A "MIDDLE ROAD" TO HOMOGENEOUS GROUPING: AN EXPERIMENT[1, 2]

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There have been many arguments concerning the merits of homogeneous grouping. Some of these arguments have focused upon the lack of flexibility of grouping procedures, the stigma inherent in being assigned to slower groups, and the frustrations felt by teachers who work primarily with the slower groups.

This study, which grew out of efforts at one school to give more attention to the individual needs of students in ninth grade algebra classes, does not pretend to be a complete solution to these problems. It does examine, however, a workable procedure whereby variations among students due to one factor, achievement level, can be reduced without some of the undesirable effects of rigid grouping. A periodic grouping according to achievement levels is involved, but the basis for the grouping provides a flexible scheme in which a periodic regrouping is possible: neither students nor teachers are permanently identified with a given group. Although the procedures described below were used in ninth grade algebra classes only, the same principle may work just as well for subjects other than mathematics and at other levels.

Procedure

A total of 328 students registered for ten classes of ninth grade algebra which were taught by two teachers, five sections each. The experimental group was composed of a total of 263 students in eight classes, four classes under each teacher. The eight experimental classes were paired so that two classes, one from each teacher, met at the same time. This arrangement made possible the mixing of two classes, one from each teacher, as described below. The possibility of mixing two classes during a given class-period was the basis for selecting the experimental group.

The control group consisted of 65 students in the two remaining sections. They were taught by the "usual" procedures, lecture-discussion, class questions, and assigned problems. The material covered included basic concepts and skills in algebra, and elementary algebra up to and including quadratics. The superior students who were able to go beyond the usual content were given additional enrichment material, including word problems, completing squares, simple trigonometry, and finding equations from graphs. In general, the control groups were taught as they had been

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before the experiment, with as much attention as possible given to the slow students who needed more practice with elementary material, and to the advanced students who progressed more rapidly than the class as a whole.

The experimental group was taught in the same manner as the control group until almost halfway through the year. Beginning in January, the students in each pair of classes (one class from each teacher) who had made satisfactory progress during the preceding five weeks of regular class sessions were combined to form a single enrichment class. These students were then given more advanced topics, similar to the enrichment material given the superior control subjects. The students from each original pair of classes who had not made satisfactory progress during the preceding five weeks of class sessions were combined to form a second class to review the material covered during the preceding five weeks. These new classes then met for one week, in some instances six days, and after that all the students returned to their original classes for the next five weeks. This alternation was carried on throughout the remainder of the year. Five such groups of special classes were formed between January and June. The two teachers alternated between the slow and advanced special classes.

Each control and experimental subject was administered the Cooperative School Abilities Test (SAT), Form 3A, in October, 1957, and the Cooperative Algebra Test (CAT), Form Z, in May 1958. The means and standard deviations on these tests are given in Table 1. No information was available concerning the comparability of the experimental and the control groups in algebra achievement at the beginning of the year. The SAT scores was 1.15. Regarding the latter, a value of 1.46 is required for significance at the .10 level for 218 and 55 degrees of freedom.

Table 1

Means and Standard Deviations of Scores on the SAT and CAT for the Control and Experimental Groups

	SAT (October, 1957)		CAT (May, 1958)	
	Mean	Standard Deviation	Mean	Standard Deviation
Control (N = 55)	66.76	22.13	50.03	7.53
Experimental (N = 218)	67.27	23.76	53.14	9.35
Total (N = 273)	67.17	23.44	52.51	9.22

Results

The advanced and slow students in the experimental group did not form distinct sub-groups since the basis for separation at the end of each five week period was each student's performance during the preceding five weeks. Although it rarely happened, a student could be in the slow group at one time and in the advanced group at another. Furthermore, all students were taught at some time by each of the two teachers. Hence, no estimate from these data is available concerning differences in effectiveness of individual teachers, nor the progress of the slow and advanced groups separately. The only meaningful comparison must be between all experimental subjects and all control subjects.

A t of 2.29 was obtained for the difference between the control and experimental group means on the CAT, representing statistical significance beyond the .05 level. The difference of 3.11 raw score points was in favor of the experimental group. The total number of subjects involved in this analysis was somewhat less than the total number enrolled in the classes. The only basis for excluding subjects, however, was incomplete test information, due principally to absences at the time the CAT was administered.

Discussion

The absence of an achievement score in algebra for each subject at the beginning of the school year prevents complete assurance that the two groups were originally equivalent in this respect. The similarity of the aptitude scores, however, permits some confidence in the comparability of the two groups at the beginning. Assuming, then, that the difference between mean algebra achievement scores was due to the experimental procedure, one factor that may account for the lack of a larger difference in favor of the experimental group is that the control group was taught well, with much attention given to individual students according to their rates of progress. Also, the total time which the experimental subjects spent in specially grouped classes was less than six weeks or a two semester course. During the remaining thirty or so weeks the experimental subjects were working under conditions similar to those of the controls.

Perhaps the principal advantage, other than the slightly higher achievement of the pupils, of this periodic grouping procedure is that the heterogeneity of the classes with respect to achievement levels is reduced in the special classes. This permits the teacher to review with all students or to go on to more advanced topics with all students, depending upon which special group she is teaching.

There are two other advantages of the experimental procedure as compared with the customary class organization: (a) The teachers reported greater satisfaction with the experimental procedure since they had more opportunity to teach advanced topics; and (b) the students appeared to like

the experimental procedure. No analyzible data were available on this latter point; rather, it is based upon the judgments of the teachers who talked with the students. The principal disadvantage of the periodic re-grouping procedure is that it may not be administratively convenient to offer algebra classes in pairs.

There are still many points to be clarified, and the following questions are suggested for further study: Could groups of three classes instead of two be used, permitting still more homogeneity for the special classes? What schedule should be adopted for the periodic re-grouping? The five to one ratio of time spent in regular classes to time in special classes may not be optimum. Are all teachers more effective with the regrouping procedure? Which students at what ability and achievement levels profit most? Is the degree of mastery of fundamentals better for all students, and especially for the slower ones? Do students really prefer such a procedure?