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International Cooperative Group Dynamics Across Multiple Grade Eight Subject Settings

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Abstract

Since the early 1970's (Slavin, 1995) research focused on cooperative learning has been greatly increased and education has progressed away from direct instruction as its singular modus operandi. A plethora of research has been conducted into the effects of group work on achievement and group dynamics. However, there is a dearth of research investigating the amount of focus on group work being used in the classroom and if this has any relationship to academic success. The study was conducted in a large for-profit international school in the emirate of Sharjah, United Arab Emirates, with the student roll of circa 4,500 from K-13 of a middle to upper class socio-economic demographic with students from approximately 75 different nationalities. The study was designed to show the relationship between focus of time spent in the classroom and academic achievement in an international setting and the structure of heterogeneous cooperative group dynamics among Grade 8 students. Observations were conducted in four fifty-minute English, Social Studies, Mathematics and Science lessons within the same week at various times of the school day. The data suggests all four groups fit into the same group dynamic in a natural hierarchy heterogeneous groups may fall into. In this research, the group dynamic observed was always; the high ability student initiated, led, and concluded the task interaction. One or both of the middle ability students contributed examples or definitions and the low ability student became the focus of the cooperative group by the other group members, especially by the high ability student regardless of the subject matter. This research is important to consumers of research due to its international focus and proposal of a model of cooperative group dynamics.

Key Words: Cooperative Learning, Group Work, Secondary Education, Observation

Introduction

Since the early 1970's (Slavin, 1995) research focused on cooperative learning has been greatly increased and education has progressed away from direct instruction as its singular modus operandi. A plethora of research has been conducted into the effects of group work on achievement and group dynamics. From a cognitive development perspective, Piaget and Vygotsky both advocate group work as elemental to the development of a child's learning. The majority of the research conducted has focused on the group itself and each researcher has their own twist on efficacious group work such as the jigsaw method (Aronson, 1997), Joplin Plan (Kulik, & Kulik, 1992), and cooperative grouping (Slavin, 2006). However, there is a dearth of research investigating the amount of focus on group work being used in the classroom and if this has any relation to academic success. It is also within the remit of this study to present and discuss empirical data gathered from cooperative group observations.

Literature Review

Cognitive-development theory 'views cooperation as an essential prerequisite for cognitive growth' (Johnson et al, 1998, p. 29). For Piaget this was in the form of 'disequilibrium' (Slavin, 2006, p. 34) when an imbalance is created between what is seen and what is understood. In group work other group members' help in developing new schemes, hence equilibrium is restored. Whether dealing with 'assimilation', (Slavin, 2006, p. 32) adding to 'schema' or 'accommodation', (Slavin, 2006, p. 33) building new schema; group work aids students in these processes. Who this helps most in a group is of some debate and will be discussed in more detail later. Empirical studies have shown that non-conservers can learn to conserve through interaction with peers (Bell, Grossen, and Perret-Clermont, 1985; Murray, 1982; Perret-Clermont, 1980). Vygotsky's theory of cognitive development contributes to group work in a number of important ways. Firstly, through the use of 'zones of proximal development' (Slavin, 2006, p. 45) group work has the possibility of assisting students in accessing these zones to promote development. Kuhn (1972) found children who were close in proximal zones of development were more conducive to assisting cognitive development than children who were operating out of each other's zones of proximal

development. Secondly, through the development of making 'private speech' (Slavin, 2006, p. 44) audible children can learn complex tasks more effectively (Emerson & Miyake, 2003; Slavin, 2006). In group work this allows all members of the group develop their private speech. Thirdly, 'scaffolding' (Slavin, 2006, p. 45) 'assistance provided by more competent peers' (Slavin, 2006, p. 45) in groups enables students to enhance their peers responsibility to complete tasks with diminished support. According to Webb, Farivar, and Mastergeorge, (2002, p. 14),"receiving explanations can help receivers fill in gaps in their understanding, correct misconceptions, and strengthen connections between new information and previous learning". Unlike Piaget, Vygotsky directly theorizes about cooperative learning (Slavin, 2006, p. 45), but it is indistinguishable which group members are benefiting from cooperative learning because he hypothesizes group members as 'providing models for each other' (Slavin, 2006, p. 45) in a reciprocal relationship. Webb (1982, p. 426) concurs 'giving and receiving help are beneficial for achievement'. However, the research does not wholly agree with this assumption and perceives each member of a heterogeneous group as functioning in a specific fashion. Peterson and Janicki (1979, cited in Webb, 1982, p. 424) 'found positive relationship between giving help and achievement'. Webb (1982, p. 427) found 'explaining to others may be more beneficial to the explainer... requiring integration or recognition'. In essence, the student explaining, according to Piaget's cognitive development theory, would develop effective schema for assimilation and accommodation. Durling and Schick (1976, cited in Webb, 1982, p. 428) also found 'verbalising is more important for learning'. Vygotsky's verbalising of private speech would agree with this assertion. The role of the high ability student is important for achievement benefits for the tutor as well as the tutee (Devin-Sheehan, Feldman, & Allen, 1976) have been observed and Ross (1995) postulates high ability students receive enhanced self-efficacy from helping peers. A negative effect may also be true as high ability students' progress may be stifled by having to explain to lower ability students (Bershon 1992, Slavin, 1995) observed low ability students develop their private speech by working with students operating at a higher level. It is rare for all members of a group to make equal contributions to cooperative groups (Cohen, 1994). Cohen (1994, p. 3) also suggests 'No one of us is as good as all of us'. Bennett & Cass (1988, p. 19) propose group work is nothing more than 'physical juxtapositions of children engaged on individual tasks'. So, what is the reality?

Research Questions

The purpose of this study is to investigate,

1) What is the relationship between focus of time spent in the classroom and academic achievement in an international setting?

2) What is the structure of heterogeneous cooperative group dynamics among Grade 8 students?

Methodology

Study Design

The study was conducted in a large for-profit international school in the emirate of Sharjah, United Arab Emirates, with the student roll of circa 4,500 from K-13 of a middle to upper class socio-economic demographic with students from approximately 75 different nationalities. The study was designed to show the relationship between focus of time spent in the classroom and academic achievement in an international setting and the structure of heterogeneous cooperative group dynamics among Grade 8 students. Observations were conducted in four fifty-minute English, Social Studies, Mathematics and Science lessons within the same week at various times of the school day. The whole class was observed and then directly following the lesson heterogeneous groups of four were observed while conducting a subject specific task. These groups were chosen based on their respective subject averages to give the group a composition of one high ability, one low ability and two average ability students. To gather empirical data during the lessons a four part tool was developed specifically for this task. The tool was divided into four sections, one for each of the lessons observed, and then further divided into four subsections: teacher talk (TT), teacher and group (GT), cooperative group dynamics (G), and individual work (I). TT refers to teacher talk, the act of the teacher giving direct instruction to the class, group, or an individual in a lecture style. GT refers to the teacher and the group and is the act of the teacher working through subject material with the class. This may be with the whole class adding to the development of a concept or the teacher focusing on a specific group to answer a specific set of questions or contributing to an idea. G is the act of cooperative group work and refers to work conducted by students independently from the teacher defined as ‘three or

more children who were working together' (Gillies, 2003). I refers to the individual working independently from the teacher and their respective group. The tool was designed to observe three different teachers because the same teacher was timetabled to teach English and Social Studies and was divided into fifty one-minute boxes to represent the timing of the lesson. The professional teaching experience of the teachers ranged from three years to twenty-six years. The students observed were the same grade eight section with thirty-five students of mixed ability, gender, race, and socioeconomic status. Lessons were chosen on two criteria; 1) the subject material could be understood by the observer to enable comprehension of the lesson structure for coding and, 2) the students were in the same cohort, so no mixed lessons such as Arabic or French, as some students did not take these subjects. The second part of the observation focused on heterogeneous groups of four completing a set task.

Procedure

Four lessons were observed within the same international school. All lessons were observed within a five-day period at various times of the day ranging from 09:55 am to 15:10 pm. A single observer gathered data for the whole fifty-minute lesson and for a further three-to-five-minute period directly following the lesson with a heterogeneous group of four chosen on the basis of their academic average in that subject.

Firstly, verbal permission from the director of the school and all three teachers was obtained and head of departments were also informed of the observation times to avoid observational clashes. All parties concerned were told the observations were for research purposes, however, the exact intention of the observation was not stated as the observer did not want to taint the results by influencing the teachers consciously or subconsciously to focus on a certain aspect of their classroom dynamic. At the begging of the observation the observer entered the classroom at the same time as the teacher and proceeded directly to an empty chair already placed at the back of the classroom. At no point before or during the lesson were the students communicated with as to the purpose of the observation. An observation tool was used to record the focus of time spent during the lesson and a watch was used to note the time of the type of activity taking place at the end of each of the fifty minutes. For example, at the end of the tenth-minute students were working in groups, hence a mark was scored in the horizontal column G and under the vertical column 10 as seen here in table 1.

Code/minutes	9	10	11
TT	X		
GT			
G		X	
I			X

Table 1. Focus of time spent during lesson.

The lessons which did not directly flow into another lesson were selected to allow for the heterogeneous aspect of the observation to take place. The tool used for this was basic and allowed for a wide range of scenarios to be recorded. Similar to Webb (1989, p. 22) the observer did not assign specific roles or give information not shared with other members of the group. Groups were given a task in which they had to work together, in the case of Mathematics and Science to solve subject based equations and in the case of English and Social Studies to summarize material read during the lesson. Each group was told "I would like you to work as a group to solve/summarize the following material and then, as a group, present your ideas to me." The observer did not make eye-contact with any of the subjects so as not to signal or influence which member of the group should take charge. The observer also made sure not to give any prompts while the group was on task, again to ensure the group members were not influenced by the observer in any way possible. Obviously the mere presence of the observer and the experimental condition in which the group work was conducted had an influence on the group and this will be analyzed in the discussion.

Finally, at the end of the lesson the participating teacher was thanked and offered access to the completed results if they wanted and the students were given a brief explanation of the research purpose. Each student also gave permission for their academic data to be used during the analysis of this study.

Results

The first variable tested was the focus of the lesson and if there was any positive correlation between the amount of time the teacher dedicated to group work and the student's academic average in that subject. Firstly, the amount of time for each for the four subjects is graphically presented in the order they were observed,

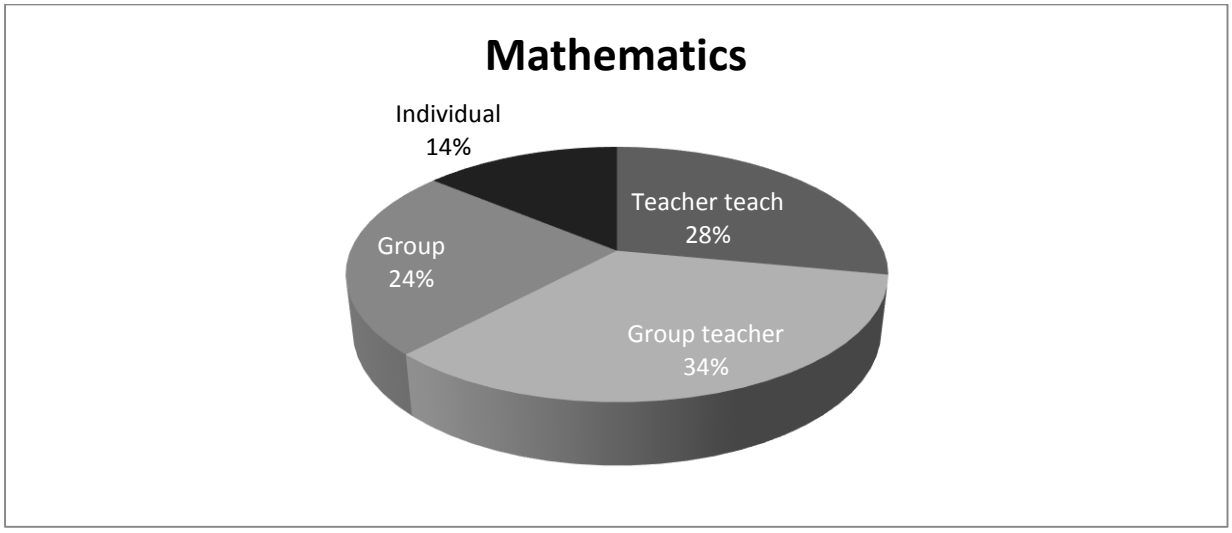

Figure 1. Time spent in Mathematics

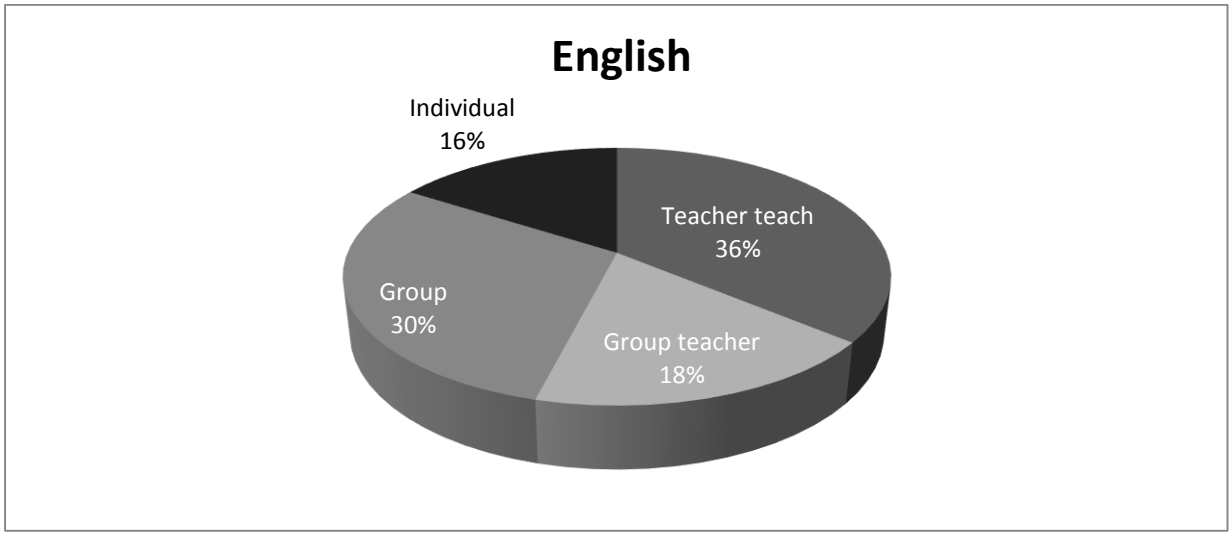

Figure 2. Time spent in English

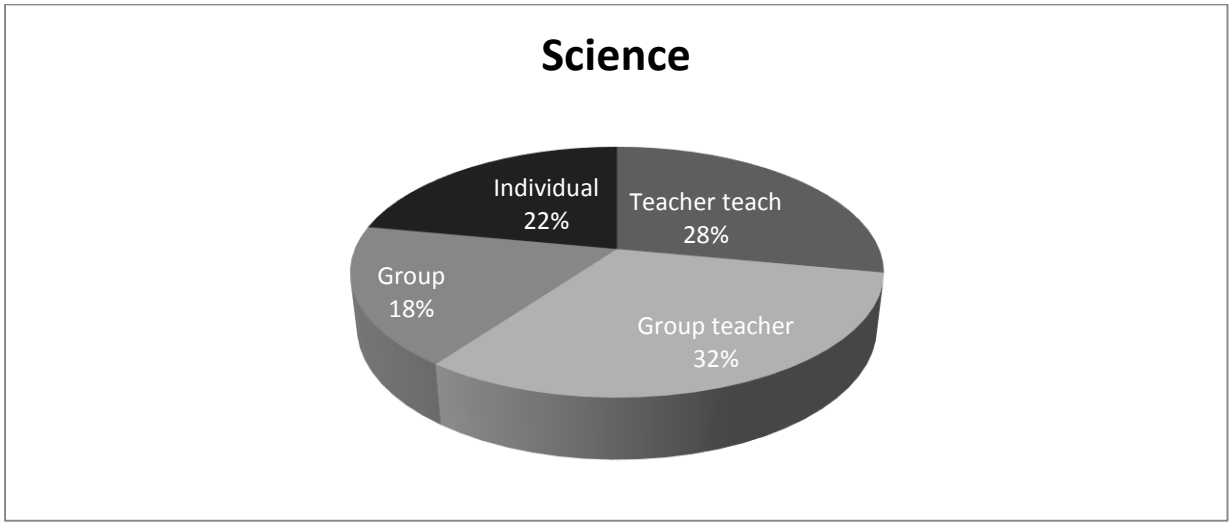

Figure 3. Time spent in Science

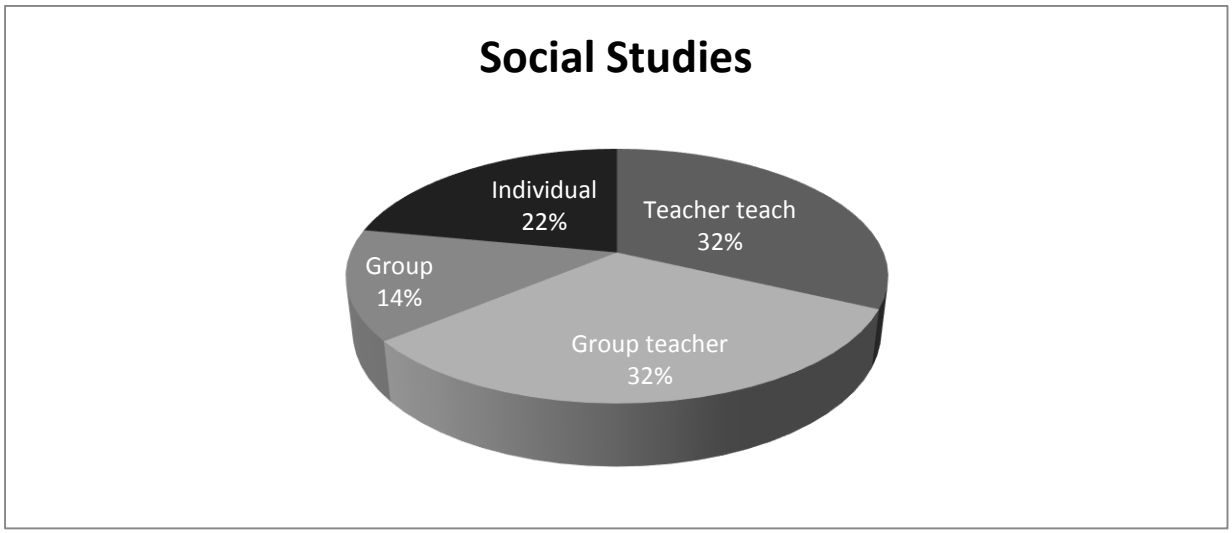

Figure 4. Time spent in Social Studies

	Teacher teach	Group teacher	Group	Individual
Mathematics	28%	34%	24%	14%
English	36%	18%	30%	16%
Science	28%	32%	18%	22%
Social Studies	32%	32%	14%	22%

Figure 5. Focus of time in all four lessons

Secondly, the student academic averages in each subject are compared with the amount of time spent on group work. The students were ranked from 1 to 4. 1= highest, 4= lowest. (In most tasks the group composition of students was different)

	Student 1	Student 2	Student 3	Student 4	Total
Mathematics	96	74	68	47	285
English	95	76	64	59	294
Science	89	82	72	66	309
Social Studies	99	80	77	71	327

Figure 6. Student academic averages (out of 100) in each subject

As can be seen by comparing figure 1.4 and figure 1.5 there is no direct relationship in this research between the amount of time spent on group work and increased academic achievement. In fact, the opposite effect can be seen when comparing student 2 from each group. The more time spent on group work the lower the academic average. More research would be required to ascertain if this were an isolated event.

If the amount of time a teacher dedicates to group work does not play a dominant factor in the benefits of group work then a more in depth look at the group its self is required. Webb (1980a, cited in Webb, 1982, p. 425) noted 'students who gave explanations of how to complete the task showed higher achievement than students who did not actively engage in group interaction'. As with Webb (1982, p. 432) this study also noted 'high-ability students gave more explanations than low-ability student' with middle ability members of the group contributing to a much simpler degree than the high ability student.

Discussion

Interestingly, the student with the highest academic average in their group always initiated the group discourse. Buckholdt and Wodarski (1978) suggest this may be an effect of slow learners may learn more quickly from other students and children may recognize other children's nonverbal signs of confusion. This would confirm Vygotsky's zone of proximal development, however, this research further illuminates the nature of this construct in action.

To have observed four independent groups where only one member of a group appeared more than once (Student 4, English, Mathematics, Science), no communication was had with or between the groups before the task was conducted. The data suggests all four groups fit into the same group dynamic in a natural hierarchy heterogeneous groups may fall into. In this research, the group dynamic observed was always; the high ability student initiated, led, and concluded the task interaction. One or both of the middle ability students contributed examples or definitions and the low ability student became the focus of the cooperative group by the other group members, especially by the high ability student regardless of the subject matter. In light of this, the following model is proposed,

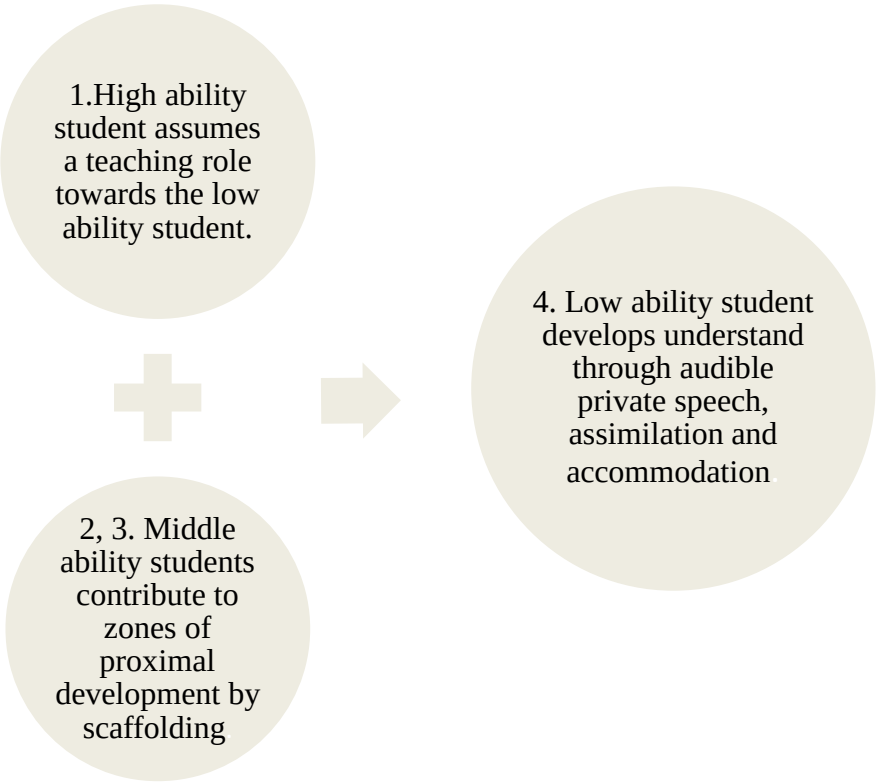

Figure 7. Heterogeneous group dynamics contribution model (Etchells, 2016)

During the tasks observed superficial contributions were seen to be made by the middle ability members of the group. This is not to be over looked the in theory according to Vygotsky they would be operating closer to the low ability students zone of proximal development than the high ability student. Their small yet significant contributions play an integral role in the matriculation of the low ability student. Also, by making their own private

speech audible the middle ability students are also developing. Piaget would refer to this process as assimilation. Often middle ability group members were looking for affirmation that their comments were appropriate to the development of task completion. Webb (1985) notes explanations may occur between high and low ability children, effectively leaving those with average ability out. This is an underestimation of the subtle manner in which dynamic groups interact. The utterances of middle ability group members are at the core of a low ability group member's comprehension.

Heterogeneous groups do not have a blueprint to success as 'the same student may have different experiences in different groups' (Webb, 1989, p. 36). This was seen with student 4 in the Mathematics task. He had little to contribute to the group, yet, in the English task he was much more active assisting in organizing the group, but still sought confirmation from student 1. He had developed group terms such as 'let us' instead of using 'I'. By the third task, Science, student 4 took charge of the task unfortunately running out of the ability to structure the task and being usurped by a higher ability student 1 who provided a clear explanation and logical progress. Student 4's increased involvement may be due to familiarity with the parameters and expectations of the tasks set or it may be accorded to cognitive development theories as outlined by Piaget and Vygotsky. Moreover, high ability students works as a catalyst for dynamic group productivity. Webb & Kenderski, (1984, cited in Webb 1989, p. 33) 'most able student in the group may take a teaching role' and Webb (1989, p. 35) 'level of elaboration...is related to achievement'. This idea is confirmed by Burns (1981) suggests higher-order understandings will emerge. Possibly explaining why high ability students in all four tasks took charge of the group. Passive students were not affected by lack of contributions as Webb (1982, p. 427) suggests 'passive behavior [is] negatively related to achievement'. This was not the case for this study as passive students still met with an acceptable level of academic success. This may be due to other external factors such as direct instruction of internal factors, such as, already understanding an understanding of the task and, therefore, the student did not feel their comments would benefit themselves. Furthermore, Webb (1989, p.28) theorizes utterances 'not necessarily directed at others' and maybe a verbalization of Vygotsky's private speech, or of Piaget's accommodation. As was observed by Webb (1989, p. 25), students in this study also interrupted with 'suggestions and corrections' which as discussed enrich the groups understanding of the given task.

Webb (1989, p. 30) observed students who 'gave explanations showed high achievement' whether this means explaining raises a student's average or vice versa is not clear from this research. From the data collected, it would appear explaining has no direct effect on academic standing as the amount of group work dedicated by each teacher had no consistent relationship to the grades of the student who did the majority of the explaining.

Conclusion

Further research should focus more on the interaction between a high ability student within a cooperative dynamic group, the effects on achievement, and for this purpose the following question is proposed –how does communication within cooperative groups' affect achievement in high ability students? High ability students' are mostly seen in current research as giving and not receiving understanding with the underlying assumption they could perhaps complete the task unassisted by other group members. Finally, interviewing and observing students who are a member of a group, but are passive, would shed some light on their experience within a group. The following question is posed. What is the learning experience of passive group members, in terms of their academic development?

Recommendations

The recommendations of this research are,

1. More site specific research needs to be conducted across the school to ascertain whether the percentage of group work observed was isolated to the lessons observed or can be generalized to the whole school.
2. Further research to ascertain the most effective classroom activity that produces academic achievement.
3. Design a professional development policy that encourages all members of staff to develop cooperative group teaching strategies.
4. Develop more complex observation tools that will allow for simultaneous actions to be recorded and group interactions to be transcribed.

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