

RELATIONSHIPS BETWEEN TIME SPENT TEACHING, CLASSROOM ORGANIZATION, AND READING ACHIEVEMENT

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Recent research has focussed considerable attention upon the relationship between scholastic achievement and two kinds of 'manipulable' variables, variety of teaching style and amount of time devoted to scholastic instruction. In this study, variance in English reading scores and in Irish reading scores (after the effect of verbal ability had been removed from these scores and from other potential predictor variables) was related to a set of measures of teaching style (whole/group/individual work; teacher/pupil direction) and to a measure of time spent per week in English and Irish teaching. Verbal ability accounted for by far the greatest amount of variation in reading performance in both languages. No significant additional contribution to explaining English reading performance was made by time spent teaching English, but a significant contribution to the explanation of Irish reading performance was made, in a positive direction, by time spent teaching Irish. Only very small contributions were made by any of the teaching-style variables.

The research on correlates of scholastic achievement has been fairly consistent in identifying the personal and background characteristics of students on entry to a course as being of prime importance (3). However, such characteristics are for the most part outside the control of the teacher who is likely to be more concerned with the conditions which can be created in the classroom to enhance student learning. The study reported in this paper is concerned with two such conditions which are within the teacher's control — the organization of pupils for learning and the amount of time allocated to particular activities — and the possible relationship between these conditions and the achievements of pupils.

The organization of pupils for learning has in some cases been considered an aspect of 'teaching style', a rather vague term which, as the investigator feels inclined, may be used to categorize a variety of phenomena, ranging from ideological positions about educational issues to actual teacher behaviours. In Bennett's (1) study, the percentage of time spent by the

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teacher in individualized and group work and in teacher directed and pupil directed work was used as a variable to determine overall teaching style. Among Bennett's teachers, more time was spent on teacher directed than on pupil directed activities. The greatest amount of time (37%) was spent by pupils working individually on tasks of the teacher's choice, a further 21% was also spent on teacher tasks – this time by pupils working in groups. Teachers spent 19% of their time talking to the whole class. The remainder of the time was spent on tasks of the pupils' own choice – 13% working individually and 10% working in groups. Overall, pupils' time was divided evenly between individual work and group or class activities. Bennett related pupils' achievements to the overall 'style' of the teacher but not to the particular organizational variables which are the concern of this paper.

In a more recent and somewhat similar study, Galton & Simon (7) reported that group and class work activities, a variable they found to be closely related to 'teaching style', bore a slight relationship to achievement in language, reading, and mathematics.

Time spent in teaching and learning would seem to be an obvious determinant of achievement. It has, however, received relatively little attention, perhaps because an early classical study in educational research, carried out by Joseph Rice (7) at the turn of the century, found no relationship between the number of minutes per week devoted to spelling drills and students' actual achievement in spelling. What holds for spelling drills of course may not hold for other teaching procedures. A more recent study, based on *Equality of educational opportunity* (5) data, using a grosser measure of time (the length of time a school is in session), seemed to support the view that time is not an important predictor of achievement (9). However, Wiley (18) reconceptualized and reanalyzed data from the *Equality of Educational Opportunity* study and did find positive relationships between 'quantity of schooling' (defined as average daily attendance, number of hours in the school day, and number of days in the school year) and measures of reading comprehension, verbal ability, and mathematics achievement. In the International Evaluation of Educational Achievement (IEA) studies also, time (defined as years of instruction in a subject, hours per week spent on a subject, and number of hours homework in a subject) was found to be related to achievement in the relevant subjects (2).

Wiley's position, supported by some empirical evidence, that time spent in teaching and learning should be an important determinant of achievement is one that is shared by investigators such as Carroll and Bloom.

Indeed, Carroll's (4) model of school learning, later popularized and developed by Bloom (3), places a very high premium on time spent in the learning process; according to the model, aptitude may be defined as the time required by a learner to attain mastery of a learning task. While Carroll and Bloom focus on smaller units of learning than ones based on an entire course or curriculum, their argument should also apply to grosser areas of achievement, such as general reading and mathematical attainments.

Even if the empirical evidence regarding the role of time in affecting achievement is not very strong, the intuitive arguments regarding the importance of time suggest that the matter is worthy of further empirical investigation. In such investigation more refined subject-specific measures of time than those used in the Coleman study should be found to be more effective predictors of achievement.

There is one Irish study in which the relationships between the numbers of hours spent teaching Irish and English and reading achievement in the two languages were examined (16). No relationship was found for Irish at either standard 3 or 5, while the relationship for English was found to be statistically significant, but only for standard 5 pupils. Further, the relationship was negative. Thus variation between teachers in the time they spent teaching Irish did not affect pupils' Irish reading achievement in either standard 3 or 5 nor did the amount of time spent teaching English affect English reading at standard 3. In the case of standard 5 English, however, there was a tendency for the pupils of teachers who spent more time teaching English to have lower reading achievement scores than the pupils of teachers who spent less time.

In the present study, reading achievements in Irish and English are again the criterion variables and these are related for sixth standard pupils to information obtained from teachers on the amount of time they spent teaching English, reading, and Irish reading, as well as the proportion of time they organized their classes in terms of class/group/individual activities and teacher-initiated and pupil-initiated activities. A measure of the verbal reasoning ability of the pupils was also obtained. Relationships between these predictor variables and the criterion variables are explored through the use of regression analysis. Because of the evidence indicating that pupil entry characteristics are important correlates of achievement and since in the Irish study (16) it seemed possible that the negative relationship between time spent teaching English and pupil achievement in English reading was the result of teachers spending more time teaching weaker pupils, we decided in our study to control for pupil ability by entering the verbal reasoning scores first in the regression analyses.

METHOD

Instruments

Teacher questionnaire Two questions from a questionnaire administered to teachers were used in the present analyses. In one of them, the teacher was asked to estimate as accurately as possible the number of hours (to the nearest half hour) in a typical week of 25 hours that he or she spent teaching English, teaching reading, and teaching Irish reading. In the other question, the teacher was asked to indicate the percentage of class time in a typical school day spent at each of the following: (a) teacher teaching the class as a whole, (b) pupils working together in groups on work prescribed by the teacher, (c) pupils working together in groups on work of their own choice, (d) pupils working individually and at their own pace on work prescribed by the teacher, and (e) pupils working individually at their own pace on work of their own choice. Teachers were told that the five percentages should total to 100% of the class time in a day.

Measures of student ability and achievement Two tests of achievement were employed: the Drumcondra English Test, Level III, Form A, and the Drumcondra Irish Test, Level III, Form A (6). A total English reading score was calculated as the sum of the English reading vocabulary and reading comprehension subtests, the total Irish reading score was the sum of the Irish reading vocabulary and reading comprehension subtests. The ability test administered was the Drumcondra Verbal Reasoning Test (8). Raw scores for all three tests were used in the analyses.

Sample

The sample was selected from a larger sample of primary schools participating in a longitudinal study (12). The schools in the parent sample were stratified by location (city, town) and gender composition (boys, girls). It was planned to select 20 schools from each of four strata. However, the numbers available in the strata were less than this in three of the strata. The precise numbers available were 20 city boys' schools, 18 city girls' schools, 19 town boys' schools, and 17 town girls' schools. Because it was decided to restrict the study to schools in which there was at least one class which contained only sixth standard children, it was necessary to eliminate one city girls' school and two city boys' schools. In the remaining 71 schools, both tests and questionnaires were returned by all of sixth standard classes in 44 schools and by some but not all teachers in 13 schools. Altogether, completed tests and questionnaires were received from 100 teachers.

Procedure

In the middle of the 1976-77 school year, the teaching-styles questionnaire was administered to each teacher of a sixth-standard-only class in the participating schools by a field worker.

The achievement and ability tests were administered to pupils by their own teachers toward the end of the same school year. The mean scores for the class were assigned to each teacher as class English reading and Irish reading scores.

Analysis

Multiple regression analyses were performed with total English reading score and total Irish reading score in turn as the dependent variables. In each analysis, the independent variables were entered in a predetermined order. The first variable entered in each case was the ability test score. The second set of variables entered was the time spent teaching the subject in question. In the case of Irish reading, this was a single measure. In the case of English there were two measures – time spent teaching English and time spent teaching reading; a stepwise inclusion technique was used to determine which of the two should enter the prediction equation first. The third set of variables to be added to the regression analyses was the set of percentages of class time spent in the five modes of class work. In both analyses the stepwise inclusion method determined the order of entry of the class work modes.

RESULTS

The means and standard deviations of each of the variables used in the multiple regression analyses are presented in Table 1. It can be seen from these that there was much greater variation in the Irish reading scores (maximum possible score = 72) than in the English reading scores (maximum possible score = 80).

The average time per week spent in teaching Irish reading was about 5½ hours, while the average time spent teaching English and reading, together, was just over 5 hours. The range of hours recorded for Irish reading was from 2 to 9; for English, from 0 to 6½; and for reading (English) from 0 to 5.

The distributions of the proportion of time spent in group and individual class-work approaches, whether teacher prescribed or self-chosen, are severely skewed. In fact, the number of teachers who reported they spent no time using such modes were 19 for group work (teacher-prescribed), 51 for group work (pupil-chosen), 11 for individual work (teacher-prescribed), and 47 for individual work (pupil-chosen).

TABLE 1
MEANS AND STANDARD DEVIATIONS OF VARIABLES
IN MULTIPLE REGRESSION ANALYSES
(N = 100)

Variable	M	SD
English reading	66.26	6.04
Irish reading	47.29	9.92
Ability	79.12	8.87
Hours teaching Irish reading	5.48	1.18
Hours teaching English	3.08	1.19
Hours teaching reading	2.06	.80
Whole class mode %	60.05	16.80
Group mode (teacher prescribed) %	13.58	10.58
Group mode (pupil chosen) %	3.79	4.50
Individual mode (teacher prescribed) %	18.39	12.52
Individual mode (pupil-chosen) %	4.19	5.68

The zero order correlations between each criterion variable and its predictors are set out in Tables 2 and 3. Scores on the Drumcondra Verbal Reasoning Test are much more highly correlated with English reading ($r = .85$) than with Irish reading ($r = .66$). The amount of time spent teaching Irish reading is positively correlated with Irish reading scores ($r = .25$), while the amount of time spent teaching English reading

TABLE 2
SIMPLE CORRELATIONS BETWEEN IRISH READING SCORES
AND MEASURES OF INDEPENDENT VARIABLES

Variable	1	2	3	4	5	6	7
1 Irish reading score							
2 Verbal reasoning score	.66***						
3 Hours teaching Irish reading	.25**	.09					
4 Whole class mode	.13	-.13					
5 Group mode (teacher prescribed)	-.24**	-.04	-.08	-.49***			
6 Group mode (pupil-chosen)	.02	.07	-.16	-.37***	.15		
7 Individual mode (teacher prescribed)	.07	.14	-.15	-.56***	-.30**	-.07	
8 Individual mode (pupil-chosen)	-.13	.09	-.07	-.51***	.12	.17	.07

*** $p < .001$ ** $p < .01$ * $p < .05$

TABLE 3

SIMPLE CORRELATIONS BETWEEN ENGLISH READING SCORES
AND MEASURES OF INDEPENDENT VARIABLES

Variables	1	2	3	4	5	6	7	8
1 English reading score								
2 Verbal reasoning score	.85***							
3 Hours teaching English	-.08	-.03						
4 Hours teaching reading	-.23*	-.23*	-.31*					
5 Whole class mode	-.00	-.13	-.11	.11				
6 Group mode (teacher-prescribed)	-.14	-.04	.24*	-.07	-.49***			
7 Group mode (pupil-chosen)	.12	.07	-.00	-.37***	.15			
8 Individual mode (teacher-prescribed)	.10	.14	-.11	-.07	-.56***	-.07		
9 Individual mode (pupil-chosen)	-.04	.09	.07	-.04	-.51***	.12	.17	.07

*** $p < .001$ ** $p < .01$ * $p < .05$

is negatively correlated with English reading scores (-.23); the number of hours spent teaching English is not significantly correlated with English reading test scores. The proportion of time spent in whole-class teaching is positively related to Irish reading performance but not significantly related to English reading performance.

A multiple regression analysis, utilizing a hierarchical inclusion procedure combined with step-wise inclusion where appropriate, was used to assess the successive effects of the different types of variables on the explanation, separately, of Irish reading performance and of English reading performance. The summary tables of the regression analyses are presented in Tables 4 and 5. The multiple R , R^2 , and size of the change in R^2 are given for each cluster of variables in the order in which the three clusters were entered — ability, time teaching, and modes of teaching.

TABLE 4
 MULTIPLE REGRESSION OF IRISH READING SCORES ON
 STUDENTS VERBAL ABILITY AND TEACHING VARIABLES
 SUMMARY TABLE

Variable	Beta	Multiple R	R ²	R ² change	F	df	P
Verbal reasoning score	654	662	439	439	89.68	1.92	0.01
Time teaching Irish	165	688	474	035	7.25	1.92	0.1
Modes of teaching		735	540	066	13.42	4.92	0.01
(a) Group work (teacher prescribed)	-196	(.715)	(.512)	(.038)	(7.75)	(1.92)	(<.01)
(b) Individual work (pupil chosen)	-160	(.732)	(.535)	(.023)	(4.79)	(1.92)	(<.05)

TABLE 5
 MULTIPLE REGRESSION OF ENGLISH READING SCORES ON
 STUDENTS VERBAL ABILITY AND TEACHING VARIABLES
 SUMMARY TABLE

Variable	Beta	Multiple R	R ²	R ² change	F	df	P
Verbal reasoning score	883	845	715	715	273.76	1.92	0.01
Time teaching English and reading		849	721	006	2.31	2.92	N.S.
Modes of teaching		867	751	030	11.63	4.92	0.01
Individual work (pupil chosen)	-11	(.856)	(.733)	(.012)	(4.60)	(1.92)	(<.05)

When the F-value for a cluster is significant, statistics are also presented, in brackets for any variables within that cluster which contributed significantly toward the overall R^2 -value.

In predicting Irish reading performance, the first variable entered, the verbal reasoning test scores, explained 43.7% of variance, which is significant beyond the .001 level and indicates that Irish reading achievement is a function of a pupil's verbal ability. When hours spent teaching Irish were entered, the value of R^2 rose to 47.4%; this rise of 3.5% was significant beyond the .01 level. The cluster of modes of teaching, which was entered third in the analysis, brought the R^2 to 54%, the increase of 6.6% being significant beyond the .001 level. Since this cluster made a significant contribution to the explanation of Irish reading performance the contributions of each mode were assessed separately. Two were found to be significant: amount of group work (teacher-assigned), which added 3.8% to the value of R^2 and was significant at the .01 level, and amount of individual work (pupil-chosen) which added 2.3% to the value of R^2 and was significant at the .05 level. Each of these measures had a negative *beta weight*, indicating that high Irish reading performance as well as being a function of verbal ability and of high amounts of time spent in the teaching of Irish is also a function of low degrees of use of teacher-prescribed group work and pupil-chosen individual work.

In the analysis of English reading scores, the verbal reasoning score explained 71.5% of variance, which is significant beyond the .001 level. The cluster including hours spent teaching English and hours spent teaching reading did not make a significant contribution to explaining any further variance over and above that explained by verbal reasoning. When verbal reasoning scores are given precedence in the regression analysis, they use up the explanatory power which they share with hours spent teaching reading (which had correlated $-.23$ with verbal reasoning ability). The addition of the modes of teaching to the analysis resulted in the explanation of an additional 3% of variance, bringing the total explained variance to 75.1 percent. The addition was statistically significant beyond the .001 level; therefore, the contributions of the modes were examined separately. Only one was found to make a significant unique contribution ($p < .05$); that was the individual work (pupil-chosen) mode with a contribution of 1.2 percent. Thus, high English reading performance was found to be a function of high verbal reasoning ability and a small amount of time spent in individual pupil-chosen class work.

DISCUSSION

Information from teachers in this study relating to their organization of pupils for learning within the classroom indicates that teachers spent, on average, 60% of their total time teaching the class as a unit. On average, almost 23% of time was spent on individual work and just over 17% of time on group work. By contrast, English teachers in Bennett's (1) study spent only 19% of their time in class teaching, 50% on individual work, and 31% on group work. Thus, Irish teachers, compared to English ones, spend more time with the class as a whole and less time on individual work with pupils.

Given these figures, it is not surprising that Irish pupils also spend less time on tasks of their own choice than English pupils. In our survey, the ratio of teacher chosen to pupil chosen work for group and individual work was 4 to 1. In England also, the bias of Bennett's (1) teachers was towards teacher-chosen work, but not to the same extent (2.1 for group work and 3.1 for individual work).

Overall, our findings indicate that if one accepts Bennett's (1) typology, Irish teachers tend to be more 'traditional' than 'progressive' in their classroom organization. Further, there is some evidence that the system of organization adopted by teachers is related to students' achievements in Irish and English reading.

In the zero order correlation matrix, the strongest correlate of both English reading and Irish reading was the pupils' verbal reasoning score, a finding that adds to the considerable evidence already available that personal characteristics of students are major correlates of achievement. Only one other predictor variable — time spent teaching reading — correlated significantly with English reading scores. And the relationship between time and achievement was negative as in the earlier Irish study (16). Only one other variable, apart from verbal reasoning scores, correlated significantly with Irish reading scores also. The variable was teacher prescribed group teaching and its relationship to reading was negative.

There is evidence in the zero order correlations, as one would expect from the nature of the variables, that relationships exist among the classroom organization variables. The regression analyses take these relationships into account and so may change somewhat the picture that emerged from the simple correlational matrix. In considering the regression analyses, we should bear in mind that verbal reasoning scores

were entered first. This variable predicted 71.5% of variance in English reading scores and 43.9% of variance in Irish reading scores.

After the contribution of verbal reasoning has been taken into account, the relationship between time spent teaching English and English reading scores found in the zero-order correlations is no longer significant. We may conclude, on the basis of the negative value of the zero-order correlation between ability and time spent teaching reading, that this is because teachers spend more time teaching reading to weaker pupils. Classroom organization also contributed significantly to the prediction of English reading scores in the regression analysis, but not very much. The only organizational mode that contributed significantly was pupil-chosen individual work (1.2% of variance was explained by this variable). The contribution was negative.

The picture that emerges from the Irish reading regression analyses shows similarities to the English reading analyses but there are some differences. As one would expect from the zero-order correlations, the most important predictor of reading achievement in both languages was pupils' verbal reasoning scores. The contribution of this variable, however, as we have already seen, was considerably less for Irish than for English. Indeed, overall, our variables were less successful in predicting Irish reading (54% of variance was accounted for) than in predicting English reading (74% of variance being accounted for). Despite this, classroom variables contributed more to the prediction of Irish reading (about 10% of variance) than to the prediction of English reading (less than 4%).

While in the English regression analysis, of the classroom variables, only the amount of pupil-chosen individual work was a significant predictor, in the Irish analysis, three variables contributed significantly to prediction – time spent teaching Irish (3.5% of variance was attributable to this) and two modes of classroom organization – teacher-prescribed group work (3.8% of variance was associated with this variable) and pupil-chosen individual work (2.3% of variance was attributable to this). The relationship between time spent reading and pupils' Irish reading scores was positive. Thus, after controlling for the verbal-ability level of pupils, the more time teachers spent teaching Irish reading, the higher the level of their pupils' Irish reading scores. Higher Irish reading achievement was also associated with a relatively low proportion of time spent on teacher-prescribed group work and a high proportion of time spent on individual pupil-chosen work. These relationships, though not very strong, suggest that more traditional methods of classroom management are associated with higher levels of achievement in Irish.

Our findings that performance in Irish is more closely related to classroom variables than is performance in English is not surprising if one considers that Irish is more restricted to the school than is English. This finding is supported in other studies (13, 14, 15, 16). In the present study, we did not consider the role of home factors, though their contribution to verbal reasoning ability and achievement has been well documented (10, 11). There can be little doubt that their influence sets limits to the amount the school can do to affect achievement. But our findings indicate that such achievement is also to some extent within the control of teachers. The fact that we were able to demonstrate relationships between relatively crude variables, such as time spent teaching a subject, and achievement suggests that an examination of more sensitive variables that take into account such aspects of teaching as presentation, explanation, and ordering of the elements of a task (all of which, for example, may vary between teachers who devote the same amount of time to a subject) may point the way towards other factors which affect student achievement and which are within the teacher's control.

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THE NATURE AND STUDY OF EDUCATION

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The purpose of this paper is to suggest a structure of graduate studies in education in light of an analysis of several meanings of the term education. The first section of the paper is addressed to a description of three meanings of education, which is a basis for a prescribed meaning of the term directly pertinent to the study of education in a college or university. The second section includes an outline of a framework for graduate studies in education with some general comments on that framework. In the conclusion, the relationships between the two sections of the paper are analyzed and three topics of related research are suggested.

Schools of education in universities exist and develop with varying patterns of graduate programmes due to fundamental options exercised on the basis of values, interests, and needs. That these patterns sometimes are widely divergent according to circumstances is not surprising in light of the radically different kinds of activity possible under the auspices of a graduate school of education. While the wide array of legitimate kinds of programme may prove advantageous, it also provokes problems of choice and unity, particularly the latter.

The general purpose of this paper includes the proposal of a structure for graduate studies in education. However, this purpose cannot be pursued effectively without some attention to a classification of meanings ascribed to education, with a focus upon *what* is investigated and *how* one inquires in this area. One of the important differences among those who attempt to answer these questions (of what and how one studies in education) concerns the relative autonomy of the field, while some assert that education represents a highly independent realm (e.g., 1), others claim that it is fundamentally dependent upon recognized academic disciplines (e.g., 10). Although this controversy, as such, will not be elaborated here, it is an important matter for anyone concerned with the study of education, the side taken here soon will become evident.

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