

## Issues of Heterogeneous Grouping for Engaged Learning

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**Abstract:** Heterogeneous groups are usually used in cooperative learning to structure positive interdependence among the members for complementing and helping each other's learning. It is not uncommon to find in heterogeneous groups, students of different ability, gender, interests and socio-economic status. Supporters of heterogeneous groups claim that the performance of low ability pupils improves (Webb & Cullian, 1983) because these pupils receive more elaborated explanations from their high ability peers about the learning materials. High ability pupils can also benefit in heterogeneous groups because in the giving of elaborated explanations to the low ability peers, they reorganize and clarify information in different ways, which enhances the development of meta-cognition (Webb, 1992). This paper argues that these benefits will not come about automatically when students are put in heterogeneous groups. Although positive interdependence and individual accountability can motivate group members to interact with each other, diversity in needs and interests may counteract the motivation, affecting the quality and quantity of interaction. Based on a case study of two primary schools, the author found that students encountered many problems in heterogeneous groups such as quarrels, conflicts, frustration and lost of interest in learning. Although quarrels and conflicts could be handled by the students themselves after they had learnt to use social skills to reduce the level of confrontation in their groups, frustration and lost of interest in learning still lingered on. Alternative strategies of grouping students on a friendly or homogeneous basis are suggested. Teachers are drawn to the flaws of cooperative learning and the subsequent importance of team building before cooperative learning is introduced as an instructional practice.

**Keywords:** heterogeneous grouping, cooperative learning, group task, power status

Group work is commonly used to engage students in interactive learning. Despite its popularity, some groups are not as productive as others. For example, in groups where members can work on their own for the majority of time, the interaction among them is limited mostly to information sharing and clarification of assignments. In such cases, each member is basically responsible for his/her own learning. Sometimes it is even counter-productive and “the interaction among group members detracts from individual learning without delivering any benefit. The result is that the sum of the whole is less than the potential of the individual members” (Johnson and Johnson, 1999, p.71). Groups are more productive when students are interdependent on each other, as is often found in lessons where cooperative learning is used as the teaching strategy. When positive interdependence is

structured among students, they will realize that their goal can only be attained when the goal of all members in the group are also attained. In order to reach their common goal, members have to do their best on the one hand and to use every possible way to make sure that every member in the group has also put in the greatest effort on the other. Furthermore, to maximize the degree of interdependence, group work is often designed in such a way that it requires each member's unique contribution to the success of the work. Then members will increase their efforts (Harkins & Petty, 1982); otherwise, they will decrease their efforts if their potential contribution is regarded as dispensable (Kerr, 1983). Therefore, it is not difficult to understand why heterogeneous grouping is normally employed to bring about engaged learning.

### **Issues of grouping students heterogeneously**

We often find, in a heterogeneous group, students of different ability, gender, ethnicity or socio-economic status. Such a kind of grouping enhances the cooperation and engagement of students in the group work as each member possesses different expertise to share with each other. Research on heterogeneous grouping shows that the performance of low ability pupils improves (Webb & Cullian, 1983) because these pupils receive more elaborated explanations from their high ability peers about the learning materials (Webb, 1992). In the case of high ability students, research shows inconsistent results for their learning outcome. Some research suggests that there is no decrease in performance of high ability students (Hooper, Ward, Hannafin & Clark, 1989), others show that they perform as well in heterogeneous as in homogeneous groups (Nastasi & Clements, 1991; Hooper & Hannafin, 1988). Webb (1992) argues that high ability students learn more in heterogeneous than in homogeneous groups because in the giving of elaborated explanations to their low ability peers, they reorganize and clarify information in different ways, which enhances the development of meta-cognition. The discrepant results may be attributed to the difference in the sample characteristics which include age, gender, communication skills and personal traits (Bearison, Magzamen & Filardo, 1986; Slavin 1985; & Webb, 1992).

### **A project on cooperative learning**

Cooperative learning is defined as “the instructional use of small groups so that students work together to maximize their own and each other's learning” (Johnson & Johnson, 1999, p. 5). In 2004, the author conducted a study of cooperative learning in the Hong Kong primary schools. The study attempted to explore how pupils of different abilities interact in cooperative groups, how they resolve confrontations, and what problems they encounter. Several themes emerged from the research data, one of which was on the issues of heterogeneous grouping. It is this theme on which the present paper is focused.

## Methodology

The sample of the study consisted of nine classes of 198 pupils from two primary schools which was suitable for conducting research on cooperative learning as their class size was small, and the students were diversified in ability and gender. A majority of the students had low social and economic status. The teachers who taught the nine classes were selected by their principals as they were enthusiastic in using cooperative learning as their main teaching strategy. Heterogeneous grouping was adopted in each class. The groups were formed first by ability, then moderated by gender.

Classroom observation was employed to collect the relevant data on, for example, what students did in the classroom when they engaged in group work using cooperative learning. Focus was put on observing how students cooperated and interacted with each other in the process of completing their group task. A total of 31 groups of students had been observed. The interacting process of the students in each of the 31 groups was videotaped. The videotaping of the lessons was conducted in five days over a couple of months. All together, nine lessons were observed in two primary schools A and B, comprising three core subjects: Chinese, Mathematics and General Studies across all six levels except Primary 5 as depicted in Table 1. All the videotapes were transcribed and coded for analysis. Themes were then extracted and categorized. This was done by first analyzing the data separately by the principal investigator and a research assistant, then comparing the two sets of results. Reference was also made to the field notes taken during class observation.

Table 1

School	Subject		
	Chinese	Mathematics	General Studies
A	P3	P2, P3	P1
B	P4	P3, P4, P6	P3

Group interviews were conducted to all the 198 pupils in the same week of their lesson observation. Each group consisted of five to six students of different ability and gender from the same class, but the combination was different from that of their regular home group. The new composition was believed to be conducive to eliciting response of the students, and avoiding embarrassment among them. Each group interview lasted for about 30 minutes. The purpose of the group interview was to follow up on the themes that emerged from the videotaped lessons. The interviews were tape-recorded and transcribed verbatim.

## Results

The students in general were seen to work together by helping each other. The

interactions between the students suggested that some of them would explain to their members how an answer was arrived at, instead of just telling them the answer. Although more than half of them showed their preference for cooperative learning, they encountered many problems like quarrels, conflicts in the lower primary in all the subjects observed, as well as frustration and loss of interest in the upper primary in all the subjects observed. This was probably attributed to the difference in ability among the students in their heterogeneous groups. These problems were evidenced in the lessons observed and in the group interviews of the students.

### **Lesson observation**

Quarrels and conflicts mainly arose from the division of labor of the group tasks and in the process of peer teaching. Below is a typical conversation between two students when they were asked in a Primary 3 Mathematics lesson to work together to draw a square of sides of 27 cm each and then divide it into three equal portions in as many ways as possible. It was apparent that student A was of high ability and usually dominated over the group task. For the task in question, however, student B who was weak at Mathematics but good at drawing, wished to take the lead in the drawing. Student A did not agree and continued to treat student B as his assistant. They quarreled over the division of work and asked the teacher to resolve their conflict.

#### Dialogue 1 (School A)

A: Give me a pencil sharpener. A sharp pencil can draw the figure better.

B: I don't want to see you do the work. This time, I want to do it.

A: You'll ruin the work.

B: No, I'm good at drawing.

A: Don't waste time arguing. As usual, I do it and you help me when I need it. Now give me your ruler. I am going to measure 27 cm.

B: Use your own unless you let me draw it.

A: My ruler is only 12 cm long.

B: I'll tell the teacher if you don't let me do the drawing.

Frustration and loss of interest developed in the students when positive interdependence failed to function properly. It happened when the group members who each worked on different parts of a task had difficulty to teach their members the part they were responsible, or to learn from their members. The result generally indicated a feeling of frustration in the low ability students and a loss of interest exhibited by the high ability students. These problems were most prominent in lessons in which Jigsaw II was employed as the teaching

strategy. Jigsaw II usually starts by assigning to each member of a group a portion of the reading materials. Upon finishing the reading, pupils from different groups with the same focus of reading materials form an expert group to discuss the materials. When the group members go back to their home groups after discussing in the expert groups, each member takes a turn to teach and learn from one another. In the following conversation extracted from a Primary 4 Chinese lesson, the high ability student F was teaching his part, by reading from his notes, to his three members, G (medium ability), H (medium ability) and I (low ability). It was apparent that the difference in ability between F and I had created problems in the learning process.

#### Conversation 2 (School B)

F: The athlete who had won many awards in cycling was once a problem child mixed up with the gangs in the street.

G: Oh really?

H: Difficult to believe.

I: What is a gang?

F: Come on. You know it.

I: I honestly don't know. What does the word look like?

F: Don't waste time. Here you are. (Showing his notes to D)

G: Be quick. We can't finish our task on time.

F: The problem child had an opportunity to participate in a training course in cycling and from then on he gradually began his career as an athlete.

I: I can't hear it. Can you repeat that?

F: The problem child had an opportunity to participate in a training course in .....

I: Wait. Say it slowly.

F: You idiot! We are never going to finish. I'm fed up with repeating simple things again and again.

I: You are an idiot, too! I have tried hard to follow closely. The teacher has told us to respect each other. I'm going to tell the teacher.

#### **Interviews**

In interviews, the problems of quarrel and conflict over the division of work were also strongly expressed. The high ability students worried that the quality of work would be affected if their low ability peers took over the lead of the work; whereas the low ability student students felt that they did not have any chance to contribute to the work of which they were capable:

C: It is reasonable to divide the group task among members according to their abilities. A more able member should take a leading role in the work division. If we rely on a low ability member to take charge of the work, the outcome of the work will not be good and we cannot get a group reward. (a high ability student of School A)

D: We quarrel over the division of work in the group. I feel ill treated by my high ability peers who always take over the division of work and do not allow me to work on those I think I am good at. (a low ability student of School B)

Quarrels and conflicts were also encountered in the process of peer teaching. Very often it started when the low ability students could not understand or follow what their high ability peers were teaching them:

E: I don't think I can benefit from teaching my group mates or learning from them. I often cannot catch up with them. Then they say some nasty words to me and we start to quarrel. (a low ability student of School B)

Unlike individualistic learning in which students are mainly responsible to their own learning, in cooperative learning students have to be held accountable for the learning of their members as well. It is probable for students to feel frustrated when they cannot properly discharge their responsibility in teaching their peers because they have not learnt the materials well themselves. This is illustrated in the interview excerpts below:

J: I find it difficult to understand what my home group members teach me. Very often, they just read from their notes and assumed you would be able to understand it. They said I was wasting their time if I asked them to explain the thing that only I did not know. I have tried my best, but I can learn very little from them. (a low ability student of School B)

K: I was not confident to teach my group mates the part of story I was assigned to read because I had difficulty to understand the story myself. I feel frustrated. (a low ability student of School A)

The loss of interest exhibited by pupil F in Conversation 2 was also expressed by the high ability students L and M in the interview excerpts:

L: During the expert group discussion, our teachers often remind us to share our views and give feedback to each other. However, some group mates seldom have anything to share, not to mention giving feedback. I am not interested in this kind of peer learning. (a high ability

student of School A)

M: I'm not interested in the lesson when I have to teach my low ability peers. I think it will be more interesting if you have someone of similar ability to interact with. They can comment on your views and you can also respond to their comments. We might not agree to each other's views, but it is challenging. (a high ability student of School B)

### **Discussion**

The above results from lesson observation and group interview will be discussed with reference to the power status in a heterogeneous group and the type of group tasks. These two aspects are closely related to each other and contribute to the effectiveness of a heterogeneous group.

### **Power Status**

In the present study, the heterogeneous groups were different largely in terms of the students' ability, or in more precise terms, the overall academic position of the pupils in class, which was determined by the total of marks awarded to a student in all the subjects examined. Yet not all subjects carry the same weight of marks. Subjects like Chinese, English and Mathematics have the biggest weighting, nine times more than that of Music and Art. The unbalanced recognition for different subjects favors the students who are talented in logical-mathematical ability or linguistic ability in getting a higher academic position; while relatively penalizing the students who are talented in musical ability or spatial ability. In this context, a student who has a high academic position is usually held as someone with more knowledge. As it is commonly recognized that knowledge is power, the high ability students in the groups have a higher power status. Testimony to this is the way student A took control of the group work and treated student B as his assistant, as could be seen in Conversation 1. This conclusion concurs with the interview excerpt of the high ability student C.

The existing of unequal power status in groups should not be taken as problematic. On the contrary, this inequality can help to increase the cohesion of the group members, in the manner like inequality in human relationships contributes to the stability of the country in Confucius' thinking. In normal circumstances, inequality in power status can help to maintain a stable relationship of interdependence among the members of a group, which increases the efficiency of cooperation. However, when the power structure of the group is suddenly in disequilibrium, quarrels and conflicts may arise. The problems seen in Conversation 1 were probably due to disequilibrium in the power status between the two students. Student B got a low academic position, but he was talented in spatial ability. The group work in question was a drawing task in which student B had more knowledge, hence more power accordingly.

However, student A did not want to lose his power that had been taken for granted and prevailed in the group. In order to maintain the original power structure and to avoid conflicts between the members, it is advisable for the teacher to monitor the group and to take control in allocating the work to the students, if necessary. This is supported by Harwood (1995) who found that the presence of teacher correlated with improved quality and continuity of group discussion.

### **Group Tasks**

From Conversation 1, we can see that the group task actually did not require the cooperation of the members, but could be completed by any one of them, irrespective of their level of ability or knowledge. As students A and B were not interdependent to each other, any disagreement to the division of labour could lead to conflicts in the group. This kind of task is not suitable to be used as a cooperative learning activity. If it is to be used, the task should be highly structured with detailed guidelines and procedures to improve the quality of the members' contributions and cooperation (Lyle, 1993). There is a close relation between the type of group task and group composition. While expert/novice dyads made up of students with different interest or an inequality of knowledge, are effective in cognitive problems that have definite answers, cooperative dyads made up of students with similar interest or an equality of knowledge, are effective in open-ended problem solving or in brainstorming (Kutnick, 1994). This is supported by Fuchs, Fuchs, Hamlett and Karns (1998) who found greater cognitive conflict and resolution between high ability cooperative dyads. Furthermore, a genuine cooperative group work should require the different expertise of individual members for completion (Cohen, 1994). Such a kind of group task is designed to make use of the different abilities of the group members for completion, e.g., reasoning ability, visual spatial ability and linguistic ability, not the difference in level of the same kind of ability. This kind of group work can increase the degree of interdependence of the members.

Sometimes, even when positive interdependence had been structured in the group task as found in some lessons in which Jigsaw II was employed as the teaching strategy, there were still the problems of frustration and loss of interest as can be seen in Conversation 2 and the interview excerpts. Because of the difference in ability between members, it is inevitable that the high ability students will complain the low ability peers for hindering the progress (Elbaum, Moody & Schumm, 1999). Then, their interest in working together will be affected. They prefer to work in homogeneous groups where they can work faster and challenge one another (Lou et al, 1996). Despite the advantages of an increase in meta-cognition when high ability students teach their low ability peers, the present study finds that there can be a loss of interest towards learning together from the perspective of the high ability students, probably because they find no challenge from their low ability peers.

Cortazzi and Jin (1996) and Flowerdew (1998) found that it was common practice for students to form student-initiated groups to help each other. This kind of study groups could be heterogeneous, but the members were all friends who helped everyone else for the common good. They did not want to let each others down. Probably, the element of friendship in a heterogeneous group contributes to increasing the cohesion of the group and keeping the group to function properly when problems are encountered (Cohen, 1994). According to Leonard (2001), group cohesiveness affects the quantity and quality of student interactions more than group composition. When students are willing to work together, the effectiveness of the group will increase (O'Connor & Jenkins, 1995).

### **Conclusion**

Students are grouped in different ways depending on what purpose teachers want to achieve. In cooperative learning, students are usually grouped heterogeneously to enable them to help each other to achieve a common goal. Research on cooperative learning generally show an increase in performance when students of different abilities work together in heterogeneous groups. Some of these include enhancing motivation and improving interpersonal relations (Nastasi & Clements, 1991) as well peer relations (Slavin 1995). However, in the present study in which we examined the process of students working in heterogeneous groups, we found they encountered some problems. These problems include frequent quarrels and conflicts among members, as well as frustration and a loss of interest towards working together. On the evidence found from the present study, we argue that the problems can probably be attributed to the inequality of power status in the heterogeneous groups and the inappropriate type of group tasks assigned. The problems need to be addressed before students can get the benefits from cooperative learning.

It is worth mentioning that the study postulates that friendship of the group members might be a mediating factor of interest of working together in a mixed-ability group. However, whether the positive effects of cooperative learning will be affected by using mixed-ability groups of friends warrants further investigation, especially in classes with Chinese students. The Chinese people consider it important to give face to members of the in-group in order to continue their relationship (Bond and Hwang, 1986). In this connection, conflicts tend to be avoided and compromised as they disrupt the harmony of the group (Bond, 1991). When conflict is unavoidable, they will resolve it through mediation by a third party for impartiality and face maintenance (Ma, 1992). In cooperative learning, members help each other learn through peer teaching. If members are not willing to challenge each other during group discussion, it will be difficult to generate cognitive conflict which is important in enhancing the cognitive growth, academic performance and relationships among students (Johnson &

Johnson, 1999). When cooperative learning is introduced to the classroom, teachers should also put emphasis in team building and class building activities to create a collegial learning atmosphere.

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