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In 1966, Powel Elementary School initiated an ungraded system to discover if this program would meet the needs of its students and community. In 1967-68, an evaluation of this ungraded program was made to determine if the reading and arithmetic performance levels of the students at Powel were higher than those of a matched graded school. An evaluation of pertinent school summaries and testing program results was conducted to identify a graded elementary school which would closely match the student population at Powel. Powel and the control school were matched on teacher-pupil ratio: EIP status: academic performance in school years 2, 4, and 6: and socioeconomic status. The results showed that the ungraded organization produced greater total school achievement. Within-year comparisons revealed that at year 6, students in the ungraded program achieved more than their counterparts in the graded school, while at year 4 the above average students in the ungraded program achieved less than the average students in the graded school. An ungraded program, therefore, might not be advantageous at all elementary school levels, but does appear to be suitable for students in the upper elementary years with above average abilities. (Author/HW)

AN EVALUATION OF THE UNGRADED PROGRAM AT THE POWEL ELEMENTARY SCHOOL

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SUMMARY

According to recent research reports, an ungraded school organization provides an environment in which the greatest achievement in reading and arithmetic may be realized. In 1966 the staff at the Powel Elementary School decided to organize around an ungraded system to discover if this program would meet the needs of its students and community. In the 1967-1968 school year, an evaluation of this ungraded program was made to determine if the reading and arithmetic performance levels of the students at Powel were higher than those of a matched graded school.

I. Procedure: A systematic search and evaluation of pertinent school summaries and testing program results was conducted to identify a graded elementary school which would closely match the student population at Powel.

Matching variables — Powel and the control school were matched on the following criteria: teacher-pupil ratio; EIP status; academic performance in school years two, four, and six; socio-economic status.

Problem — To determine which organizational environment causes elementary children to attain the highest level of achievement in reading and arithmetic.

Hypotheses to be tested — The students in the ungraded program will obtain higher reading and arithmetic scores on the Spring ITBS subtests than those in the control school.

The "above" average groups in the ungraded program will gain more in reading and arithmetic skills than any other group.

II. Results: The results showed that the ungraded organization produced the greater total school achievement. The within-year comparisons revealed: (1) at year six, students in the ungraded program achieved more than their counterparts in the graded school; (2) at year four, the "above" average students in the ungraded program achieved less than the average students in the graded school.

Observations
- The ungraded organization produced the greater gain in total school achievement.
- An ungraded program appears to be more suitable for students in the upper elementary years with above average abilities.
- An ungraded program might not be advantageous at all elementary school levels.

III. Implications: Although a conclusive statement cannot be made about the differential effects observed during this evaluation, some judgment can be made using insights from the intellectual development of children. Piaget and Bruner have indicated that there is a marked difference in the intellectual patterns between children at school years four and six. The preliminary results of this study seem to imply that not only are different instructional programs needed at these stages, but also organizational plans.

Additional studies are needed to determine whether teacher behavior patterns (direct/indirect) within an ungraded context affect the achievement of the children at different school year levels.

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AN EVALUATION OF THE UNGRADED PROGRAM AT THE POWEL ELEMENTARY SCHOOL

Until recently, only two kinds of groupings were used in the Public School System--heterogeneous and homogeneous. Over the past decade many ungraded or non-graded programs have been introduced. The objective of this grouping was to reduce the range of achievement within a class so that a teacher could come closer to the individual student. In effect, this class organizational structure was designed to achieve a more effective means for organizing and instructing students, especially those who needed either additional instructions or special remedial work. Therefore, the purpose of this evaluation is to determine whether an ungraded system can provide an educational environment that will enable all students to achieve at their maximum potential.

Systems of Grouping Robinson (1960) classified grouping into three categories: heterogeneous, homogeneous, and individual. Under a heterogeneous system, one groups according to a program and, thereby, accepts the probability of having a diverse group complement within a class. In contrast, homogeneous grouping was instituted as a technique for equating and placing students in a program such that the range of abilities within a given class would be at a minimum. A variety of measures was used to reduce the array of student capabilities to a common denominator. However, none of the proposed formulae proved to be any more practical or effective than the previous procedure, simply because students are not homogeneous with respect to a total-school program.

Individual An ungraded system, on the other hand, has the achievement levels of a student as a common base. The theory or philosophy of an ungraded system rests on the tenent that all students, regardless of age, should be placed into a program in accordance with their present

levels of achievement. Since one's achievement is not constant across all school subjects, a student could be in classes on different levels concurrently. This systematic placement provides a kind of individualized service for the student in that he would be working and participating in an environment that has been adjusted to his present educational level. Moreover, it is further hypothesized that a student will achieve at a rate commensurate with his abilities when his achievement levels are the bases for class placement.

A Possible Use for an Ungraded Program

An organization of this kind tends to best fit the elementary schools where the entering students are at differing levels of cognitive development. They could be: (1) deficient in certain pre-school experiences; (2) slow to develop the essential skills for future academic success; or (3) developing at different mental and physical rates. Since these and other diversities exist, a new student placement procedure is needed--one which has been specifically designed to cope with these conditions and, at the same time, provide for a maximum expression of a student's potential.

Bearley (1954) and Goodlad (1959), who advocated an ungraded plan for elementary schools, believe that it would more adequately meet the needs of children than the graded structure. Lewin (1966) listed these advantages for an ungraded program: (1) it enabled a child to move ahead as far and fast as his abilities could take him; (2) it removed the stigma of failure; (3) it liberated the children from predetermined norms; and (4) it allowed for individualized instructions. Bloom (1959) found his experimental group to be approximately one year ahead of his control group when he used an ungraded primary grouping according to reading achievement and learning over a three year period.

Williams (1966) reported no significant differences were noticed between the ungraded and graded achievement scores in reading and mathematics in her study. She attributed this finding to the fact that the ungraded classes had a larger teacher-pupil ratio than the graded. She concluded that the teacher-pupil ratio may be more important than the grade organizational plan and, therefore, recommended that more research be conducted using smaller class sizes. She also noted that there were some intrinsic benefits from the ungraded program -- such as constructive behavior change and self-image -- which could not be measured in statistical terms.

PROBLEM

The foregoing studies have indicated that the ungraded school program might overcome some of the learning difficulties students face when entering the educational community. It is proposed that an ungraded elementary school will:

- Increase the student's level of achievement in reading and arithmetic.
- Increase the student's interest in school by improving his chances to succeed in his school work.
- Raise the interest level of both parents and teachers in the educative process of the students.

However, the conclusions of Williams give evidence that additional studies are needed to answer the following questions: "What is the influence of the teacher-pupil variable on achievement in an ungraded system?" and "What are the effects of an ungraded program on total-school achievement?"

PROCEDURE

Powel Elementary School, District One, has an ungraded organization. The students in Powel are assigned to classes according to their Continuous

Progress Program (CPP) levels in reading and arithmetic. It will serve as the experimental treatment condition. In order to locate an elementary school which could serve as a suitable control, four criteria had to be met. The school had to have an EIP program, equivalent academic performance scores, identical teacher-pupil ratios (1:25), and a similar socio-economic level. After consulting the Monthly Report Summaries (Form E-15), Spring 1967 Testing Program Results (Office of Research and Evaluation), and the principal of the Powel School, Darrah Elementary School was selected. A profile of these schools appears below.

SCHOOL	District	School Totals	Teacher-Pupil Ratio	PMA	Th-IQ			APT
					Total	V	NV	
Powel	1	297	24	111.7	89.7	35.6	38.9	74.8
Darrah	2	391	26	101.0	86.6	34.4	34.7	61.2

Evaluative Rationale To determine whether the ungraded program could provide a differential effect between and within school year levels, the measured ability scores of the students in each school were studied. Measured ability scores may be used to make conservative predictions about how well a student could be expected to perform in an academic area. Three ability groups were formed at year four: Upper ability (IQ's greater than 103), average ability (IQ's between 93 and 102), low ability (IQ's less than 93). For year six the Verbal and Numerical scores of the Academic Promise Test (APT) were used to divide the classes into two groups: Verbal-lower half (less than 36), verbal-upper half (more than 35); Numerical-Lower half (less than 14), numerical-upper half (more than 13). In each case, it was predicated

that students in the higher ability groups would attain more knowledge during the school year.

Scores on the Reading (R) and Total Arithmetic (Total A) subtests of the Iowa Test of Basic Skills were selected to be the criterion measures--measures which indicate the level of a student's achievement. IQ levels are known to correlate with achievement; however, APT scores were studied to determine how reliable they were at predicting the ITBS' measures. It was found that the correlations between these tests' measures were good--Reading(Verbal) = .68; Total Arithmetic(Numerical) = .63--and could, therefore, be used.

Sample Selection

Because the number of students in each grade level was not the same at both schools, the size of the control sample was determined by the level of enrollment at Powel. However, each student in the control sample was randomly selected. For the evaluation, each student, control and experimental, was assigned to the designated groups according to his measured ability score. A summary of the within group distributions appears below. A Chi square statistic was used to determine if the distribu-

	Year Six		Year Four		
SCHOOLS	Lower half	Upper half	Low ability	Average ability	High ability
Powel	9	15	5	13	10
Darrah	16	9	14	8	6

tion of students were statistically equivalent. The results indicated that the samples from the schools could be compared for meaningful differences.

Statistical Design

To test the objective that the achievement in reading and arithmetic will be greater in the ungraded school than in the graded, a one factor nested analysis of variance was used. A nested

design was used to maintain the independence of each school. Accordingly, the effects of those inherent conditions within each school which could not, under normal circumstances, be controlled or evaluated became constant effects within each school- viz., inter-school policies, administrative procedures, general physical structure.

Hypotheses to be Tested — Although it was assumed that no measurable differences in achievement would occur, three hypotheses were postulated:

- The students in the ungraded program will obtain higher reading and arithmetic scores on the ITBS subtests than those in the graded program.
- The "above" average groups in the ungraded program will gain more in reading and arithmetic than any other control or experimental group.
- The results of the interviews will indicate that both the parents and teachers felt that the organizational change resulted in improved learning by the students.

RESULTS

The results of the nested analysis between building averages in reading and arithmetic indicate that the ungraded program is superior to the graded. An inspection of the listings in Table 1 will reveal that at each year level, the average grade equivalent score of the students at Powel is greater than that of the students at Darrah. It is the analysis of these differences which indicate that the total school achievement at Powel is significantly greater than that at Darrah. However, if one is interested in determining whether there is a significant difference between the two schools in achievement within the designated ability groups, an independent analysis must be conducted. This analysis involves a multiple comparison of the groups' achievement scores.

TABLE 1

A LISTING OF THE AVERAGE YEAR SCORES AND F-RATIOS BETWEEN THE EXPERIMENTAL AND CONTROL SCHOOL

		Year in School	Average Grade Equivalent Score	
			Powel	Darrah
Subjects	Reading N = 314 F = 34.4**	3	3.4	2.6
		4	3.2	2.8
		5	4.5	4.0
		6	6.2	4.3
	Arithmetic N = 314 F = 13.2**	3	3.2	2.9
		4	3.4	3.3
		5	4.6	4.2
		6	5.6	4.7

**p<.01

TABLE 2

YEAR SIX GROUP AVERAGE ACHIEVEMENT SCORES IN READING AND ARITHMETIC

School's Organization	Group	Averages[a]	
		Reading	Arithmetic
Ungraded	Lower ability	4.9	5.0
Ungraded	Upper ability	7.0	6.1
Graded	Lower ability	3.9	4.7
Graded	Upper ability	5.0	4.8

[a]Grade equivalent scores, ITBS (Spring) 1968

Year six

The group average scores for year six are presented in Table 2. This table shows that the students in the Upper Ability group in the ungraded school achieved the highest scores in reading and arithmetic. To obtain additional information about this group, comparisons were made to determine if this group's attainments were significantly greater than the others. The results of this analysis show that the achievement made by the Upper Ability group in the ungraded school was superior to all others. A list of all significant comparisons is presented in Table 3; however, summaries of the statistical analyses appear in Appendix Tables C and D.

TABLE 3

A LIST OF THE SIGNIFICANT DIFFERENCES AMONG THE GROUP AVERAGE SCORES IN READING AND ARITHMETIC FOR YEAR SIX

SUBJECTS	COMPARISON:	DIFFERENCES In Grade Equivalents
Reading	Upper ability (Ungraded) with Lower ability (Graded)	3.1
	Upper ability (Ungraded with Upper ability (Graded	2.0
Arithmetic	Upper ability (Ungraded) with Lower ability (Graded)	1.3
	Upper ability (Ungraded) with Upper ability (Graded)	1.1

Year four

The group average scores for year four are presented in Table 4. This table shows that the students in the High Ability group in the graded school achieved the highest scores in reading and arithmetic. Although it

was assumed that the High Ability group in the ungraded school would achieve more than all other groups, the results of the analyses did not support this assumption. The list of comparisons among the groups shows that the grade equivalent scores attained by the High Ability group in the graded school were significantly greater than the others (See Appendix Tables A and B). Table 5 presents a listing of all the comparisons between the graded and ungraded groups which were significant. This table reveals that in reading the High Ability group in the graded school did significantly better than the Average Ability students in the ungraded. The difference between their reading scores was 1.3 grade levels. A similar presentation is made for each comparison appearing in the table.

In summary, the fourth year students in the graded school obtained higher achievement levels in reading and arithmetic than those of equal ability in the ungraded school.

TABLE 4

YEAR FOUR GROUP AVERAGE ACHIEVEMENT SCORES
IN READING AND ARITHMETIC

School's Organization	Group	Averages[a]	
		Reading	Arithmetic
Ungraded	High ability	3.2	3.7
Ungraded	Average ability	2.9	3.3
Ungraded	Low ability	2.7	3.0
Graded	High ability	4.2	4.6
Graded	Average ability	3.5	4.2
Graded	Low ability	2.6	3.4

[a]Grade equivalent scores, ITBS (Spring) 1968

TABLE 5

A LIST OF THE SIGNIFICANT DIFFERENCES AMONG THE GROUP AVERAGE SCORES IN READING AND ARITHMETIC FOR YEAR FOUR

SUBJECTS	COMPARISONS	DIFFERENCES In Grade Differences
Reading	High ability (Graded) with Average ability (Ungraded)	1.3
	High ability (Graded) with Below Average ability (Ungraded)	1.5
Arithmetic	High ability (Graded) with High ability (Ungraded)	0.9
	High ability (Graded) with Average ability (Ungraded)	1.3
	High ability (Graded) with Low ability (Ungraded)	1.6
	Average ability (Graded) with Average ability (Ungraded)	0.9
	Average ability (Graded) with Low ability (Ungraded)	1.2

The teachers and students at Powel enjoyed the ungraded experience. The teachers indicated that they believed that they could provide more educational opportunities under this program.

The parental questionnaires were not returned in sufficient quantity to reflect their feelings about the program adequately. However, indications from those returned were favorable.

DISCUSSION

One of the objectives of this evaluation was to ascertain whether students of higher ability achieve more in an ungraded program. For this

reason, comparisons were made among the ability groups to determine which group performed best. In most evaluations of an ungraded program, this refinement has not been considered--only "in toto" results were reported.

From the "in toto" findings of this evaluation, an ungraded school organization provides the more successful instructional program for teaching reading and arithmetic at the elementary school level. However, this conclusion was not upheld when group comparisons were made at year four. The students of average and above average ability in the graded program achieved more. Although one cannot generalize this finding to all elementary schools or give the "real" reason(s) for this reversal, a plausible solution could be explained in terms of the relationship between cognitive development and the learning environment. According to Piaget's theory of cognitive development, a sharp distriction exists between students in school years four and six. In year four, a student is in the "concrete operations" stage and thinks in concrete terms. During this stage, a structured program which would give him an opportunity to develop the skills necessary for abstract reasoning appears to be preferable. Bruner (1960) reported that students at this stage cannot go systematically beyong the information given them. He also stated that they do not command the operations for conjuring up the full range of alternative possibilities that could exist at a given time. Therefore, it appears that a "direct" teacher or program would be better for these students.

At year six, students are entering the "formal operations" stage. Bruner summarized this stage as a time in which a child operates on hypothetical propositions rather than being constrained to what he has experienced. The child can now think of possible variables and deduce potential relationships that can be later verified. His intellectual operations now

appear to be predicated upon logical operations. With this intellectual framework, it is quite possible that an ungraded program would be most beneficial.

Although the results of the statistical analyses confirmed that the total achievement in reading and arithmetic in the ungraded school was superior, the within-year data suggested two important outcomes:

- An ungraded program appears to be more suitable for students in the upper elementary years who have above average abilities.
- An ungraded program might not be advantageous at every level.

IMPLICATIONS

Although this study has provided some insight into the behavioral effects of an ungraded program on school year and ability levels, some important variables--among them, teacher influence--were not included. To determine the behavioral effects of this factor (variable), additional studies should be conducted to answer these questions:

- Are there specific school levels at which an ungraded program is most effective?
- Which teaching pattern (direct/indirect) is more effective at each level of an ungraded program?
- What effect does the cognitive development level, as defined by Piaget and/or Bruner, have on achievement under an ungraded program?

It is postulated that a two factor hierarchial design could be used to obtain additional information about the effects of teacher attitudes, preparation, and methodology on an ungraded program.

This information, combined with the wealth of research on student achievement under a graded system, could provide an administrator with many of the facts he would seek to decide which program is best suited for his school.

APPENDIX

List of Tables

TABLE A

ANALYSES OF THE DIFFERENCES BETWEEN GROUP AVERAGE READING SCORES FOR YEAR FOUR[a]

Ordered pairs	Differences (1)	(2)	(3)	(4)	(5)	(6)
(1) Group III, Graded	---	1.5	3.7	6.0	9.1	16.8
(2) Group III, Ungraded		---	2.2	4.5	7.6	15.3
(3) Group II, Ungraded			---	2.3	5.4	13.1
(4) Group I, Ungraded				---	3.1	10.8
(5) Group II, Graded					---	7.7
(6) Group I, Graded						---
Critical values[b]:		8.59	10.0	11.3	12.0	12.6
Tests on all ordered pairs (1)	---	---	---	---	---	*
(2)		---	---	---	---	*
(3)			---	---	---	*
(4)				---	---	---
(5)						---

[a]Newman-Keuls procedure (Winer, p. 77).

[b]$\tilde{n}_h = 6.76$, $q_{.95}(r,92)$, $MS_{w.cell} = 63$.

TABLE B

ANALYSES OF THE DIFFERENCES BETWEEN GROUP AVERAGE ARITHMETIC SCORES FOR YEAR FOUR[a]

Ordered pairs	Differences (1)	(2)	(3)	(4)	(5)	(6)
(1) Group III, Ungraded	---	2.8	3.5	7.0	11.9	15.5
(2) Group II, Ungraded		---	0.7	4.2	9.1	12.7
(3) Group III, Graded			---	3.5	8.4	12.0
(4) Group I, Ungraded				---	4.9	8.5
(5) Group II, Graded					---	3.6
(6) Group I, Graded						---
Critical values[b]:		3.86	5.84	6.41	6.83	7.15
Tests on all ordered pairs (1)		---	---	*	*	*
(2)			---	---	*	*
(3)				---	*	*
(4)					---	*
(5)						---

[a]Newman-Keuls procedure (Winer, p. 77).

[b]$\bar{n}_h = 6.6$, $q_{.95}(r,92)$, $MS_{w.cell} = 19.8$.

TABLE C

ANALYSES OF THE DIFFERENCES BETWEEN GROUP AVERAGE READING SCORES FOR YEAR SIX[a]

Ordered pairs		Differences (1)	(2)	(3)	(4)
(1) Group I, Graded		---	9.6	11.3	31.3
(2) Group I, Ungraded			---	1.7	21.7
(3) Group II, Graded				---	20.0
(4) Group II, Ungraded					----
Critical values[b]:			11.4	13.8	15.2
Tests on all ordered pairs	(1)		----	----	*
	(2)			----	*
	(3)				*

[a]Newman-Keuls procedure (Winer, p. 77).

[b]$\bar{n}_h = 10.4$, $q_{.95}(r,44)$, $MS_{w.cell} = 167$.

TABLE D

ANALYSES OF THE DIFFERENCES BETWEEN GROUP AVERAGE ARITHMETIC SCORES FOR YEAR SIX[a]

Ordered pairs		Differences (1)	(2)	(3)	(4)
(1) Group I, Graded		---	1.90	2.98	13.9
(2) Group II, Graded			---	1.58	12.5
(3) Group I, Ungraded				---	10.9
(4) Group II, Ungraded					---
Critical values[b]:			2.75	3.31	3.65
Tests on all ordered pairs	(1)		---	---	*
	(2)			---	*
	(3)				*

[a]Newman-Keuls procedure (Winer, p. 77).

[b]$\tilde{n}_h = 11.5$, $q_{.95}(r,75)$, $MS_{w.cell} = 71.4$.

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