

The Relationship Between Grade Configuration and Student Performance in Rural Schools

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The purpose of this study was to examine the relationship between grade configuration—the sequence of grades in a school—and student behavior (attendance/suspensions) and academic achievement. Elementary (grades K-6/7), middle/junior high (grades 6/7-8/9), secondary (grades 7/8/9-12), and unit (K-12) schools were examined using grade-level data at grades 6, 7, 10, and 11. Students in elementary and unit schools outperformed their middle and secondary school peers.

Public education, especially rural education, originated from small one-room, ungraded schools. The concept of graded schools was not introduced until the mid-1800s in the Boston schools and rapidly spread across the country. Since the graded school required a larger student body and faculty, this concept became a reality first in larger towns and then later in less densely populated rural areas. It was not until the advent of the high school that public education evolved into a continuous program from elementary school through high school (Callahan, 1960).

Much of what happened with regards to school grade structure can be attributed to the development of the middle school. Superintendent Frank Forest Bunker is generally given credit for establishing the first middle school around 1909 in Berkeley (CA). His plan called for the reorganization of that city school system to a 6-3-3 structural pattern in which grades 7, 8, and 9 were housed separately (Popper, 1967). During this time, many came to believe that the three-tiered grade structure was appropriate in all respects. During the early years of existence, beneficial gains were often noted by these middle school advocates, which encouraged the proliferation of the tiered grade structure.

Educators have failed to reach a consensus regarding which grade configuration offers the best educational opportunities for students. Much of the concern regarding grade arrangements centers on the developmental levels and emotional needs of the various mixtures of students (NASSP, 1959, 1962, 1967). Alexander and Kealy (1969) and Alexander (1971) justify the existence of the middle school as a program geared to the needs of early adolescents. Their push is to replace the junior high by moving grade nine up to the high school and bringing in grades five and six to the middle school.

The lack of organizational consistency among various types of schools confuses the issue concerning which type of grade arrangement provides the best combination for students. Throughout the twentieth century, schools have been formed with any number of different grade combinations. Many school systems develop their own organizations in response to educational theory, administrative needs, or population pressures (Educational Research Services, 1983). Alexander and Kealy (1969) and Valentine (cited in Hough, 1991) explain the variation of grade patterns among middle schools as methods “to alleviate current administrative problems including crowded conditions in other school organizations and the need to desegregate school systems” (p. 152). The reverse has also been noted in areas where declines in enrollment result in the merger of elementary and middle into the K-8 elementary school arrangement (Educational Research Services, 1983). The basic assumption, it appears, is that the grade configuration of a school has little or no relationship to student performance.

Relevant Literature

The various assortments of grade structures across the United States demonstrates little consensus among policy makers about the impact of grade structure on the learning environment of children. As an example, Louisiana currently has 64 different grade configurations within its K-12 public education system. Current interest in this area appears to have declined within the research community. Except for the study by Wihry, Coladarci, and Meadow (1992), the most recent research on grade configuration is eight to ten years old. Wihry et al. (1992) state that “little evidence bearing on the relationship between grade organization and academic achievement” (p. 58) exists. In their study of Maine schools, these authors found that eighth grade achievement was highest in schools having a K-8 grade configuration.

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Stetson (1917) conducted one of the earliest studies of school configuration in the early 1900s. He examined the cost effectiveness of the Grand Rapids (MI) junior high school and concluded that the increased administrative cost of the separate school produced no improvement in student achievement in comparison to the elementary school. Research in the 1920s showed that students in elementary settings performed slightly better than their junior high peers (Educational Research Services, 1983). Numerous studies continued to be conducted from the 1920s through the 1960s, yielding no substantive differences between elementary and junior high peers on measures of academic achievement and social development (Educational Research Services, 1983).

Most of the research since the 1960s also relates to effects on early adolescence (Blyth, Simmons, & Bush, 1978; Blyth, Hill, & Smyth, 1981; Safer, 1986; Wihry et al., 1992). While grade configuration research exists for middle/junior high schools, there is little research on the secondary grades (9-12; see Cotterell, 1982; Heaton & Safer, 1982; Nisbet & Entwistle, 1969) and even less involving K-12 school structures.

The environment created by a school grade structure may affect student attitudes (Blyth et al., 1981) and social adjustment (Wihry et al., 1992). The fragmentation of schools—moving from K-12 graded schools to another division such as 7-3-3 or 8-4—changes the ability of the educational organization to maintain a core population over long periods and thus affects the social structure of schools. McPartland, Coldiron, and Braddock (1987) found greater continuity and similarity among different grades with the same school than the same grade levels between schools.

There can be little doubt that the school environment and the activities that take place within it are major dimensions of a youth's life and play a critical role in his or her socialization. To the extent that the school environment changes, one would expect corresponding changes in socialization experience. (Blyth et al., 1978, p. 150)

McPartland et al. (1987) found a school's grade-level configuration was a strong predictor of school practice. Higher grades tend to influence practices at the lower grades. These authors concluded that the higher the grade, the less likely that each grade in the school was self-contained, blocked scheduled, and grouped within the class. McPartland et al. (1987) also reported that the higher grades increased the likelihood that the school was departmentalized and students were tracked by subject or program.

One result of earlier restructuring efforts has been the greater number of middle/junior high schools. Anderman and Maehr (1994) conclude that "few reform efforts have emerged which consider the motivational and developmen-

tal needs of youth" (p. 289). They suggest that reform "must consider the multiple contexts in which students interact" (p. 289). Anderman and Maehr (1994) suggest that "developmental changes that occur at early adolescence are attributable to grade-related changes in the structure of the school" (p. 289). Haladyna and Thomas (1979) demonstrate that student attitudes toward school, specifically mathematics, science and art, decrease with age. Many argue that adolescence alone brings on these changes, but Eccles and Midgley (1989) and Simmons and Blyth (1987) report that contextual and environmental factors play a role as well. Simmons and Blyth (1987) find that females moving into the middle/junior high school suffer from a drop in self-esteem which does not occur in females remaining in a K-8 structure; further, this lowering of self-esteem continues as females enter high school. In a study of Louisiana public school suspensions and expulsions, Kennedy (1993) shows that "school grade configuration plays a role in the variations among schools for both indicators" (p. 8).

This article presents empirical findings on the relationship between school grade configuration and student achievement and behavior in grades six, seven, ten, and eleven in Louisiana rural schools. Anecdotal evidence suggests that school grade configuration is of minor significance when financial and administrative decisions are made about how schools are structured in a district. Either there is much confusion about how to achieve a good (or best) learning environment or school context does not appear to play a role in these decisions.

Although resistant to change, the graded school has undergone several modifications. Most of this interest centers on the needs of the early adolescent (Carnegie Council on Adolescent Development, 1989). Restructuring efforts have produced an increase in the number of middle/junior high schools based on the assumption that a separate facility will better serve the special needs of this age group. This segregation of early adolescents has simultaneously created elementary and secondary schools. Wihry et al. (1992) and Blyth et al. (1981) call for additional research to ascertain the effectiveness of a school's grade structure. The present research attempts to address this need.

Method

We explored the effects of a school's grade configuration on both student behavior and academic achievement for grades 6, 7, 10, and 11. The grade 6 sample comprised 76 elementary, 68 middle, and 73 unit schools; the grade 7 sample comprised 77 elementary, 73 middle, and 76 unit schools, and the sample of grade 10 and 11 schools were divided into two groups of 73 each: unit (K-12) and secondary (grades 9-12). Sample schools were randomly selected, within grade configuration group, from the population of all Louisiana schools during the 1993-1994 school year.

Grade Configuration

Grade configuration is defined as the set of grade levels housed within a specific school. We categorized schools as being “elementary” (grades K-6/7), “middle/junior high” (grades 6/7-8/9), “secondary” (grades 7/8/9-12), or “unit” (grades K-12).

Student Behavior and Academic Achievement

Student behavior represents a combination of school-level attendance and suspension rates. A school’s percentages regarding student attendance and student suspensions were each standardized and then averaged, giving a single school-level student behavior score. Student achievement was treated in a similar manner. For grades 7, 10, and 11, students took a state-developed criterion-referenced test which, for our purposes, yielded a language arts and mathematics composite score for grades 7 and 10 and a science and social studies composite score for grade 11. For grade 6, we used the total battery score from the California Achievement Test.

Analysis

We examined four different grade levels—two middle-school grades (grades 6 and 7) and two secondary grades (grades 10 and 11)—to determine if student behavior and achievement differ with grade configuration (elementary, middle/junior high, secondary, unit schools). An initial multiple analysis of variance that included measures of school size and socioeconomic status resulted in no interactions involving the latter two variables and grade configuration. Below, we report ANOVA results separately for the two dependent variables and at each of the four grade levels.

Results

Grade 6

We obtained a significant main effect for both student behavior, $F(2, 210) = 10.09, p < .0001$, and academic achievement, $F(2, 214) = 8.37, p < .0001$. A post hoc Tukey test revealed that students in elementary and unit schools were significantly higher than their middle-school peers on both dependent variables (see Table 1).

Grade 7

Similar results were obtained at grade 7: a significant main effect for both student behavior, $F(2, 220) = 8.78, p < .0001$, and academic achievement, $F(2, 222) = 10.20, p < .0001$. Again, elementary and unit-school students were

higher than middle-school students on both measures (see Table 2).

Grade 10

A significant main effect again was obtained for both student behavior $F(1, 143) = 11.07, p < .001$, and academic achievement $F(1, 143) = 6.60, p < .01$. Grade 10 students in unit schools were significantly higher their secondary-school counterparts in both behavior and achievement (see Table 3).

Grade 11

In contrast to the findings above, no significant differences surfaced at grade 11 (see Table 4). Student behavior and academic achievement were statistically equivalent in secondary (grades 7/8/9-12) and unit (grades K-12) configurations.

Discussion

Our results suggest that at grades 6 and 7, the learning environment in elementary (grades K-6/7) and unit (grades K-12) schools is more beneficial to students than the middle school (grades 6/7-8/9). At grade 10, the unit school environment is more beneficial than the secondary (grades 7/8/9-12) school environment. This is true both for academic performance as well as for student behavior. The lack of a detectable difference for grade eleven may be due to student maturation and a change in the subjects tested (science and social studies).

Regardless of the grade configuration adopted by local school boards, we believe that the developmental, social, and emotional needs of students should be given priority over fiscal and physical demands. Grade configuration is important because it establishes the basic context for the learning environment. We propose that K-12 schools have much to offer in the way of social and academic development and should be given careful consideration by school administrators engaged in restructuring activities. In Louisiana, and doubtless elsewhere, middle schools appear to exist in name only and much is yet to be done regarding middle school reformation. If we are to continue fragmenting the graded school, then school design must not be one-dimensional. The creation of separate middle or secondary schools should be guided by the needs of the students they are targeted to serve. These needs exist regardless of where students are housed. We must be careful that in creating grade-segregated schools (i.e., elementary, middle, secondary) we do not sacrifice a certain segment of the student population for purely administrative reasons (e.g., saving money or space). Specifically, the unit school appears to have positive effects on the academic perfor-

Table 1
 Mean Table for Grade 6 Grade Configuration Comparison for Student Behavior and Achievement

	Behavior			Achievement		
	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>
Elementary	525.52	58.53	76	512.24	42.61	76
Middle ^a	485.69	63.06	68	491.85	32.29	68
Unit	526.57	61.90	69	514.81	32.67	73

^aMiddle-school students were significantly lower, on both behavior and achievement, than either elementary- or unit-school students ($p < .05$, Tukey's Studentized Range).

Table 2
 Mean Table for Grade 7 Grade Configuration Comparison for Student Behavior and Achievement

	Behavior			Achievement		
	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>
Elementary	543.79	53.28	77	523.66	42.85	76
Middle ^a	498.97	87.03	73	498.25	39.64	73
Unit	538.65	70.05	73	522.80	33.29	76

^aMiddle-school students were significantly lower, on both behavior and achievement, than either elementary- or unit-school students ($p < .05$, Tukey's Studentized Range).

Table 3
 Mean Table for Grade 10 Grade Configuration Comparison for Student Behavior and Achievement

	Behavior ^a			Achievement ^b		
	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>
Secondary	503.67	52.11	73	494.14	30.60	72
Unit	536.00	64.37	72	507.11	30.19	73

^aThe two means are significantly different at the .001 level.

^bThe two means are significantly different at the .01 level.

Table 4
 Mean Table for Grade 11 Grade Configuration Comparison for Student Behavior and Achievement

	Behavior			Achievement		
	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>
Secondary	508.45	54.24	72	495.34	22.84	72
Unit	527.67	70.56	68	493.49	34.34	73

Note. Neither mean difference was statistically significant.

mance of students in grades six and seven, whereas middle and secondary schools have a detrimental effect on the same grade levels. As Sergiovanni (1995) indicates, it is time to forsake the grade fragmentation approach to school structure and return to a community approach to schools, not only in rural schools but urban as well.

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