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On the Influence of Grouping Practices on Classroom Teaching

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PRACTICES ON CLASSROOM TEACHING

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Abstract
The article starts with a historical overview, discusses the arguments for and against ability grouping. It surveys the literature on different practices of grouping that exist in the American and British literature. The study mainly focuses on instructional grouping practices based on ability and on cooperation. It discusses arguments for and against ability grouping. The study also presents information about the use of mastery learning with cooperative strategies.

Introduction

The issue of assigning students to different classrooms for instruction has been debated over so many years. Should the equal numbers of high, low and middle ability groups be assigned to different classes in equal numbers (heterogeneous assignment) or all of the students who are similar in their perceived[1] ability should be clustered in the same classroom (homogeneous assignment) Having assigned them into classes there is again the problem of how to organise the learning environment. Should the instruction be on the individualistic basis, or could grouping be a possible solution?

Ability Grouping

The issue of effective teaching has long appealed to many educational researchers. Starting from the early 1900s the quest was for the identification of the teachable group. Being commissioned by the French Ministry of public instruction in 1904, Binet and Simon set out to identify children who could benefit from ordinary instruction in schools. from those who could not. The intelligence test developed by them so wide an acceptance that it became a universally accepted indicator of school achievement. In less than twenty years, educators came up with a model that assigned to those who could sufficiently judge, comprehend and reason to different classes from those who could not. Since then ability grouping has found wide application based on various criteria besides IQ, such as past academic achievement, scores on standardised tests and the recommendations of the teachers (Reuman, 1989).

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[1] There are concerns on the validity of the instruments (i.e. the standardised tests) measuring ability.

Slavin (1987) defined ability grouping as "some means of grouping students for instruction by ability or achievement so as to reduce their heterogeneity". An added rationale is that students are easier to manage and keep attentive in smaller groups (Hallinan & Sorensen, 1983). Furthermore, as Kerckhoff (1986) pointed out, high ability students can move faster without having to slow down for their less competent friends on the one hand, and on the other, low ability students can benefit from this segregation in that the teachers can provide them with an appropriate curriculum and pace of instruction.

Grouping efforts have taken many directions based on diverse theories and resulted in diverse practices. Slavin (1987) cited some grouping forms in elementary schools such as ability-grouped class assignment (which Americans call tracking and the British refer to as streaming), ability grouping for selected subjects, Joplin plan, non-graded plans, special classes for high achievers, special classes for low achievers, and within class ability grouping.

In ability-grouped class assignment, students are assigned to a self-contained class on the basis of ability or achievement. On the other hand, ability grouping for selected subjects requires student assignment to a homogeneous class for a particular subject or two according to achievement while they spend most of the day in a heterogeneous homeroom class. Joplin plan differs from the second form of grouping in that students regardless of their grade levels meet for reading in a homogeneous class based on their achievement levels. Non-graded programs are those that entirely remove grade-level designations, such as age, and form flexible groups based on student performance. Special classes for high achievers seek to bring together gifted, talented or superior students for part or all of the school day while their normal peers remain in relatively heterogeneous classes. Similarly, special classes for low achievers bring together students with learning problems in special classes for part or all of their school day. Finally, in within-class grouping, students form ability-homogeneous groups in their homeroom class for a subject or two.

No matter what grouping plan is chosen by the schools, there are generally two or three ability groups; high, middle and low. Middle ability groups are used in schools where three groups are formed. Although not as common as the low ability group, there are instances where educators choose remedial groups instead of low ability groups (Slavin, 1987; Hallinan and Sorensen, 1983).

Arguments for and against ability grouping

Grouping strategies based on ability are used in various forms in schools and classrooms world-wide, and are certain to arouse discussion.

Research has proliferated in the field and mainly two diverse views emerged. The traditional hypothesis states that ability grouping yields positive gains by all students regardless of the group they are placed in, whereas the divergence hypothesis holds that only the students in high ability group show gains in achievement and those in low ability group actually lose in performance (Kerckhoff, 1986). For over seventy years ,the pendulum of search for the effects of ability grouping has been swinging between the two ends of this debate.

The advocators of grouping students by ability propose four basic rationale (Mamary & Rowe, 1985):
- It will allow the teacher to be more efficient in their planning.

- high ability students learn more than low ability ones
- low ability students do not get frustrated by the progress of high ability students.
- It is easier to teach hence less discipline problems occur in homogeneous classes.

Some criticism of ability grouping is based on the supposed negative impact on self-esteem for those students placed in low ability groups. But Mamary and Rowe argues that this does not in fact appear to be the case, with ability grouping having minor, generally positive effects on the self-esteem of slower learners with instruction received in homogeneous ability groups (Mamary & Rowe, 1985).

The possible negative effects of labelling can be reduced by minimising any conspicuous nature of the labelling involved (for example using colours or names of famous people to name groups rather than "advanced", "normal" and "remedial"), and by retaining as much flexibility as possible in terms of group selection and revision. The "role model" argument in favour of heterogeneous groups appears flawed as children of low or average ability do not model themselves on fast learners even when they are in the same class (Schunk, 1987).

The weight of argument in favour of ability grouping appears strong with questions now appropriately shifting to how such ability grouping can be most appropriately handled, and to whether it should be across all ability levels or targeted largely at the gifted and talented.

According to Slavin and Braddock (1993) grouping by ability is ineffective. It is harmful to many students and inhibits the development of interracial respect, understanding, and friendship. It undermines democratic values and contributes to a stratified society

Their criticisms to ability grouping can be summarized as follows:

- *Opportunities to learn* One of the clearest outcomes of ability grouping at all instructional levels is that students in low-ability groups are exposed to substantially less material and to lower quality instruction than are students in middle-or high ability groups.
- *Achievement:* He argues that the pro-grouping argument is primarily concerned with effectiveness, and the anti-grouping argument is primarily concerned with equity, and democratic values. He states further that the proponents of ability grouping fail to meet this burden of proof clearly showing the effectiveness of grouping enabling to sacrifice the needs of low achievers in favour of the high achievers.
- *Low level skills*: Students in low-ability groups are likely to be exposed to more low-level skills than are students in middle and high groups.
- *Segregation*. One of the most consistent effects of ability grouping is to create classes that have disproportionate numbers of students from the same racial or social groups
- *Self-esteem, and feelings of inferiority*. The feelings of inferiority and worthlessness may be the outcome the students in low achieving groups.
- *Delinquency, and dropout*: Students in the low track are still more likely to be delinquent than are other students and are less likely to complete their education.

Yates (1966) mentions that the children who are streamed by their ability to a certain group (a class or a school) quickly understand the significance of the procedure. The students who are assigned to the lower groups indicates lower motivation, hence their progress is prevented. The able ones, on the other hand, may develop feelings of anxiety and others overestimating their capabilities might develop inflated notions about their intellectual superiority

Another criticism for ability grouping is that it leads those in low ability groups to delinquent behavior and that they hold significantly lower attitudes toward the school and the self than those in high ability groups (Hallinan and Sorensen, 1983).

Another important criticism to ability grouping stems from the possibility that teachers might have lower expectations which, in turn, has negative effects on students' intellectual development (Rosenthal & Jacobson, 1968),. Thus homogeneous grouping may be one of the causes for the communication of their low expectations to the low achieving students. this may prevent the students showing their full potential.

Research on ability grouping

The terminology used in the studies of ability grouping is quite different for the UK and the USA. For instance, the British terms of setting [2], streaming[3], and mixed ability teaching[4] are corresponded by regrouping, tracking, and heterogeneous grouping respectively in the US literature.

The research in the UK, unlike the American literature, has focused on the underlying processes involved in the group work. In those studies group interactions and the kinds of social and ability groupings which appears to be effective have been investigated (Hallam & Toutounji, 1996). It has also concentrated on the inequities of the setting or streaming system for those students who are allocated to low sets or streams because of the factors such as race, class or gender an that little attention was given to the effects of setting or streaming upon the students' development of subject understandings. (Boaler, 1997).

In the USA, on the other hand, the studies mainly concentrated on the outcomes of such procedures on cognitive and affective variables of learning (Abadzi, 1984). In these studies the average scores of students taught in homogeneous and heterogeneous groups were compared. neglecting the responses of individual students to the procedure, the ways in which setting influences achievement or the processes by which it takes effect (Boaler, 1997).

Research on the effects of ability grouping have yielded contrasting findings. The two main hypotheses on ability grouping reveal this diversity. The traditional hypothesis states that ability grouping is conducive to student achievement regardless of being in the high, low or middle group (Kerckhoff, 1986). In their analysis of the "High School and Beyond" (HSB) study, Newfield and McElyea (1983) went through the data that comprised 58,000 high school seniors and sophomores in order to clarify the conflicting views about the effects of ability grouping. Their results indicated that grouping leads to improved achievement and attitude toward subject matter for students in regular and remedial classes alike.

Slavin (1987) made an allusion to the joint study of Atkinson and O'Connor (1963) and commented on the rationale of ability grouping:

> Ability grouping is supposed to increase student achievement primarily by
> reducing the heterogeneity of the class or instructional group, making it more

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[2] Regrouping of pupils with respect to their ability in the subject concerned.
[3] The method of assigning pupils to classes on some overall assessment of ability.
[4] The assignment of pupils to different classes either randomly or on the basis of some factors such as social backgroung and gender.

possible for the teacher to increase the pace and level of instruction for high achievers and provide more individual attention, repetition, and review for low achievers. It is supposed to provide a spur to high achievers by making them work harder ... and to place success within the grasp of low achievers, who are protected from having to compete with more able agemates. (Slavin, 1987, p.296)

Kerckhoff (1986) cited the work of Wilson and Schmits (1978) and stated that teachers in Britain favour the use of ability grouping in spite of the lack of empirical support. More interestingly, he referred to Barker Lunnis NFER survey of streaming in British primary schools in 1970 which revealed that teachers objected to streaming on philosophical grounds but actually practised it.

Boaler (1997) on the other hand, relates the swinging between setting and streaming in the UK in the last half of this century to developments in research, educational theory and the political agenda of the time.

At the other end of the controversy are those who established support for the divergence hypothesis (Kerckhoff, 1986) which maintains that students in high ability groups gain in academic performance and those in low ability groups lose in performance (Hallinan & Sorensen, 1983; Kerckhoff, 1986).

Using longitudinal data from 48 classes of fourth to seventh grade Californian elementary schools, Hallinan and Sorensen (1983) found that although instructional grouping is a popular method especially in reading (71%) and mathematics (44%), students are generally assigned to three quite stable groups as high, medium, and low in equal numbers rather than on the basis of homogeneity. They also found that the impact of grouping is greater if true homogeneity is substantiated. This partly explains the inconsistent research findings. Still, the results of their study indicated that the students who are placed in high ability groups benefit more from the practice.

Another confirmatory evidence for the divergence hypothesis came through the research of Kerckhoff (1986). He took a birth cohort whose records were kept from birth to early maturity in order to control for the initial characteristics before becoming separated into ability groups. His sample comprised of 4,797 boys and 4,602 girls, a total of 9,399 individuals. These students were followed through their education until just before graduation from secondary school. The cohorts attended one of the four major types of schools: grammar schools which high ability students attend to prepare for university, secondary modern schools which also serve the high ability group, comprehensive schools which serve a cross-section of ability levels and private secondary schools which are attended by high ability groups -although ability is not their sole criterion. In the schools that streamed their pupils, there were mostly three ability groups as high, middle, and low. The cohorts were compared in terms of their achievement in math and English courses. The comparison was done both between ability groups and between grouped and ungrouped students. The divergence pattern of increased gains for high ability groups and decreased gains for low ability groups was found most clearly and consistently in comprehensive and secondary modern schools. A similar pattern was obtained in the comparison of achievement among the four schools: grammar school students' achievement in both courses was the highest, followed closely by private schools, comprehensive schools being the third, and secondary modern the last. Both grammar and private school students scored well above the mean for the cohort, while

comprehensive school mean approximated the cohort mean and the average of the secondary modern fell below. None of these results implies any support for the traditional hypothesis, but confirms the divergence hypothesis firmly.

On the other hand, in his best-evidence synthesis on between-class ability grouping in secondary schools, Slavin (1990) concludes that none of the grouping plans has a significant effect on achievement. Similarly, his analysis led him to the conclusion that ability grouping has no positive or negative effects on the students of high, middle, or low ability.

Slavin's best-evidence synthesis at the elementary level indicated that while between-class ability grouping has no positive effect on achievement (Slavin, 1987). Another study on ability grouping has been conducted by Hackenberg (1995). The findings of this research revealed that type of ability grouping accounted for a negligible. .09% of the variance in achievement.. However, it provided support for the heterogeneous ability grouping under conventional classroom instruction.

Affective consequences of ability grouping, especially the detrimental effects of it on low ability students are investigated by numerous researchers. Besides, assignment to low ability classrooms or groups call for expectation for students that become self-fulfilling prophecies (Nachmias, 1977, in Reuman, 1989). Hence, students have negative affect toward school due to their low academic self-concept.

Hallinan and Sorensen (1983) report that when students are moved to a lower-ability group, this reassignment affects student academic self-esteem and disturbs parents. Students who fall behind their group, they found, are apt to become discouraged or lose motivation and even learn less than if they were not grouped.

Within-class ability grouping

The division of a single heterogeneously grouped classroom into two or three small ability groups for reading or math instruction has been recently in the USA (Slavin, 1993).

Standardised tests often are used to measure intelligence and achievement which leads to the formation of various ability groups within classrooms While this practice still requires the sorting of students into different groups for instruction, it has several advantages over large- scale methods of between-class ability grouping.. The smaller size of the groups makes them somewhat fluid, so it is more likely that students will be able to move into higher groups as their achievement improves. In addition, using small groups make it may be possible to make necessary changes in the curricula and teaching methods to satisfy the needs of the individual students (Sorensen & Hallinan, 1986).

Wilkinson (1988) argues that within class ability grouping generally favours higher achieving students, low achieving ones receiving less appropriate instruction. Good et al. (1990) found out that simply using more grouping does not lead to more verbalization, critical thinking or collaboration in mathematics learning.

The most common model for schools in the USA to move away from streaming is cooperative learning, where small groups of students work collaboratively on classroom projects. All students in a group learn the same course-work together and share responsibility for the success or failure of their group work. In addition, students learn from each other and

support each others' efforts.

Teachers function as guides and facilitator and senior partners, not as dispensers of knowledge in cooperative learning environments. In fact, it is the constructivist philosophy of learning which emphasises the importance of facilitation of learning which necessitates teachers acting as guides, not as sole leaders of the classroom (Lerman, 1994). Besides, social constructivists argue that the route to the facilitation of learning is via co-participation (Linn & Barbules, 1993). Then it makes sense to organise students for learning such that they can interact with others using a shared language. Learning in small groups can, then, occur by students appropriating the ideas of others by building on someone else's idea to create an idea they could not have created alone (ibid.).

Cooperative learning is not itself a grouping model and can be, thus, often used in streamed schools as well as in non-streamed schools. Nevertheless, it is typically thought of as a form of heterogeneous grouping, and its advocates recommend that it be used in heterogeneous settings. They assert that it is the best option for all students, in part because, unlike in the case of streaming, it emphasises active interaction between students of different abilities and backgrounds.

Critics of cooperative learning as a replacement for grouping by ability suggest that it should not be considered a panacea. If cooperative techniques do nothing more than allow students to work on low-level tasks, they note, the techniques will not contribute to improve instruction Others have suggested that while cooperative learning is valuable in certain situations, it is not always appropriate; it can be more effective, particularly with high-achieving students, when used in conjunction with ability grouping (Nelson, Gallagher & Coleman).

Cooperative Grouping

Cooperative learning is one of the three ways of organising the learning environment of a classroom, others being competitive and individualistic. In cooperative learning environment, the goals of the separate individuals become so linked that there is a positive correlation between them; contrarily in a competitive environment, the goals of the students are so linked that there is a negative correlation between their goal attainments, whereas in an individualistic one, students' goal attainments are independent (Johnson & Johnson, 1970).Members of a football team working together to win the game is an example of a cooperative environment, on the other hand, a 100 meter running event would be an example of a competitive one (Ryan, 1979).

The term *cooperative learning* refers to instructional strategies in which students work in small cooperative groups or teams to master academic materials and are rewarded for doing well in the group (Slavin & Karweit, 1981). Cooperative learning is "a group learning activity organised so that learning is dependent on the socially structured exchange of information between the learners in groups, in which each learner is held accountable for his or her own learning and is motivated to increase the learning of others" (Roger, Olsen & Kagan, 1992). They state further that the interaction patterns can be very simple such as students discussing a point of a lecture in pairs, or so complex such as being based on precise grouping, grading or specialized tasks.

The instructional strategies in which students work in small groups that are

competitive with one another, and either homogeneous or heterogeneous in ability with respect to past school performance are referred to as *competitive learning* (Skon, Johnson & Johnson, 1981; Johnson, Johnson & Stanne, 1986). On the other hand, the term *individualistic learning* as operationalized by Skon, Johnson & Johnson (1981) and Johnson, Johnson & Stanne (1986) refers to instructional strategies in which students work individually. Student teams may (Skon, Johnson & Johnson, 1981; Johnson, Johnson & Stanne, 1986) or may not (Johnson, Johnson & Scott, 1978) be formed. Students are instructed to work on their own, avoiding interaction with other students.

The competitive ethic dominated the Western culture over many years (Coelho, 1992). The theory of "natural selection" stated by Darwin as "The fittest will survive" is reflected to the scientific world. In fact, competition, which is the major motivator in the Western world, is often believed to be an innate characteristic of human nature, promoting excellence in business, politics, and education.

Kohn (1986), in a literature review, concludes that contrary to popular assumptions, competitive behavior is not innate, but learned, and does not promote excellence. It is reflected in the classroom situation where students will compete for a limited number of good grades and teacher approval, in a teacher dominated learning environment The teacher domination inhibits the communicative climate of classrooms (Coelho, 1992).

On the other hand, Flanders (1978) states that when students are given more opportunity to explain their ideas in the classroom, their attitudes toward the teacher, the curriculum, and their academic achievement will improve. Learners can find such an opportunity in a cooperative classroom environment. Indeed, cooperative learning classes are more relaxed and enjoyable than traditional classes, because there is a positive environment in the classroom (Roger, Olsen & Kagan, 1992).

Bassano and Christison (1988) identify some benefits of cooperative learning classroom related to classroom management: Cooperative learning orders the classroom environment and social tasks such as arranging the classroom or distributing materials; it is useful in selecting content and setting goals; it assists in monitoring progress and evaluative tasks.

The literature indicate that students are too passive and need to become more involved intellectually in classroom activities (Good et al., 1987). Apart from listening the teacher passively, what students actually need is to act on concepts themselves and to share their thinking with teachers and peers.

Small group cooperative instruction may be a possible solution for this. But there are misconceptions about the utility of the procedure. For instance, just increasing the amount of small group instruction does not necessarily lead to more meaningful experiences. If the teacher continues to use the same boring materials in a cooperative learning environment, nothing will change in schools. As Good and Biddle (1988) state, grouping is not a panacea but a useful instructional format, if implemented carefully, that could enable teachers to achieve certain goals such as taking different approaches to problem solving, articulating ideas about mathematics.

Research on cooperative learning

There are many studies done about cooperative within-class grouping in the USA. Those studies mainly concentrated on the cognitive and affective outcomes of learning investigated. (Slavin, 1983; Johnson, Maruyama, Johnson, Nelson & Skon,1987; Johnson & Johnson, 1989). But these studies were criticised as being limiting themselves to the input and output and showing less or no regard to the fact that how groups were effective (Bennett, 1990).

In spite of the positive results obtained by the American researchers, the UK studies of cooperative grouping did not give promising findings in the social context of classroom learning. Bennett (1990) mentioned the study of Galton, et al., (1980) which found low pupil involvement in groups, marked sex differences whereby boys tended not to talk to girls and vice versa. "children worked *in* groups not *as* groups" (ibid.). Less than 10% of all observations were of groups working cooperatively. The results of the later study of Bennett, et al (1984) indicated more positive results than the former. They found that three quarters of talk was task related. But it was not task enhancing and mostly about procedures. The majority of questions and responses was low-order. The frequency of incorrect responses was high.

Another example of the studies done in the UK focusing on the group processes involved in the functioning of the groups is Bennett and Cass, (1989) study. They investigated the effects of group composition on group interactive processes and pupil understanding. In their design, they set up three broad group types: homogeneous, heterogeneous, and mixed ability. They found that that heterogeneous groups performed poorly contrary to what was generally expected. Mixed groups, on the other hand worked very well. There were more pupil to pupil talks, more suggestions in the mixed ability groups than in heterogeneous ones (ibid.).

There are other studies which explored how pupil-to-pupil and pupil-to-teacher interactions influence the way groups function. Rowland (1984), for instance, illustrated the capacity of pupils to learn through interaction with each other activities not formally structured and the teacher involvement is minimal. He stated that the study showed the value of children's own attempts of making meaning (ibid.). Yeomans (1983), on the contrary, advocated that the group work should allow the children to contact with their teachers (In Biott, 1987). Biott (1987) stated that the selected leaders of the groups may sometimes be harmful for the other members of the group, and advocated to find ways in which group members share responsibility for maintaining and raising the quality of the work. He proposed that a self directed groups might be more beneficial for the children.

In a meta-analysis of 122 American studies, the effects of the three learning environments (cooperative, individualistic, and competitive) on achievement were investigated (Johnson, Maruyama, Johnson, Nelson & Skon, 1987). Cooperative strategies were superior to the competitive ones in 53% of the 122 studies, whereas the competitive ones were superior in only 5%. In the comparison of individualistic and cooperative environments, it was found that cooperative strategies were more effective in increasing achievement levels (106 of the 156 studies). Only in 6 studies individualistic strategies were found to be effective. Johnson & Johnson (1989) in a larger meta-analysis of 349 studies, reported that the mean effect size of cooperation over competition is 0.66, and over individualistic learning procedures it was 0.63. Slavin (1983) meta-analysed 46 studies which investigated the effects of cooperative strategies on academic achievement, and reported that 29 studies (63.04 %) favour cooperative, 2 (4.35 %) studies favour control strategies (either

competitive or individualistic), while the difference was non-significant in 15 studies (32.61 %).

Johnson, Johnson & Stanne (1985) compared the impacts of computer-assisted cooperative, competitive, and individualistic instruction on student achievement and attitudes. Results indicated that computer-assisted cooperative instruction promoted greater quantity and quality of daily achievement; more successful problem solving; and higher performance on factual recognition, application, and problem-solving test items.

Discourse and dialogue plays a vital role in promoting student understanding and awareness in mathematics (Lampert,1986). Therefore cooperative learning strategies can be very effective in mathematics learning (Quinn & Molloy, 1992). The reason is that Cooperative Learning brings two-way communication patterns to the classroom (Coelho, 1992). Furthermore, in cooperative situations communication among students are frequent, open, accurate and effective. Infrequent, closed, and inaccurate communication patterns dominate the competitive classroom (Johnson & Johnson, 1971).

Reid (1992) studied the effect of cooperative learning strategies on mathematics achievement of 7th graders using an ex-post facto design. Reid (1992) collected information based on school records indicating whether a student had participated in the cooperative learning strategies or had received individualized or competitive instruction. He found that, the means of cooperative learning groups were significantly higher than that of the other groups, and concluded that cooperative group learning strategies were more effective in promoting mathematics achievement, confirming the results of similar studies.

Cooperative instruction strategies are effective means that foster positive student attitudes (Wheeler & Ryan,1973; Johnson, Johnson & Scott, 1978; Gunderson & Johnson,1980; Sharan, 1980; Slavin & Karweit, 1981; Jacobs, 1988; Dalton, Hannafin & Hooper, 1989).

Johnson & Johnson (1987) reported a meta-analysis of 133 research studies of adults comparing the relative effectiveness of cooperative, competitive, and individualistic efforts. They conclude that cooperation is effective on both affective and cognitive components of learning and that cooperative strategies not only promote achievement, but are also helpful in developing positive interpersonal relationships, social support, and self-esteem.

Okebukola and Ogumniyi (1985) investigated the effects of cooperative, competitive, and individualistic student-student interactions on affective processes (objectivity, open-mindedness, curiosity, and others) and attitudes toward science. Results show that students with teachers trained in cooperative interaction patterns achieve higher affective scores.

The reason why cooperative learning causes gains in the level of achievement is attributed to the patterns of communications among its members. Indeed, in many studies consistent relationship was found between the student talk and achievement. By talking with one another, students rehearse the material, obtain feedback on their understanding, receive information they lack, and in describing and explaining it to others, restructure it. Therefore it is possible to understand that the communication involves learning.

Cooperative mastery learning

The "individualized instruction" movement started in early 60s with Skinner's programmed learning produced positive learning outcomes. It has often been criticised by being superficial and repetitive. In brief, there were good products (i.e. the achievement levels were raised) but, the process was largely ignored. (i.e. little gains in learning). In fact, what was forgot was the value of the social context in learning. Indeed, Personalized System of Instruction (PSI), and Mastery Learning has been very successful in producing achievement gains. But recently, there is a tendency to blend such programs with cooperative learning strategies. Cooperative Mastery Learning (CML) (Mavarech, 1985) was the outcome of that effort, in which the students study cooperatively in small heterogeneous groups, where mutual cooperation among the members of the group is stressed. Then they are individually tested to take feedback on the strengths and weaknesses on the task to be learned. Finally corrective activities are supplemented for the students to reach mastery.

According to Mavarech (1985) both Mastery Learning method and cooperative learning strategies have certain drawbacks and the deficiencies do not occur when they are used together. Mavarech (1991) stated four benefits of CML as:

- All team members are progressing at the same rate.
- The misconceptions are immediately corrected by the team members.
- It provides incentives that strengthen motivation and decrease anxiety.
- The corrective instruction in small groups for those who do not initially attain

Research on cooperative mastery learning

Aydin (1995) studied the effects of instructional methods (mastery learning and non-mastery) as well as learning environment organizations (cooperative, competitive, or individualistic) on both the achievement levels of students as well as on their attitudes toward mathematics. Findings of the study suggest that in terms of achievement levels, there is no significant difference between cooperative or competitive arrangements. Both types of peer interaction enable students to reach significantly higher levels of learning in comparison to conditions where peer interaction is not allowed (individualistic learning environment organizations. Under non-mastery conditions, on the other hand, cooperative arrangements led to significantly higher levels of learning in comparison to individualistic arrangements, the trend in achievement being again cooperative, competitive, and individualistic respectively. In terms of attitudes toward mathematics, a significant difference was found favoring the cooperative learning environment organizations in comparison to individualistic ones when students in the mastery learning and conventional classes are taken together.

Laney et al. (1996) examined concept learning and retention in 121 first and second graders who were randomly assigned to four instructional conditions: cooperative learning, mastery learning, cooperative-mastery learning, or control treatment in an undergraduate economy course. They report that cooperative-mastery method was superior to other methods in promoting learning and retention as their posttest and delayed posttest scores indicated.

The Krank and Moon (2001) study, also, attempted to combine mastery learning and cooperative learning instructional strategies to 104 undergraduate social science students enrolled in three sections of a required course. Their results also confirmed the effectiveness of cooperative mastery group in producing significant achievement gains and positive change

in self-concept compared to either mastery learning or cooperative learning alone.

Conclusion

Changes in the way students are grouped have the potential of changing the way they are taught in schools. However, studies done so far about between-class ability grouping prevents us from concluding that which of the approaches of grouping is really efficient. The reason for this is the methodological difficulties implicit in those studies (Harlen & Malcolm). There is something to please everyone. Hence, it can be forecasted that, the decisions concerning them are bound to be done on a more *non-scientific* basis for the near future.

Fortunately the results concerning within-class ability grouping yielded confirmatory findings. Especially cooperative grouping is the form of within-class ability grouping is one of the forms that found to be advantageous for pupils' learning. Having encouraged by this, many educators have suggested that the way to enhance instruction is by increased use of teaching to small groups. But it seems that that the increased use of group-work, alone, unlike resolve the problems pertinent in the classrooms. This may be because the important issue is not the method used, whether being mastery learning, computer based learning, discovery learning etc., but rather the quality of the planning and teaching. Therefore, as Good et al. (1992) put it systematic and large investments in research in this area could provide the data needed to build better theories and transforming our thinking for the forthcoming century.

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