among students in the large-scale classes (Matsuba et al. 2014). The other is a survey of preliminary findings for effectively implementation of the activities focusing on both grouping and students' characteristics adoptive to the collaborative works. In this short paper we describe our developed online collaborative activity support tool briefly, then show our recent progress of a survey of relevance between a peer reviewing activity and students' characteristics.

2. A SURVEY FOR GROUPING IN AN ONLINE LARGE-SCALE CLASS

The goal of our study is to carry out collaborative works via online efficiently in large-scale classes with more than one hundred students. We conduct to design and construct a course introduced online peer works. It the effort to the development, we have developed a supporting tool that can automate the painful processes of both receiving and delivering assessment reports among classmates when we carry out peer grading anonymously (Matsuba et al. 2014). The tool is a module of open source learning management system Moodle, so instructors can install it into their Moodle freely and introduce online peer works in their class more easily than that with other computer-supported collaborative learning systems. We also study how well group members work together, and how better to group, because we would provide students the activities as possible as we can.

From investigation of earlier studies regarding the grouping method we obtain some perception as follows;

- Groups composed by students with similar characteristics including knowledge, skills, and interests tend to be better at achieving specific learning tasks,
- Students usually tend to work peers with similar characteristics, if an instructor permits to choice group members by themselves,
- Low-achieving students can learn more in a group composed by students with different (not similar) characteristics than in the group composed by students with similar characteristics,
- High-achieving students can make learning outcomes equally in any group,
- Students, beginners in particular, have difficulty in criticizing friends and perceive grades given by peers to be arbitrary,
- Students worry about variations in how criteria are interpreted, distrust peers' evaluation abilities,

(e.g., Williams, 1992, Webb et al. 1997, Brindley and Scoffield 1998 Zurita et al. 2005). In addition, the research of the relationship between peer works and learning styles of Felder-Silverman (Felder and Silverman 1988) suggests that

- Learning styles seem to affect the performance of the students when working together,
- There is not any clear correlation between the dimensions of the learning styles,
- The tendency seems to be that groups/pairs in the active/reflective and the sensing/intuitive dimensions can work better,

(Alfonseca et al. 2006). Also we understand the efficient number of students in a group empirically. It is that three persons in a group works efficiently, because if we set up four persons in a group, then contribution by a person tends to be little, on the other hand, in two persons group sometime argument may not settle into a consensus. With the perception we consider that if we employ an online collaborative activity like blinded peer reviewing in the large-scale classes by using our supporting tool, it is better to group students arbitrary under a certain condition by three students. We often provide an assessment report submission term for a few weeks so that some of the students upload it in Moodle within a few days, but some of them are in deadline. If we impose a peer activity in the assessment, it is convenient for students to pair with peers who hand it in around the same time. We name such group formation is "marathon like grouping".

In order to reconfirm the perception described above and study relevance of marathon like grouping, we conduct questionnaire surveys regarding with the learning style, students' characteristics and adaptability of peer activities. The object persons are the attending students of a medium-scale class less than fifty where we impose a blinded peer reviewing with a rubric in an assessment, and the questionnaires in the surveys are referred on the results of some different researches (Felder and Silverman 1988, Kikuchi 2007, Pintrich et al. 1991). We can recognize the perception is roughly valid. It means that, though there are some exceptional students, we consider the perception can adapt to most of the students. It is also shown that students with visual style feel available comments by peers, and having high self-efficacy for peer activities. They think peer activities are to be favorable learning activities for them. It is interested that we envisaged that there may be positive correlation between sociality and self-efficacy in peer work, but unfortunately we cannot find clear result for such prediction. We have an indication that we should avoid to employ un-blind peer works if there are many students with high scored social skills in a class, because they tend to hesitate to exchange of unrestrained criticism and comments. When we compare efficacy in progress of students learning between grouping based on students' characteristics or learning styles and marathon like grouping, we consider that the big difference does not reveal whichever we employ. The questionnaire to ask the composition of his/her group members in both grouping implies that even if we may take the marathon like grouping, distribution of students in groups tend to be roughly similar to those we make groups based on students' characteristics. Thus we think the marathon like grouping may powerfully act the group formation in the large-scale classes we supposed, because the grouping need not to demand any additional task for instructors such as preliminary survey of students' characteristics or learning styles widely used in both classroom collaborative learning and computer-supported collaboration. It also found that many of the students have times to discuss or make the report of the assessment with his/her friends having similar characteristics as preparation of the peer work. It indicates that if we announce implementation of a blind peer work beforehand, then students may have twice peer activities including a preliminary work spontaneously. These are tentative consideration so we will try to use the grouping in a large-scale class and, continue to study about such students' behavior more carefully.

3. CONCLUDING REMARKS

We have studied tactics for writing skills development through cross-disciplinary learning in online large-scale classes. We particularly are interested in implementation of online collaborative learning such as peer reviewing of writing. The goal of our study is to carry out collaborative works via online effectively in large-scale classes with more than one hundred students. We conduct the study in two aspects: One is development of a supporting tool for peer activities via online which provides relieving care of instructors to expense for both receiving and delivering essays among students in the large-scale classes. The other is a survey of preliminary findings for effectively implementation of the activities focusing on both grouping and students' characteristics adoptive to the collaborative works.

In this short paper we show our recent progress of a survey of relevance between a peer reviewing activity and students' characteristics with the perception obtained from investigation of earlier studies regarding the grouping method. We show the results of questionnaire surveys regarding the learning style, students' characteristics and adaptability of peer activities. We recognize the perception can adapt to most of students we supposed. Also from the perception if we employ an online collaborative activity in the large-scale classes by using our supporting tool, we consider that it is better to group students arbitrary under a certain condition. We propose a grouping method named marathon like grouping in which a student pairs with peers who submit his/hers assessment report around the same time as the student hand in own report. We think the marathon like grouping may powerfully act the group formation in the large-scale classes we supposed, because the grouping need not to demand any additional task for instructors such as preliminary survey of students' characteristics or learning styles widely used in any collaborative learning. We will try to use the grouping in collaborative works of an online large-scale class in the next survey.

REFERENCES

Alfonseca, E., et al., 2006. The impact of learning styles on student grouping for collaborative learning: a case study, *User Modeling and User-Adapted Interaction*, Vol.16, Issue 3-4, pp.377-401.

Balfour, S., P., 2013. Assessing Writing in MOOCs: Automated Essay Scoring and Calibrated Peer Review. Research & Practice in Assessment, *Special Issue: MOOCs and Technology*, Vol.8.

Beetham, H. and Sharpe, R., 2013. *Rethinking Pedagogy for a Digital Age: Designing for 21st Century Learning*. Routledge, London, UK.

Boud, D., et al., 2001. *peer learning in higher education*. KOGAN PAGE, London, UK.

Brindley, C., and Scoffield, S., 1998. Peer assessment in undergraduate programmes. *Teaching in Higher Education*, Vol. 3, No.1, pp.79-89.

Cho, K. and MacArthur, C., 2010. Student revision with peer and expert reviewing, *Learning and Instruction*, Vol.20, pp.328-338.

Deibel, K., 2005. Team formation methods for increasing interaction during in-class group work. *Proceedings of the 10th annual SIGCSE conference on Innovation and technology in computer science education*, pp. 291-295.

Felder, R.M., and Silverman, L.K., 1988, Learning and Teaching Styles in Engineering Education, *Engineering Education*, Vol.78, No.7, pp.674-681.

Kikuchi, A., 2007. Kikuchi's Scale of Social Skills: 18 items (KiSS-18), *Handbook of Measurements of Social Skills*, Kawashima, Tokyo, Japan.

Matsuba, R., et al., 2014. Development of A Supporting System For Online Peer Activities. *Proceedings of World Conference on Educational Media and Technology 2014*, Tampere, Finland, pp.1092-1097

Pintrich, P. R., et al., 1991. A Manual for the Use of the Motivated Strategies for Learning Questionnaire (MSLQ), *National Center for Research to Improve Postsecondary Teaching and Learning*, Michigan, MI, USA

Webb, N. M., et al., 1997. Teachers' grouping practices in fifth-grade science classrooms. *Elementary School Journal*, 98 (2), 91-124.

Wessner, M. and Pfister, H-R., 2001. Group formation in computer-supported collaborative learning, *Proceedings of the 2001 International ACM SIGGROUP Conference on Supporting Group Work*, New York, NY, USA, pp. 24-31.

Williams, E., 1992. Student attitudes towards approaches to learning and assessment, *Assessment and Evaluation in Higher Education*, Vol.17, pp. 45–58.

Zurita, G, et al., 2005. Dynamic Grouping in Collaborative Learning Supported by Wireless Handhelds, *Educational Technology & Society*, Vol.8, No.3, pp.149-161.