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# Pupil Achievement in a Nongraded Primary Plan After Three and Five Years of Instruction

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CONTEMPORARY American Education has been notable for its emphasis upon innovative instructional materials and experimental organizational plans. Regarding the latter, pupils have been grouped on the basis of intelligence, achievement, age, social maturity, or other common factors. A related development has been an intensified interest in nongraded schools. This study involved a comparison of one type of graded program with a type of nongraded primary plan, as measured by pupil achievement. Comparisons were made following the experimental period (grades one to three) and again at the end of the post-experimental period (grades four and five).

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The majority of schools in the nation are organized under a graded-type plan. Graded schools have been attacked mainly because the program is established first, and pupils are then expected to adjust to the program. Critics of graded schools contend that grade labels restrict teachers from teaching above and below their particular grade. Consequently, they recommend that these labels be removed and a nongraded organization be substituted.

The evaluative literature on true nongraded plans has been distorted because, among other things, many nongraded plans have tampered more with labels than with actual procedures. Hopkins (6: 207) and McLoughlin (8: 248) have decried the dearth of formal evaluation of nongraded plans. Anderson (1) has deplored the poor quality of nongraded evaluational studies.

Of the few formal evaluations available, the results are confusing. Carbone (3) found significant differences in achievement that favored the graded group over the nongraded one.

Halliwell (4) found inconsistent differences in favor of the nongraded plan with respect to arithmetic and spelling. Hillson (5) found significant differences in favor of nongrading for reading. Hopkins (6) found significant differences in reading favoring the graded method, but tests administered later yielded no differences. Conversely, Jones' (7) findings were completely opposite; the nongraded group was significantly higher in reading, but subsequent test findings were not significant. The evaluation issue is further confounded because many studies do not define the organizational differences between the schools (graded vs. nongraded) being compared and quite possibly have compared two plans that differed primarily in name only.

If properly implemented, nongrading requires more work for administrators and teachers and a greater expenditure of funds for materials, consultant services, and paraprofessional help. To justify these expenditures of time and money, some tangible benefits should be evidenced. Hence, the present study was conducted.

## Procedure

A suburban school in Montgomery County, Pennsylvania, was used. This school had converted from a graded plan to a nongraded primary plan. The control group ($N = 60$) progressed through the school under the graded plan. The experimental group ($N = 57$) progressed through the same school one year later under the nongraded primary (grades one to three) plan. The study would cover: (a) the experimental period involving grades one through three (Stage I); and (b) the post-experimental period involving grades four and five (Stage II). It must be noted that the nongraded aspect of the experimental group lasted only throughout the primary grades; this procedure is apparently the most common one in connection with nongraded plans (Shearron and Wait, 11).

The control group was assigned to classes on the basis of age in first grade. A modified-graded (three reading groups instead of only one) plan was used during Stage I. Instructional materials generally involved grade level and below-grade level reading books. The experimental group was randomly assigned during the first year (grade). A three-group reading plan was used, but grade levels were not used. During the second and third years, pupils were assigned to rapid, average, or below-average classes. Instructional procedures generally involved above-, at-, and below-grade level reading and arithmetic materials. Grade designations were removed from the report form used with the experimental group and a levels system was substituted; there were eight levels which encompassed the primary grades. Pupils were moved from group to group within the class or reassigned to another class (for part of the day or for a full day) as needed to ensure optimum instruction. These reassignments could be temporary or permanent depending upon the individual needs of the pupil.

In grades four and five, a similar procedure was used for both groups. Pupils were assigned to either a rapid, average, or below-average class during the reading and arithmetic periods. Teachers were not restricted

to grade level materials for these two subjects.

The assumptions tested in the study were: (a) the absence of grade barriers through nongrading at Stage I would improve achievement; (b) the initial experimental gains developed in the early school years would be maintained during the post-experimental school years (Stage II); and (c) girls, who are purportedly more academically inclined, would profit more than boys from the nongraded method.

## Results

Because the design of the study involved intact groups, it was necessary to adjust initial differences in learning potential (as measured by the Kuhlman Anderson Test, Form A, Sixth Edition, given in first grade) between the two groups. Therefore, the analysis of covariance was used with a two-way (methods by sex) factorial design, as suggested by Winer (12: 595-606). The original cell frequencies (27, 27, 30, 33) were not equal. Therefore, three cell means were inserted in the two 27-size cells and three cell scores were randomly removed from the 33-size cell to make all cells of size 30; the degrees of freedom were adjusted accordingly.

The basic assumption of analysis of covariance, linearity of regression of Y on X, was satisfied by the use of a scatter diagram for both stages of the study. The assumption of homogeneity of within-class regression coefficients was also satisfied in the same manner; all cells had similar slopes of linearity of regression of Y on X. The assumptions of normality and homogeneity of residual variance were not formally tested because the *F* tests of the analysis are robust and are not appreciably affected by nonsatisfaction of the two assumptions about residual variance (Norton, 10).

| Stage I | | | | | |
|---|---|---|---|---|---|
| Source | df | SS | MS | F | P |
| A (methods) | 1 | Ayy′ = 4.03 | 4.03 | 6.11 | .01<P<.025 |
| B (sex) | 1 | Byy′ = 0.59 | 0.59 | — | — |
| AxB | 1 | AByy′ = 0.42 | 0.42 | — | — |
| Error | 106 | Eyy′ = 69.76 | 0.66 | — | — |

Table 1. Analysis of Covariance Summary, Iowa Test of Basic Skills, Third Grade

| Stage II | | | | | |
|---|---|---|---|---|---|
| Source | df | SS | MS | F | P |
| A (methods) | 1 | Ayy′ = 32.47 | 32.47 | 19.68 | P<<.005 |
| B (sex) | 1 | Byy′ = 10.55 | 10.55 | 6.39 | .01<P<.025 |
| AxB | 1 | AByy′ = 12.36 | 12.36 | 7.49 | .005<P<.01 |
| Error | 106 | Eyy′ = 174.84 | 1.65 | — | — |

Table 2. Analysis of Covariance Summary, Stanford Achievement Test, Fifth Grade

In the Stage I analysis of covariance, the Iowa Tests of Basic Skills (Multi-Level Edition, Form I, 1955) were the criterion scores. The results are given in Table 1.

In the Stage II analysis of covariance, the Stanford Achievement Test (Intermediate II, Form Y, 1965) provided the criterion scores. The results are given in Table 2.

At each stage, boys and girls were also compared for one method at a time (the simple effects of sex), using regular *z* tests as recommended by Winer (12: 598).

## Discussion

The following conclusions were drawn at Stage I from the analysis of covariance and the *z* tests of simple effects. The nongraded method was significantly better than the graded method (.01<P<.025). There was no significant difference between the two sexes. The interaction between methods and sex was not significant. When analyzed by methods within sexes (the simple effects of methods), the nongraded method was significantly better than the graded method for both boys and girls (P1-tail<<.001, both sexes). Within the nongraded method, girls significantly excelled boys (P1-tail<<.001). Within the graded method, girls excelled boys but not significantly.

The following conclusions were drawn at Stage II from the analysis of covariance and the *z* tests of simple effects. The experimental group was significantly higher than the control group (P<<.005). Boys were significantly better than girls (.01<P<.025).

The interaction of methods by sex was significant ($.005<P<.01$). When analyzed by methods-within-sexes, the nongraded method was significantly better than the graded method for both boys and girls ($P<<.001$, both sexes). Within the nongraded method, boys were only slightly better than girls. Within the graded method, boys were significantly higher than girls ($P1\text{-tail}<<.001$).

The original test scores (not adjusted by analysis of covariance) revealed that both boys and girls in the graded group were slightly higher in intelligence. However, the achievement scores of both the graded boys and girls were lower at both stages of the study. An inspection of these findings appears to establish the superiority of the experimental (nongraded) method. The analysis of covariance findings substantiated these findings by establishing the levels of significance.

The sex findings are also of interest. An analysis by sex (unadjusted for IQ) indicates that the achievement of girls (both methods pooled) was considerably higher at Stage I and only slightly higher at Stage II. Therefore, disregarding IQ, girls outperformed boys. However, because the girls (in both groups) had higher IQ's than the boys, they normally should be expected to achieve at a higher level. Also, when adjusted statistically by analysis of covariance, there was no difference between sexes at Stage I but the boys caught up to the girls at Stage II. An examination of sexes-within-methods indicated that graded boys were slightly lower than graded girls in achievement at Stage I but significantly surpassed them at Stage II; the nongraded boys were significantly lower in achievement than nongraded girls at Stage I but no significant difference was found at Stage II. In both instances the learning rate of boys, as compared to girls, was accelerated during Stage II.

## Recommendations

The bulk of the literature on nongrading appears to be concerned primarily with meeting the needs of below-average pupils. However, both groups in this study had mean IQ's of approximately 115. In the investigators' opinion, graded schools are equally, if not more, ineffective in meeting the needs of above-average pupils. Therefore, it seems that more intensive studies involving nongrading are needed in school districts having pupils who are considerably above-average in IQ.

The findings of Bloom (2) and others suggest that the preschool and early school years are crucially important and, to a certain degree, predetermine future achievement in school. This study apparently substantiates this thesis inasmuch as the early experimental gains were maintained during the post-experimental period.

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