

Configuring schools: A review of the literature

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Introduction

Configuring schools by grade is a practice influenced by history, psychology, sociology, and pedagogy. With all of these social sciences to draw on for knowledge and direction, configuring schools remains a process with inexact guidelines.

This situation exists for a variety of reasons, but primary among them is the complexity of the reasons for considering various combinations of grades in the schools. Even though what is best for the student is central to the decision, administrative issues related to finances, transportation, space usage, and others can affect the final decision. Even “the good of the student” is subject to different interpretations. For example, academic achievement and social development are often cited as primary concerns when discussing grade span for school configurations yet as will be shown below, different patterns of grade span enhance different goals. That is, grade span patterns which appear to support improved student academic achievement are not necessarily the same as those which provide the best social and psychological development of the students.

This review of the literature emphasizes the complex nature of the topic and illustrates the conclusions that:

- there is not a single grade span configuration that will serve all purposes.
- there is not an agreed on “best model”
- current practice is in a state of flux

This underscores the need for clarity regarding why a particular grade span is used and awareness of the limitations of that particular configuration. It also identifies many of the additional potential ramifications of configuring school grade spans in various ways.

A Brief History

While there are over 30 documented grade span configurations (MacIver and Epstein as referenced in Paglin and Fager, 1997) in use, the most basic - a system with elementary schools containing grades Kindergarten to 8 and secondary schools spanning grades 9 through 12 - has developed since early in the 20th century. Originally, schools that spanned all grades in one building were established to serve the needs of the immediate community. Grade 1 to 8 schools were the most common since high school was not considered particularly important for most of the population (Howley 2002). If it was desirable, then schools encompassing grades 1 through 12 were a common response, especially in rural areas. This arrangement meant that there were a large number of quite small schools.

The advent of the K - 8 school as we know it came about when the proliferation of small schools began to change after 1915 through the efforts of professor Edward Cubberley of Teachers College who “. . . proposed that large schools in central locations could provide more and better education and resources . . .” (Howley 2002 p. 24).

The break up of K - 12 schools into the familiar K - 8 and 9 - 12 configuration followed the more centralized approach that Cubberley advocated. A high school education was seen as preparation for a more specialized world of work while the K - 8 schools were perceived as the basic education needed by all citizens and sufficient for most of the jobs in society at the time. This separation and centralization was helped along by the improvement of transportation which lessened the hardship of student travel to these schools. At the same time, governance structures for education started to change from one school board for one school to larger geographic areas encompassing several schools and communities. School districts were created facilitating the change to the more centralized approach to school size and resource allotment.

Larger schools also meant an increase in the number of students in each grade. In turn, alternative ways of configuring the make up by grade in schools were sought. Paglin and Fager (1997) identify two trends in the 20th century in this respect. The first began in the first few decades and was typically composed of grades 7 - 9. This was the junior high school. The number of junior highs grew until the 1970's when a new trend begun in the 1960's, the middle school, became more popular. The middle school was generally comprised of grades 6 - 8 and remains the most common form of grade configuration for the middle grades outside of the traditional K-8 model. As pointed out by Renchler (2002), since the 1970's, the historical trend has been away from junior high schools and towards middle schools. Grade 9 only campuses are now becoming more prevalent in some areas (Paglin and Fager 1997).

Table 1, below, based on figures available from National Center for Education Statistics (2003) shows the grade span configurations in the U.S. at the turn of the century. (Unfortunately, similar figures are not available for Canada). The trend towards middle schools appears to remain strong with only 8% of the schools in the Pre-K, K, or grade 1 to grade 8 category and over 18% in the Grades 4, 5, or 6 to grades 7 or 8 category. The authors of the report provide a broader perspective on this trend when they write:

The shift in structure of public school systems toward middle schools (grades 4, 5, or 6 to 6, 7, or 8) is continuing. The number of elementary schools (beginning in grade 6 or below, with no grade higher than grade 8) rose by 9 percent to 64,601 between 1990-91 and 2000-01, but middle schools rose by 37 percent. Meanwhile, the number of junior high schools (grades 7 to 8 and 7 to 9) declined by 27 percent. (National Center for Education Statistics 2003, 42)

Table 1. U.S. Public School Grade Configurations - Number of Schools and Percentages of Configurations, 2000-2001

	Pre-K, K, or grade 1 to grades 3 or 4	Pre-K, K, or grade 1 to grade 5	Pre-K, K, or grade 1 to grade 6	Pre-K, K, or grade 1 to grade 8	Grades 4, 5, or 6 to grades 7 or 8	Other grade configurations	Total
Number of schools	4,883	22,572	14,445	5,198	11,696	5,807	64,601
% of total schools	7.6	34.9	22.4	8.0	18.1	9.0	100

Source: *Digest of Education Statistics, 2002. Chapter 2. Elementary and Secondary Education.* Available online at <http://nces.ed.gov/programs/digest/d02/tables/dt098.asp>

The shift towards middle schools reported above cannot be taken as the final state of affairs however. Bradley (1998) reports on school districts in one U.S. state which are calling for fundamental changes to their middle schools and Pardini (2002) provides a list of many school districts across the United States which are abandoning middle schools altogether and returning to a more traditional K - 8 organizational structure. While not disputing the popularity of the middle school concept, Pardini presents arguments for the reversion to the more traditional model which suggest that the trend away from middle schools may only be starting. Knowing where we are and how we got here, however, is only half of the picture. It is equally important to know why the choices and decisions were made.

Complexity of Purpose and Grade Span Configurations

As Hough (1995) points out, the original purposes behind the variations were economic. When talking about the early evolution of basic configurations in the nineteenth century, he writes:

Some systems favored eight years of elementary and four years of secondary education, but most had six years of each, to better facilitate the movement of children into the labor force. With the passage of child labor laws early in the twentieth century, the need arose to prepare many more students for secondary schools. Accordingly, junior high schools, patterned after high schools, were conceived. (p. 10)

From these beginnings, several features of different grade span configurations become clearer. One of the first features is that the basic elementary and secondary school structure has its roots in economics, not in the academic or intellectual abilities or needs of the students. It is also clear that the pivotal age group in terms of alternative grade span models is the 10 to 14 year old age

group. This coincides with the grades 6 through 9. These were the students to be prepared for high school and the world of work..

With the beginnings described by Hough (1995), the group of students central to the variations in grade span configuration would find themselves in the junior high schools and an environment in which the organization was oriented towards a discipline (subject) based curriculum and the teachers were trained in their subject field. When the purpose changed from academic learning to meeting the needs of young adolescent learners, it was realized that an environment in which the program was less subject oriented and more child centered was required (Pardini 2002). It was also realized that the students needed to be with teachers trained to recognize learner needs and adapt the curriculum accordingly. As Hough (1995) points out, this environment was likely to be found in elementary school models rather than secondary school models. Thus, the movement towards middle schools and away from junior highs was begun. Associating this group of students with elementary schools led to what Hough (1995) calls the “elemiddle” school. As Paglin and Fager (1997) write:

The middle school trend reflects not only a shift in the placement of the sixth- and ninth-grader but also a conceptual change. The junior high was conceived of as a preparation for high school and usually imitated the structure of one, with departmentalized classes and uniform daily class periods. The middle school, on the other hand, was conceived as a more child-centered institution with “responsive practices” such as interdisciplinary team teaching, advisory programs, and flexible scheduling. The middle school also offers a more varied curriculum and more electives or exploratory classes than are usually available at junior high schools. (P. 2)

Recognition that other particular groups of students have particular needs that go beyond academic achievement is evident in the literature. Chmelynski (2004), reports on a growing trend to establish grade 9 only campuses and cites studies done in Georgia, Pennsylvania, Tennessee, New York, and North Carolina where this practice has been deemed successful by those who have been involved. This configuration is designed to help the grade 9 students make the transition into high school. Program adaptations are made towards this end through the provision of such things as an elective “. . . called High School 101, which covers time management, decision-making skills, study skills, test-taking strategies, learning styles, social tolerance, computer research skills, and career alignment.” (P. 49)

But the question of whether the grade span configuration employed is designed to prepare students for high school or to meet the complex learning and development needs of young adolescents is not that simple. Gauging the success of the particular model used depends on what benchmarks or standards will be used. At this point, more specific purposes come to light and, as research described below shows, every configuration has its own strengths and weaknesses.

Some of the many purposes sought for younger adolescent students through different grade span configurations are:

- academic achievement
- social adjustment
- high school preparation
- increased parental involvement
- beneficial effect on the community

To complicate matters further, administrative purposes are often part of the reason for trying different models. These purposes may include:

- cost effectiveness
- transportation efficiency
- building usage
- personnel deployment

With so many different purposes being sought through the use of different grade span configurations, it is no wonder that the one main lesson learned from the research is that no particular grade span serves them all. Research further indicates that any particular purpose may be served by more than one configuration (Howley 2002, Paglin and Fager 1997, Renchler 2002). It would seem to be important, however, to be clear about the ends being sought when determining the means to be employed and the two most common purposes as reflected in the research are academic achievement and student development.

Academic Achievement

To begin this section, Paglin and Fager (1997) provide a caveat. “No particular sequence of grade spans is perfect or in itself guarantees student achievement and social adjustment.” (P. 12).

While providing further cautions related to the need for further study, Howley (2002) references two studies done in the New England area of the United States and concludes that student achievement in grades 6 and 8 is higher when these grades are associated with elementary rather than secondary schools. Specifically, in Connecticut, grade 6 students achieved higher scores when grade 6 was configured with lower grades (for example K-6, K-8, etc.) than when grade 6 was in other configurations, especially those that associated grade 6 with high school (for example grades 6-12). Similarly, in a Maine study, the researchers concluded that grade 8 student achievement was higher when grade 8 was associated with elementary schools (for example K-8, 3-8, K-9, etc.) than when grade 8 was part of junior or senior high schools. Commenting on this same study, Renchler (2002) reports that the researchers were unable to account for the discrepancy in achievement levels but speculate the better performance of eighth graders associated with elementary schools may be attributable to such things as:

- subject specialization
- departmentalization
- tracking
- within-class ability grouping
- staff recruitment
- staff training

- expectations of student performance
- sensitivity to individual student differences (P. 3)

Alspaugh (1998) found that grade 6 students who had changed schools from grade 5 (i.e. left an elementary school and entered a middle school in grade 6) suffered an achievement loss when compared to grade 6 students in K-8 schools. This study, conducted on 48 school districts in Missouri, also found that grade 9 students had an achievement loss on changing schools from an elementary school to a high school. Grade 9 students who had changed from an elementary school to a middle school and then from a middle school to a high school experienced a greater loss than students who moved from a K-8 to a high school. Alspaugh calls this additional loss for students experiencing two school transitions double jeopardy. According to this study, when students transition between schools, achievement levels go down and the greater the number of transitions, the greater the loss. Seidman et al (1994) provide some insight into what the students face when they make a transition to middle schools or junior highs and why the achievement loss may occur.

The transition to a middle or junior high school typically requires accommodation to an increasingly large, impersonal, and bureaucratic educational milieu. Youth need to adjust to dramatic increases in disciplinary specialization, rules and regulations, and the number of teachers and other school personnel with whom they have only limited and circumscribed contact. Similarly they are confronted with a new set of school peers and interpersonal “tests.” Such disruptions in daily social regularities require a restructuring of social roles. (P. 508)

Howley (2002) also reports strong achievement in an apparent anomaly in terms of grade span configurations. Referencing research done in Louisiana as well as his own research in Texas, Howley reports positive effects on student achievement in K-12 schools. In the Louisiana study, students in grades 6 and 7 performed equally well when their classes were in a K-12 school as they did when the classes were in an elementary school. This same study reported that the grade 6 and 7 students in K-12 schools had higher achievement records than those in middle school configurations. In the Texas study, it was found that the more grades there were in a school (for example K-12) the higher the test scores of grade 10 students.

Howley (2002) relates the strength of the K-12 schools in his study (which he calls “The Texas Miracle”) to the fact that these schools tend to be rural and smaller. He also notes that they are the only schools in their districts (boards). Further, he attributes these schools with improving the performance of students with low socioeconomic status. If student achievement is considered as a factor in calculating education costs per student, then the K-12 schools are among the most cost effective models found.

Since high stakes tests (for example, EQAO tests in Ontario) are often used to gauge student achievement, the findings of Tucker and Andrada (1997) add an important dimension to the grade span discussion. In their study of Connecticut schools, they found that if schools were held accountable for the test results of the grade 6 students, these students made more progress than if

the schools were not held accountable. That is, grade 6 students in schools where grades 4-6 were kept together (for example, K-6, K-8, grades 4-6) scored higher than grade 6 students in schools where these grades were not held together (for example K-5 and 6-9). This would suggest that for a testing program for grades 3, 6, and 9 students, configurations K-6 and 7-10 would result in better test levels.

Social and Psychological Development

While student achievement is always a consideration when making decisions about grade span configuration, other factors are also important. Among the more important considerations are meeting the social and psychological development needs of students at various ages.

As Hough (1995) points out, the trend towards aligning middle schools with elementary schools is a reflection of attempts to meet the needs of young adolescents aged 10-14 years. Referring to this as a period of “transesence”, he writes:

During this period, physical growth occurs at a greater rate than at any time except infancy. Moral reasoning shapes values that will last a lifetime. Young adolescents become acutely aware of a host of social issues, including sex, drugs, and violence. . . . because these transformations occur suddenly and simultaneously, often for the first time in their experience, giant gaps emerge between maturation and children’s ability to cope. (P. 10)

For these reasons, schools with more of a child-centred philosophy where teachers have more training in how to meet the social and psychological needs of the students (i.e. elementary schools) are increasingly favoured. As Hough (1995) points out, while no single configuration is proven most effective, those which keep grades 6-7-8 together are most common. This means that the middle school concept is increasing while the junior high is decreasing in use and as reported by Pardini (2002) the K - 8 school is becoming more popular. Bradley (1998) provides the other side to this picture however when she reports disillusionment with the middle school concept in a Maryland school district where a report by a citizens’ review committee stated:

"Overemphasis on the social, emotional, and physical needs of the middle school student has led to neglect of academic competencies," the report charged. "The result is a school system with vague academic expectations and complacency in the middle school years." (P.39)

Paglin and Fager (1997), add another social dimension when they state:

Considerations might include whether the oldest students will function as positive or negative role models, whether the academic and social needs of each grade level can be met in a developmentally appropriate manner, and whether the grouping is consistent with community needs and values. (P. 7)

The trend towards middle school rather than junior high configurations has resulted in the rising phenomenon of “grade 9 only” schools and/or campuses (Paglin and Fager 1997, Rourke 2001). The group of students in grade nine were found to also have needs that could not always be met

in the traditional secondary school configuration. Writing about grade 9 only schools in Pennsylvania, Texas, and Virginia, Rourke (2001) suggests that this configuration comes about as a result of research which indicates that grade 9 students are at higher risk in three areas: drop out, poor or irregular attendance, and pregnancy.

The issue of drop out rates is frequently raised in discussions relating to grade span configurations (Alspaugh 1999, Howley 2002, Renchler 2002, Rourke 2001). A key issue identified in these discussions appears to be the number of transitions students make between schools in their careers. Generally speaking, the fewer transitions there are the better chance a student has of completing high school (Alspaugh 1998). Thus, as Howley (2002) reports, the K-12 schools compare quite favourably in the drop out rate to other schools.

Where there are transitions made between schools, the grades at which the transitions are made appear to have an effect on the drop out rate. Part of this seems to be due to an observed achievement loss by students the year after a transition is made (Alspaugh 1999, Renchler 2002). This achievement loss is generally made up the following year. Alspaugh (1999) reported that the higher the grade level of the last transition to higher school, the higher the drop out rate. Students who made the last transition in grade 10 (to a school configured as grades 10-12) had a higher drop out rate than students who transitioned at grade 9 (to a grades 9-12 school) for example. It is concluded that part of the reason for this is that students who make the transition in grade 10 are of legal leaving age and get discouraged when they experience the achievement loss. They do not stay in school long enough to regain that loss. Students who make the transition in grade 8 or 9, however, have more time to acclimatize to high school before they are old enough to leave. In the case of the grade 9 only schools as reported by Rourke (2001), the double transition does not seem to have a negative effect. He reports that the grade 9 students seem to like the smaller school and the grade 10 students feel better prepared for high school.

The effects of transitions between schools are quite broad according to the literature. Besides the impact on achievement and drop out rates already noted, Seidman, et al (1994) report negative effects on self-esteem and class preparation. While research indicates that these adverse effects of transfers on self-esteem in early adolescents is uneven, one specific study which compared students transferring into junior high school in grade 7 with students remaining in K-8 schools showed that the transfer had a negative effect on the self-esteem of the girls. Their research also indicates that transfers result in increased friction between the students and the school and behavioural changes such as decreased involvement in extracurricular activities.

Grade and School Size

Changes in grade span also results in changes to other parts of the school system, including school size and grade size. Grade size refers to the number of students in specific grades within the schools. In schools with a broad grade span, (i.e. a larger number of grades) there will be fewer students per grade than a school with an equal enrolment but with fewer grades. Howley (2002) comments extensively on school size, noting that the trend appears to be towards larger

schools and larger grade sizes. He writes:

One result of today's schools' narrower grade-span configuration is that the number of students per grade is higher than it has ever been. A K-2 school enrolling 360 students doesn't seem large compared to all those hefty suburban high schools enrolling 2,000 or more students, but with 120 5- to 8-year-olds per grade it's a very large school (and that's become our standard). K-2 schools are among the largest schools in the nation with regard to enrollment and, surprisingly, they are most common in rural areas and small towns.

The popularity of K-2 schools might be the result of excessive concern with developmentally appropriate expertise for early childhood instruction. Large size is the price of expertise. In rural areas, this price might be higher because of centralized school locations and poor funding for capital outlay.

Howley's (2002) interpretation of the studies on grade span is that there is a need to re-think the idea that fewer grades in a school is better. He notes that

. . . the evidence rather clearly suggests that the tendency to create narrow grade-span configurations reinforces the bad habit of building larger and larger schools. Larger schools damage educational equity for everyone, and they undercut educational excellence in impoverished communities, according to a growing body of evidence.

Second, every transition from one narrowly configured school to another seems to disrupt the social structure in which learning takes place, lowering achievement and participation for many students. Predictably, this damage will be most severe in the cases of students from impoverished backgrounds. Short of providing an adequate living for poor families, we can at least restructure our educational system to mitigate the detrimental effects of poverty.

Renchler (2002) adds to the list of things to consider when thinking of schools with narrow grade spans and larger grade enrolments. He points out that such schools have frequent student turnover which can adversely affect school identity and a school's sense of community. As mentioned elsewhere, schools with narrow grade spans add to the number of transitions a student needs to experience and therefore adds to the stress of many students.

Andrews et al (2002) examined school size from the perspective the costs of education in light of the apparent movement to consolidate school districts and schools in an effort to reduce costs. These investigators examined the research to try to determine at which point consolidation led to the creation of learning environments harmful to student performance. While identifying the need for further research to help policy development in this area Andrews et al conclude

At the school level, production function studies provide some evidence that moderately sized elementary schools (300–500 students) and high schools (600–900 students) may optimally balance economies of size with the negative effects of large schools. (P. 246)

Conclusion

The literature on grade span and school configuration informs us that there is no single model to achieve all desired goals related to what we hope to accomplish through the use of various models. Indeed, there is no single configuration to achieve any particular goal. And goals need to be balanced. Academic achievement, student social development, and school drop out rates are all influenced by grade span configuration. Focusing on one of these must take into consideration how the others will be affected. In order to make the best decision about which configuration to use, therefore, it is imperative to know what goals are being sought and where they fit in the organization's list of priorities. Any chosen grade span configuration will have strengths as well as weaknesses. Paglin and Fager (1997) provide a list of things to consider when thinking about grade span:

1. Will the configuration increase or decrease transportation costs? How far will students have to travel? This may be a more important issue in a community with a very dispersed population.
2. Will the configuration likely increase or decrease parent involvement? The proximity and size of the school may be factors, as well as the motivation and interest level of the parents.
3. How many students will be enrolled at each grade level and what implications does this have for course offerings and instructional grouping?
4. Are any data available that suggest whether the configuration might boost achievement scores for a significant portion of the community's students or depress the performance of others? For instance, some studies suggest that some middle-level students—low socioeconomic background sixth-graders in Pennsylvania, and eighth-graders in Maine, a predominantly rural state—benefit significantly from an elementary rather than middle school setting (Becker, 1987; Wihry, Coladarci, & Meadow, 1992).
5. Will the configuration lead to the loss of a neighborhood school or the closing of other schools in the system?
6. How many points of transition and articulation will occur in the K-12 system? How will these be addressed? What mechanisms or channels of communication will be used to ensure that students move smoothly through the system, in terms of both academics and social and emotional adjustment?
7. Does the configuration allow for interaction between a range of age levels and a variety of grouping options? A school with more than one or two grade levels has the opportunity to increase the self-esteem and responsibility of older students by using them as tutors or mentors for younger students.
8. How will the presence or absence of older students affect younger students in a particular school? A school with few grade levels may benefit because older students are not present to model negative behaviors associated with their age group; on the other hand it may suffer from the lack of older role models for academic excellence and leadership.
9. Is the design of the school building(s) suited to managing students in the

selected grade span? For instance, does it have several wings, useful for dividing a large middle school into “houses” or for keeping younger students in self-contained classrooms? (Pp. 10-11)

The literature reviewed for this report also illustrates the need to understand how a particular organizational model will impact on the schools involved and the system as a whole. Changes to the grade span configuration used may change how teachers are expected to teach and the curriculum they are expected to use. In turn, this would mean preparatory work in the form of professional development for the staff and curriculum development. It is not feasible to expect that the grade span configuration can be changed without the need for further changes in the organization including logistical changes, such as bussing. Likewise, there are likely to be changes in the school communities such as how parents interact with the school.

More importantly, Paglin and Fager (1997) remind us that “. . . sound educational practices are more important than grade span.” (P. 9).

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