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A Between-Group Interaction Study of Collaborative Scripts in an Elementary Knowledge Building Community

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Abstract: When reviewing a knowledge building process of constructing learning, it happened commonly that two types of learning scripts were generated by different learning communities, Big Idea Problem Solving style or Multi-Questions Making UP style. There comes a problem: Does the variability of transcript style have any impact on the effect of inter-group interaction? If so, will teacher's intentionally guidance toward scripts construction create better inter-group interaction? Two classes of 4th graders (56 total) in science class working on Weather Study topic participated in this study during one semester (16 weeks). 151 scripts matched inter-group interaction style were coded and analyzed by Newman interactive methodology. The result showed significant difference of interaction style between two classes of learning community.
Keyword: Inter group interaction, collaborative script, knowledge building community

Introduction

Knowledge Building is the science of learning field is one of the representative theories, is the first by two professors of University of Toronto in Canada Ontario Institute of education, Marlene Scardamalia and Carl Bereiter in 90s proposed, followed by the research on the development of the practice of different types of educational institutions in dozens of countries and many scholars, the theory has become the embodiment of the information age of teaching and learning the development direction of "frontier". One of the theory of knowledge construction is based on the principle of (Principle-based) (Process-based) based on process rather than teaching, practice embodies 12 basic principles, its core is committed to promoting the learners the real work of knowledge innovation (Scardamalia, 2002).

In the process of teaching under network support, learning community members of the community in need around a common topic published their opinions and discussion; the teacher should guide the students to clear the individual with the whole community in the current state of knowledge, that is where the agreed understanding and where are still fuzzy and differences; learning organization is in the form of multiple division and collaboration team in a dynamic person, class discussions, and constantly reflect on the original consistency, to clarify the vague and eliminate differences, make a contribution to the improvement of community knowledge. Therefore, knowledge construction is not pre designed "predetermined" teaching, but by the members of the community "generation of multi-level interaction" teaching.

Two types of collaboration in a knowledge building community. Type I, all groups in the community work together on their problems, with each group following their trajectories of theory development. Type II, students work together on a same big problem, and each group focus on their own sub-problems or sub-themes of theory development. The between-group collaboration differences are indicated by learning scripts. This study examines the quality of between-group discourse in these two modes that emerged in knowledge-building processes.

learning activities in a KB community are happened naturally by students. It is student generated rather than teacher did. Knowledge Building (KB) is a principle based pedagogical theory (Scardamalia, 2002;

Scardamalia & Webb,1996). As a constructively generated learning process (KB), a common phenomenon is the formation of a collaboration script differ in different community. A question arises: Whether different scripts will have different effects on group interaction? This study focused on two classes of 4th graders on the class of “weather”. in the study of collaboration scripts generated: one is around a single problem (Big Idea) to solve the problem of collaboration (C1), another is based on multiple problems (C2). The theme of cooperation and improve the research process of the two experimental classes (C1, C2) for a term of "science, technology and society" course tracking, collecting the original data is the choice of Knowledge Forum (KF) In two the script text with the group interaction between the 151, and invited 2 students using interactive evaluation of Newman scale and analysis of these essays are encoding method, and then use these data in macro and micro, vertical depth analysis and horizontal level. The results showed that there was significant difference in two kinds of interaction the inter group collaboration script; although the perfect cooperation theme class (C2) in the sub project of the divergence of the more breadth, but with the depth of the vertical analysis of the transverse category are that the collaborative problem solving script class (C1) the group interaction between higher level groups, more closely linked, in the on stage between group depth of interaction is higher. Therefore, in the teaching practice of knowledge construction, teachers can have the intention to lead to more development and the promotion of collaboration scripts around a single problem, in order to get better. The effect of interactive learning between groups. Research questions are proposed as:

Q1. Do different knowledge building tracks result in different quality of interaction?

Q2. Which type of between-group interaction create better in-depth learning?

Methodology

Participants

Two classes of fourth-graders, 25 in each class.16-week course (2013 spring semester). Reformed three courses “Science, Technology, and Society”taught by the same instructor. The topic is “weather”, which is a unit in their science curriculum. Both students and the teacher were familiar with Knowledge Forum. In Class One (C1), all students focused on one same problem “Why the air temperature change?” In Class Two (C2), students explored different problems such as “where the cloud comes from?” “How the wind direction changes?”

Scripts

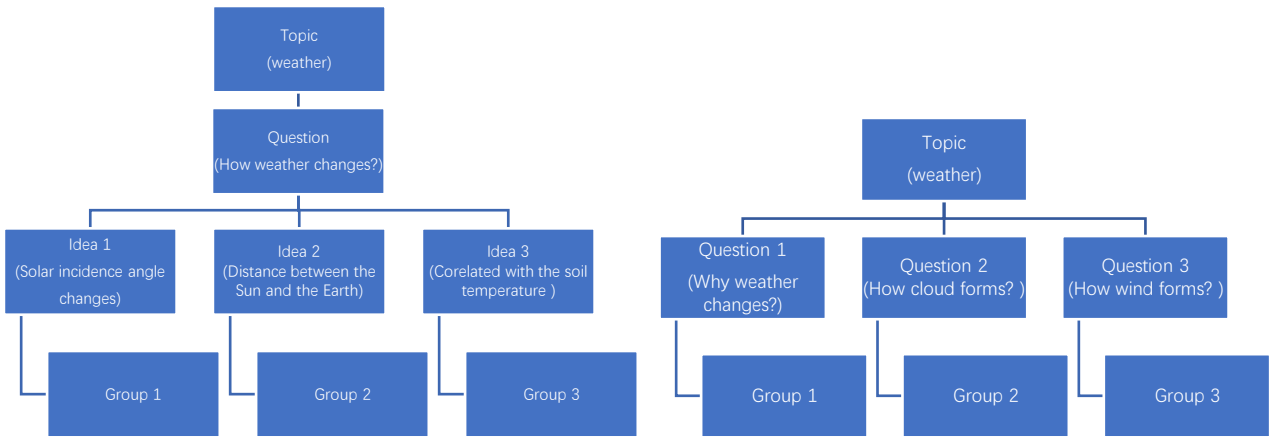

Figure 1. Two Types of Script.

Instruments

Newman Model (1995) was applied to evaluate the quality of students' discourse. The model was originally developed to measure group learning depth. It focuses on critical thinking. It is appropriate to evaluate the quality of social interaction because "successful group problem-solving processes require critical thinking, leading to the critical understanding needed for deep learning".

We adopted all indicators in the model, except for the indicators referring to tutor postings and the category "Critical assessment". For each class, the inter-group communication notes posted on KF were analyzed. A total of 151 notes are identified (C1=85; C2=66). Two coders worked independently. Their agreement was measured by Kappa (0.92).

Result

Between-group interaction depth

By relating each indicator in each category to the stage in which it is most expected, we mapped indicators to Garrison's five stages by means of the procedure reported by Newman. One-way ANOVA indicated that:

1. C1 did better than C2 in the Problem Exploration stage (the most important stage, Schellens, 2009), because for both positive indicators and negative indicators it revealed significant differences ($F(1,149) = 12.103$, $p < 0.05$ and $F(1,149) = 6.454$, $p < 0.05$) between two classes.

2. No significant difference was found for the other stages of problem-solving.

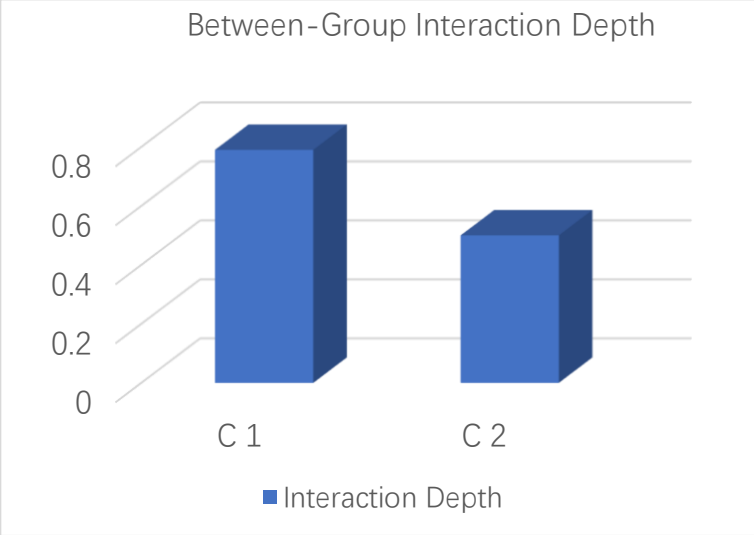

Figure 2. Between-Group Interaction Depth.

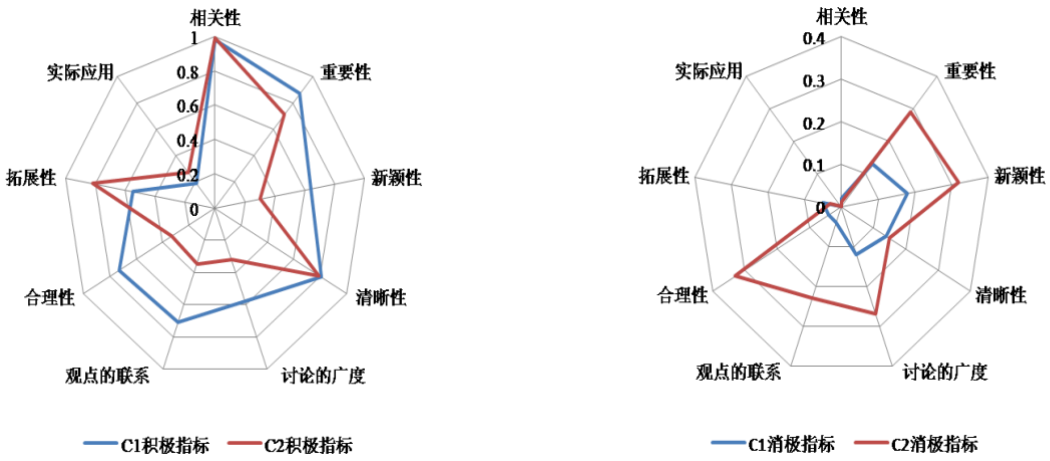

Figure 3. Indicator Frequency Comparison.

Conclusion

Enhancing the quality of inter-group discourse is one of the core issues for knowledge building.

Two classes in this study were not equivalent in prior academic performance (C2 was better than C1). However, the class focusing on one problem (C1) did better than the other class having students working on different sub-problems (C2).

Single problem generated more focused discussion and richer and more diverse ideas (which is important for knowledge building). Actually, students' interests are different more often.

future research needs to address how teachers who allow students to address sub-topics need to support student discourse in KF.

Table 1: The Mean of Indicator Frequency per Note in Different Stage.

Problem-Solving Stages	Positive Indicators		Negative Indicators	
	C1	C2	C1	C2
Problem identification	0.78	0.66	0.07	0.14
Problem definition	0.58	0.56	0.09	0.13
Problem exploration	0.53*	0.26*	0.08*	0.23*
Problem evaluation	0.61	0.55	0.02	0.10
Problem integration	0.43	0.42	0.06	0.11

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