Seven Topics in Education

A Review of the Literature for School District 112

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December 2001

Changes of every sort pose significant challenges to school districts today. It seems each day we are confronted with a new set of concerns, which force us to ponder again the best approach to schooling. Schools today, for instance, are under pressure from all sides to be fiscally efficient, rigorously accountable for student outcomes, and technologically advanced; while at the same time we demand that those schools be safer, more nurturing and also beautifully designed. These elements need not be mutually exclusive – that is to say – they may co-exist. The challenge for decision makers is to strike that perfect balance of benefits, both short and long term, with costs. This document is aimed at addressing seven topic areas in education. It is hoped that the document will stimulate questions, encourage discussion, and provide some guidance for decision making.

This section includes:

- *A brief discussion of the purpose and approach*
- *Broad themes from the literature*
- *Working assumptions*
- *Report organization and layout*

The purpose and approach

The purpose of this literature review is to provide School District 112 with both a comprehensive and comprehensible overview of the latest educational research findings on a broad range of topics. To this end, a scan of the research was performed on the seven topics as listed below. The initial search yielded well over 500 articles, studies, and reports. This body of research was distilled to 55 relevant articles that met the criteria for review. Whenever possible, the articles were recent and drawn from peer-reviewed journals to ensure that research methods and conclusions meet the standards of the field. In no case was the article's year of publication earlier than 1995.

Broad themes from the literature

The key recommendations and conclusions of this literature are provided here with minimal explanation and elaboration as broad aims for district consideration. In-depth explanations of the recommendations are found beginning with Section 1 of the report.

- *Make schools accessible to the community.* Schools should be located where people live and offer resources (e.g., gymnasium and playground, library, meeting space) that directly benefit community members. Schools must also be fully accessible to physically disabled persons.

- *Build schools that are more like houses than factories.* One objective of schools is to teach children how to behave in society. This is best accomplished when teachers and parents get to know children personally in small-scale settings. Smaller schools, smaller classrooms, and increased parent involvement foster that adult-child connection. The building design also greatly effects children's learning. Smaller schools and naturally lighted classrooms have positive effects on student learning and behavior and teacher attitudes. Community-scaled schools are also less imposing to enter and may increase parent involvement

- *Lessen the impact of transitions.* Consider restructuring schools to a preK-8 and 9-12 school configuration would reduce the number of transitions students go through. Studies show that consolidating more grades in a building site lowers the costs per pupil. Adopt full-day kindergarten programs which prepare children for future academic work and ease family burdens. Full-day kindergartens help students academically and socially. Parents and teachers state that full-day programs reduce their stress. Full-day programs may also result in lower transportation costs.

- *Make technology an integral part of school design.* We all recognize the growing importance of knowledge in society. Schools must be designed with an eye toward new developments and applications of technology to schooling.

- *Invest in the community.* Build on the community resources that already exist and push to expand relationships between the school and community. This may include actively involving all stakeholders in decision making or tapping stakeholder interests and goals by sharing resources. It is also important to provide ongoing professional development and training to all school staff.

Working assumptions

An original set of draft topics was selected and presented to the researcher by the Leadership Team for District 112's Long Range Plan. Although there is always a desire to determine best practices across all areas of education including pedagogy, child development, cognitive science, technology, behavioral sciences and sociology, it would be impossible to achieve any level of success in such a vast undertaking. Therefore, certain assumptions were made in an effort to narrow the scope of the work.

These assumptions include:

- *A balanced view.* This report has no agenda other than to convey to the district a balanced view of the literature in the selected topic areas.
- *Educational approach.* The review of literature does not include research on how best to teach children. It assumes that good education is one that begins with teachers making a personal connection to their students, is constructivist and child-centered in orientation, and has student outcomes as a central focus.
- *District capacity*. To maximize results, the district should assess the capacity of its staff and the culture of the schools and make decisions based on that assessment. For example, even if district resources are available to purchase advanced technological equipment for a school, it may be inadvisable to purchase it if faculty interest or capacity are not present to make full use of the resource.
- *Professional development for all staff.* As a follow up to the previous point, best practices related to facilities assumes staff training and expertise for successful implementation.
- *Financial limitations.* Efforts were made to include a wide range of research, which provided information about new models, designs and best practices, but it must be recognized that the district will have to make trade-offs given costs of construction and restructuring. For example, "According to one estimate, lengthening the school year would cost states between $2.3 and $121.4 million for each additional day, depending on the state." (Aronson 1998, p. 5)
- *Exceptions to the rule.* Although research findings consistently show that small schools lead to improvements in student achievement, there will be certain large schools that attain higher levels of student achievement compared to their small school counterparts. Similarly, there may be small schools that achieve only mediocre results. There are exceptions to every rule. Good teaching is the most significant factor when considering student success.

A note on the word *success* - Throughout this report, the word success is broadly defined to mean improvements in academic, social, and behavioral achievement. When necessary, a more precise term will be used.

The organization and layout of the report

This report has been organized into seven sections on the topics specified by the Leadership Team.

Section 1: School Size

Section 2: Class Size

Section 3: Planning and Design

Section 4: Grade Organizations and Transitions

Section 5: Full-Day Kindergarten

Section 6: Multiple Use Facilities

Section 7: Technology in the schools

Appendix A: Bibliography by topic

Appendix B: School design documents

Appendix C: Articles

SECTION 1: SCHOOL SIZE

"Mary Anne Raywid, one of the preeminent researchers in the field, states unequivocally that the superiority of smaller schools over larger, more impersonal settings has been established 'with a clarity and confidence rare in the annals of education.'"

Education Week
(Viadero, 2001, p. 28)

Compared to most policy discussions in education, the debate about school size appears to be relatively clear: Smaller schools[1] improve student achievement. Regardless of the strategy used to achieve "smallness", several researchers stress that most effective small schools have a high degree of autonomy and identity. (Viadero 2001) This section covers the school size issue, including:

- *The general conclusions of research on school size*
- *Specific findings regarding smaller schools*
- *Why size matters*
- *What is the optimal school size?*
- *Strategies for reducing size*
- *Barriers to smaller schools*

The general conclusions of research on school size

Nearly all of the research on school size concludes that:

- *Smaller schools result in improved student academic achievement, attitude and behavior*
- *Smaller schools have the greatest positive effect on children of poverty*
- *Smaller schools experience less violence, truancy, substance abuse and gang participation*
- *No study found large-school achievement superior to that of smaller schools*
- *The poorer the school, the smaller school size should be.* (McRobbie 2001)

Some research indicates that:

- *Smaller schools afford greater teacher contact with students*
- *Smaller schools may cost less if a longer view of costs is taken*

[1] A small school may be a school within a school, but regardless of the configuration, the school must be autonomous and possess it own unique identity.

Specific findings regarding smaller schools[2]

- *Students have more academic success.* Students show improvements in grades, test scores, attendance and graduation rates. (Rothstein 2001) A 1996 analysis of 103 research documents concluded that achievement in small schools – especially for poor and minority students– is at least equal and often superior to that in large schools.
- *Students experience greater connection and social satisfaction.* Students in smaller schools have reduced feelings of alienation and increased positive feelings towards self and peers. (Rothstein 2001)
- *Violence and behavior problems diminish.* Smaller schools by and large report fewer incidences of truancy, classroom disorder, vandalism, aggressive behavior, theft, and substance abuse (Rothstein 2001). Research also shows that gang participation decreases.
- *Attendance is higher, dropouts fewer.* Students in a small high school in Chicago's poorest neighborhoods attended up to five more days per semester and dropped out at a third to half the rate of students in larger schools The same students had slightly better grade point averages and improved their reading scores by the equivalent of almost half a year. (Rothstein 2001)
- *Extracurricular participation increases*[3]. Students join teams and clubs in significantly higher numbers – this includes students otherwise considered marginal.
- *More personalized teaching.* Teachers were found to better meet the needs of their students, provide more challenging curricula to students and offer more personalized teaching. Both teachers and students also perceived that instructional practices more closely matched their ideals of what schooling should be. (Gregory 2000)
- *Poor and minority students benefit the most.* The correlation between poverty and low achievement is ten times stronger for larger schools than for smaller ones.[4] (Bickel 2000; Rothstein 2001)

Why size matters

Research has shown that size matters, in and of itself. Still, there are additional factors that are thought to make significant contributions.

[2] Major portions of this section were excerpted and paraphrased from McRobbie's excellent policy brief. McRobbie, J., & Malia Villegas (assistance from) (2001). School size, considerations for safety & learning. San Francisco, WestEd**:** 4.

[3] While defenders of large schools continue to argue that larger schools offer a wider range of athletic teams, clubs, theatrical productions and competitions, one researcher found that typically only 5 to 12 percent of students participate in those activities. (Viadero 2001)

[4] Sadly, some of the nation's poorest students are concentrated in some of its largest schools.

- *Stronger personal bonds.* Smaller schools foster communication. Students feel more connected to one another, their teachers, and the school community as a whole. As individuals get to *know* one another they are much less likely to act out. "Acting out decreases as informal structures replace rules."(McRobbie 2001)
- *Parent and community involvement.* Parents and teachers that truly know the children become allies in fostering student success. Likewise, businesses and community organizations find it easier to make links with small schools.
- *Structural simplicity and shared vision.* In smaller schools, staff members tend to serve multiple roles and decision making is shared among staff. In these instances, staff can work together to focus the school on learning and build a coherent, high-quality curriculum across disciplines and grades.
- *Improved instructional quality.* Student achievement is influenced much more by the caliber of instruction than by the number of courses offered. Smaller faculties – collectively responsible for designing the school program around results – are likely to press for professional development that will help meet specific instructional goals. (Gregory 2000)
- *Built-in accountability*. The "internal community of accountability" that develops among teachers, parents, and students promote a culture of caring and rigor marked by hard work, high aspirations, and an expectation that all will succeed.
- *Improved working conditions.* Teachers surveyed in Chicago's small schools expressed great satisfaction in being able to draw on the skills and insights of colleagues as well as influence the structure and direction of the school. In smaller schools, working conditions and job satisfaction for teachers was higher and those schools had lower incidences of teacher turnover. (Gregory 2000)

What is the optimal school size?

Although there is a range of opinions on appropriate school size, researchers unanimously agree that districts should strive to make schools significantly smaller by today's standards.

One researcher (Lackney 2000) argues that in general, school sizes should be:

- *60-70 students in a preschool,*
- *200-400 students in an elementary school,*
- *400-600 students in a middle school, and*
- *600-800 student in a high school*

Other research supports figures suggesting a maximum of 300-400 students for elementary schools and 400-800 students for secondary schools. In general, studies that focused on social and emotional aspects of success conclude that schools should be no bigger than 500, and those looking primarily at test scores say that somewhat larger is still effective, especially for more affluent students. Perhaps most notably, researchers focusing on the interaction

between poverty and enrollment size offer a rule of thumb: The poorer the school, the smaller its size should be. (McRobbie 2001, p.1)

One researcher, at the far end of the continuum, states that the most effective high school size is 200 students or less. (Gregory 2000)

Strategies for reducing size include:

- *Create smaller schools within an existing school.* Philadelphia's Talent Development High School with Career Academies creates groups of 150-180 freshmen taught by interdisciplinary teacher teams. Upper-grade students are grouped in "academies" of 250-300 students based on career interests, each with their own academic core. All academies have their own faculty, management team, building section, and entrance. The cost of implementing these structures is about one to two percent of the total budget. Similar strategies include the creation of house plans or magnet schools or programs.
- *Construct new small schools.* Chicago's small schools initiative has created 150 small schools which serve between 200-400 students through a combination of small free-standing schools and schools within schools.

Internal restructuring strategies which might lead to a small school effect include:

- *Freshmen transition activities.* Keep freshmen together as a group to ease the transition to high school and create the capacity to provide unique services to the group. For example, this could include mentoring, regular advisory classes, study skills classes, or community-building activities.
- *Multi-year groups for teachers.* Teachers remain with a particular group to foster bonds and promote familiarity between teachers and students.
- *Alternative scheduling.* Block programming is one example of alternative scheduling which creates the opportunity for concentrating on subjects for longer periods of time. Block schedules allow for more flexibility in instructional methods, provide additional quality time for teachers to work with students, and reduce teacher stress related to time.
- *Teacher advisory systems for students on a weekly basis and informally one-on-one.* This strategy is primarily intended for secondary students.
- *Academic teaming.* Teachers across departments share the same students, rather than the same subjects.

Barriers to smaller schools

Even though there is growing evidence that small schools give rise to greater student success, high schools with student populations of 2,000 to 3,000 remain common.

One researcher has identified three trends in American society that reduce the chance of large school success. First, large schools find it more difficult to respond to rapid changes in technology and reform initiatives, while smaller schools adapt more easily. Second, some elements of youth subculture have a negative influence on learning. This impact is more pronounced in larger schools. Third, over time our view of how a properly functioning organization is structured has shifted from large, top-down organizations to smaller decentralized, locally controlled organizations.

While the vast majority of research cites the benefits of downsizing, there remain political, economic, and social factors that impede schools' efforts to reduce size including:

- *Idyllic notions of school, especially high school.* The public's image of what a high school should be is perhaps the greatest impediment to change. "Most people want better but not different high schools." (McRobbie 2001)
- *Concern over fewer course offerings or classroom level adjustments.* District administrators must concern themselves with the possibilities of decreased course offerings and the need and costs of new facility construction or renovation.
- *Lack of time, resources and technical assistance.* Schools need sustained support from the district and other assistance providers to gain new kinds of knowledge; free up planning time; involve parents and the community; persevere in implementing new structures, schedules, and approaches; and to continually evaluate the process and results.
- *System impediments.* Laws in some states create incentives for building large schools. District policies that centralize budgeting and decision making also frequently restrict small schools' autonomy and flexibility. Nationwide, the push for one-size-fits all curricula and modes of instruction runs counter to the individualized approaches prized by small schools.
- *Cost concerns.* Many view small schools as an unaffordable luxury, but small schools may in reality cost less over the longer term as a result of lower dropout and higher graduation rates. (Bickel 2001) The Bickel study concludes that "quite small additional budgets" are often "well worth the improved outputs." Other hidden costs in larger schools include administrative and teacher turnovers due to deteriorating working conditions, steeper challenges in teacher retention and recruitment resulting from the inability of the school or district to offer meaningful incentives (such as small class sizes, curricular flexibility, shared decision making, etc.), higher administrative costs, and dissatisfaction of the taxpayers with results.

  Studies frequently failed to pay attention to transportation and other less direct costs of larger schools. A Maine study, for example, found that between 1970 and 1995, the state's student population numbers decreased by 27,000 while busing costs rose a whopping 620 percent from $8.7 million to more than $54 million. (Beaumont (2000) in McRobbie 2001)

SECTION 2: CLASS SIZE

Interest in boosting student achievement and success has also given rise to policies that attempt to reduce class size (also referred to as class size reduction, or CSR). For the most part, discussion has shifted from *whether* small class size makes a difference to *how* it makes a difference and whether or not those benefits outweigh the costs. This section includes discussions under the following headings:

- *What the research says about class size*
- *Why class size matters*
- *How small is small enough?*
- *Critical conditions that lead to a small class effect*
- *Barriers to smaller classes*

What the research says about class size

Findings from the nation's largest, longest-lasting, and most controlled study on class size report the following:

- *"The defining feature of success is smallness itself."* (McRobbie 1998) While there are certainly specific characteristics of small classes which give rise to student success, smallness, in and of itself, leads to improvements in student achievement and success.
- *Small classes alone have a positive effect on student achievement in all subject areas, particularly in the primary grades.* Elementary students in particular benefit from the more intimate settings provided by small classes. Children in smaller classes were found to out perform control groups in all subjects but *especially* in math and reading. Performance in these subjects increased by as much as 15 percent. Also, students from previously smaller classes significantly outperformed their peers two years later by 11 to 34 percent.
- *Children who benefit the most were minority students and students in inner-city schools and those benefits lasted at least through the seventh grade.* It appears that those students with the least amount of familial support benefit greatly from more intimate classroom settings.
- *Small class size does not necessarily mean a lower student to adult ratio.* Smaller classes are qualitatively different than simple changes in student to teacher ratios. In Nevada, student to teacher ratios were reduced from 32:1 to 16:1 by adding another adult into the classroom. But this resulted in only limited gains in the student achievement.

Why class size matters

- *Small class sizes allow teachers to spend more time on instruction and less time on classroom management.* Teachers could better monitor student progress, increase *on-task* events and reduce *institutional* events and used more small group instruction
- *Curriculum covered was both faster and in greater depth.* When teachers know the capacities of their students, they are able to better gauge the time needed to complete the lesson and are able to extend the amount of time apportioned to high interest topics in the classroom.
- *Teachers have more time.* Teachers with fewer students are better able to spend more quality time with those children and are able to modify and individualize curriculum to better meet the needs of their students. Teachers also feel more comfortable working in these settings.

How small is small enough?

Research from Project STAR indicated that **class sizes greater than 17** are significantly less likely to have positive outcomes in student success. (McRobbie 2001)

Critical conditions that lead to a small class effect

McRobbie (1998) identifies factors which, when used in larger classrooms, may approximate the small-class effects. These include:

- *Adequate supply of good teachers.* No structural or organizational arrangement can compensate for good teaching. Good teachers reduce the apparent number of students in the classroom through good classroom management, maximizing "on-task" time, and providing excellent instruction.
- *Sufficient classroom space.* Rooms that provide enough physical space to accommodate the increases in the number of children in classrooms. Freedom of movement and adequate workspace for projects fosters a positive learning atmosphere in the classroom.

Barriers to smaller classes

- *Shortages of classroom space.* There may not be sufficient physical space to accommodate the increase the numbers of classrooms.
- *Shortages of qualified teachers.* In Minnesota, teachers must be certified to independently supervise students. That being the case, there may not be enough qualified teachers in the district to cover the increase in the numbers of classrooms.

- *Financing classroom reductions is a contentious issue.* Research shows that reducing class size to 17 to 20 students per classroom could cost approximately $1,000 per student or roughly $28,000 or more for every classroom added. These costs do NOT include the cost of additional teacher salaries, new facilities (rooms), and increases associated with added custodial and clerical services[5]. State funding of public education may not adequately cover the costs of class size reductions. Local taxpayers may feel that decreasing class size is too expensive to pursue as an educational goal.

[5] Data source, MacRobbie 1998. Cost associated with class size reductions in California included the cost of teachers hired, the cost of additional facilities, and added operational costs. A legislative analyst in California estimated

- Annual operating costs over the long run would increase by about $1,020 per pupil per year,
- First year facilities costs of $28,000 per classroom (because many schools could reconfigure existing space) with expenses rising steeply in subsequent years to $73,000 per classroom to complete K-3 reductions, and
- Additional cost associated with new teacher hires.

SECTION 3: PLANNING AND DESIGN

"We shape our buildings and they shape us." –Winston Churchill

James Banning quoted in (Hebert 1998)

In this section, planning and design of school buildings is discussed. Specifically, the section includes:

- *What the research says about design*
- *Why design matters*
- *Barriers to incorporating design features*

What the research says about design[6]

There is a vast set of suggestions for school planning and design. Lackney (2000) has identified 33 design elements and recommendations that are important to consider in the planning and design process. The list provided below contains the most important elements that surfaced regularly throughout the design literature.

Excellent school designs incorporate the following elements in school plans:

- *Plan schools as community spaces.* Schools should be considered an integral part of the overall community plan. Some schools may offer community services within their walls (referred to as co-located services) while other schools share part or all of their space with community centers, libraries, or recreational facilities.
- *Involve all stakeholders in the design and building process.* Nearly all of the journal articles stress the importance of involving all stakeholders from start to finish. Stakeholder representatives should be selected from across the entire community based on categories such as race and ethnicity, socioeconomic status, community role, geographic representation, and age.
- *Design spaces to be flexible.* Adaptable facilities are ones that can easily be modified physically and technologically. For example, wiring should be accessible and good quality building materials should be used.
- *Design a safe, comfortable school.* School designs must provide protection and comfort, and be aesthetically pleasing to students, teachers and the community at large.
- *Accommodate the needs of all learners.* Pay close attention to students' developmental stages and the needs of students with disabilities.
- *Incorporate technology planning from the beginning of the process.* Post-construction retrofitting is expensive, inefficient and problematic.

[6] This section draws extensively from the Lackney article, which provides a detailed discussion of these design principles and more. Lackney, J. A. (2000). Thirty-three educational design principles for schools and community learning centers, Educational Design Institute, Mississippi State University: 31.

- *Strive for smaller designs of both buildings and classrooms.* Create smaller schools: 60-70 students in preschools, 200-400 students in elementary school, 400-600 students in middle schools, and 600-800 students in high schools.

  Also, keep class sizes small; about 12-16 elementary students per class, 16-20 middle school students per class, and 20-24 secondary school students per class.

- *Decentralize the facility both administratively and architecturally.* Cluster resources, meeting rooms and personnel throughout the entire school facility.

- *Ease transitions between home and school and between grades.* Transitions are the adjustments to new settings that occur regularly in people's lives. For students, transitions occur daily between home and school and annually between grades. Difficult transitions make it harder for students to be ready to learn.

- *Co-locate early childhood education into the school.* Co-location is the placement of early childhood education programming in elementary schools.

- *Encourage and promote parent involvement.* Parent involvement may include soliciting parent input on school decisions, ensuring parent representation on important committees, fostering parent involvement in classrooms, or creating the conditions that promote this involvement. For example, offering childcare during meetings, scheduling meetings at more family-friendly times.

- *Separate children and pedestrians from vehicles and service.* For example, schools should be designed for separate service docks and bus loops that are set apart from pedestrian entries.

Why design matters

- *Community space*. Shared space reduces costs, ensures community and parent involvement, fosters community support and commitment, and reduces unnecessary duplication in the community.

- *Involve all stakeholders in the design and building process*. Involvement in the planning process fosters school support and expands ongoing involvement and commitment to the school in general.

- *Design spaces to be flexible.* A flexible school and classroom design makes possible alternative teaching styles and learning formats and ensures that the district can accommodate changes in student enrollments in future years.

- *Design a safe, comfortable school.* There is a definite connection between learning and the learning environment. Out-moded school designs stifle learning. The physical setting of the learning environment has a direct impact on child's behavior and learning. Students react positively to windows in the classroom. Natural lighting minimizes mental fatigue and reduces hyperactivity. Teachers have higher levels of job satisfaction in safe, comfortable schools. (Hebert 1998; Taylor 2000) Important safety elements include providing controlled access, natural surveillance, and definition of territory. Important health elements include provisions for air quality, healthy thermal conditions, and acoustics. Aesthetic factors that are important to

learning include an abundance of natural light, the use of natural materials, windows to outside views, and diverse textures and colors.

- *Accommodate the needs of all learners.* The school environment should be comfortable and familiar. The physical setting should not act as an obstacle to learning, but rather an enhancement to learning. The physical environment has a direct impact on child's behavior and learning. Students, like adults, need to have furniture, light switches, and handles designed with their size in mind. Even more importantly, ALL students must be able to enter the main entrance of the building. Separate entries for students in wheelchairs highlight differences. Thus, barrier free designs should be incorporated from the beginning of the design process and designers must take into account the size of fixtures and overall scale of the spaces.
- *Incorporate technology planning from the beginning of the process*. This will certainly save money by avoiding costly retrofits in future years. Further, there are frequently technical challenges and other problems associated with retrofitting.
- *Strive for smaller designs of both buildings and classrooms*. Smaller schools have the effect of increasing student satisfaction, lowering student misconduct and crime, and increasing student involvement in the school. Children in smaller classes were found to out perform control group children in all subjects and *especially* math and reading by as much as 15 percent. Students from previously smaller classes significantly outperformed their peers two years later by 11 to 34 percent.
- *Consider decentralizing within the facility both administratively and architecturally.* Research on leadership emphasizes the need for administrators to be visible and interacting in the everyday workings of schools to benefit students, staff, and community members. Effective leaders do not hide in back offices*!*
- *Ease transitions between home and school and between grades*. Student performance increases and anxiety decreases when transitions are eased. (See also, next section on grade organizations and transitions.)
- *Co-locate early childhood education into the school.* "Opportunities for learning start at a very early age and providing structured learning experiences for children can be beneficial in later years." Cooperation between schools and early childhood education eases transitions for children and promotes parent involvement. (Lackney 2000)
- *Encourage and promote parent involvement.* Buildings that architecturally match the surrounding community are more approachable and parents feel more comfortable entering them. Further, schools that closely match the community are more likely to be integrated into the community psychologically. Programmatic strategies, such as integrating early childhood programs into the school encourages parents to be present in the school and helps to establish behavioral patterns for family involvement. Additionally, parent information centers help interested parents learn more about the school and encourage ongoing involvement of parents. Parent involvement has a high correlation with student success. Parent friendly elements in the school design include daycare, parent centers, meeting spaces, training facilities and offer courses to parents.

- *Separate children and pedestrians from vehicles and service.* This design greatly reduces accidents.

Barriers to incorporating design features

- *Cost, the largest consideration.* The costs of including all design elements into a school plan may be too high.
- *Time consuming to gather community input throughout the process.* There can be no doubt about the challenges and costs of involving already busy constituencies in the process of planning and design.
- *The stakeholders are forced to deal with contentious issues.* Conflicting views may arise in the process.
- *Errors are commonly made regarding Americans with Disabilities Act (ADA) requirements for new construction.* Care must be taken to avoid physical barriers to entering the school. For example, ALL children should be able to enter the school through the same door. (Spoor 1997)

SECTION 4: GRADE ORGANIZATIONS AND TRANSITIONS

Shopping centers and traffic planners recognize the importance of transitions. Transitions, such as storefront windows and entryways help us shift from the rush of the workaday world to "shopping mode." Similarly, traffic planners provide visual cues, such as narrowing roads or increased vegetation, to highlight a shift from highways to residential areas. Transitions are important in all settings including educational ones. Many preschools for example, have a foyer space that looks much like a home living room to help ease preschoolers' shift from home to school.

The primary focus of this section is on grade transitions; by this we are referring primarily to the physical movement from one school to another. But of course, transitions may also refer to the important shifts from home to school or from grade to grade.

This section includes:

- *What the research says about grade organizations and transitions*
- *Why transitions matter*
- *Barriers to restructuring*

What the research[7] says about grade organizations and transitions

- *Achievement declines.* The greatest achievement declines occur as students move from self-contained classrooms to departmentalized classes. K-8 students who do not experience a transition from 5th to 6th grade experience achievement gains between those two years and also experience less overall achievement losses in the 8th to 9th grade transition. (Alspaugh 1995, 1998)
- *Mixing students from different elementary schools.* Students from one elementary school that attend the same middle school with no other students attain greater levels of achievement than do students from several elementary schools who attend one middle school.
- *Combining preschools and kindergartens with elementary schools.* When preschools and kindergartens are located in elementary schools, both children and parents stand to benefit from the restructuring. Children benefit from the elimination of one or two new transitional events. Parents (and schools) benefit from parents' increased familiarity with one school community (rather than three). Parents will tend to be more involved in school communities that they feel more familiar.
- *Loss for each transition.* Each school transition results in a new achievement loss for students. Children do recover from the achievement losses during transitions by the end of the transition year.

[7] The majority of the findings in this section were obtained from one researcher and colleagues over a three-year period. To date, this subject has not received the attention or scrutiny that other subjects, such as school size have received. Therefore, it is important to reserve a healthy skepticism of these findings, pending additional research.

- *Transitions and self-image.* During transitions, students are also more likely to experience losses of self-esteem and self-perception. (Alspaugh 1998)
- *Largest achievement declines.* The largest achievement declines occurred the year after students shifted from one teacher, elementary classrooms to multiple teacher, multiple classroom settings. (Alspaugh 1995)
- *More transitions, higher drop out rates.* Secondary students having two or more transitions had higher dropout rates than students who experienced only one transition. This finding suggests that families-in-transition and student mobility have a negative impact on students. (Alspaugh, 1998)

Why Transitions Matter

- *Fewer transitions and student success.* There may be an important relationship between the number of transitions students experience and both their academic achievement and self-image.
- *Transitions and school design.* Considering transition patterns and grade organization is a critical precursor to school design.
- *Family benefits.* The reconfiguring of schools may result in more schools located in close proximity to where students and families live. This is thought to be beneficial to those families. When more grades are present in a single school, parents are more likely to have a sustained relationship and involvement in that school community.
- *Cost reductions through decentralization.* One researcher (Bickel 2001) found a very high correlation (-98) between the number of grade levels in the school and the cost per pupil. After analyzing data of 1,001 high schools in Texas, he found that, after controlling for school size and teacher to student ratio, as the number of grade levels increased, costs decreased and vice versa. Increasing the grade spans of schools results in an overall decrease in costs of organizational variables (for example, administrative, custodial, and clerical costs).

Barriers to restructuring

- *Significant restructuring.* Research on transitions indicates that districts should attempt to increase the number of K-8 (or pK-8) schools or even pK-12 schools. This would likely entail large scale restructuring of most school districts.
- *Mobilizing community support*. Mobilizing support may depend on changing community attitudes based on prior notions of how schools and districts should be structured.
- *Staff resistance to change.* There may be resistance from teachers and administrators who prefer not to restructure the district facilities.

SECTION 5: FULL-DAY KINDERGARTEN

"50 percent of all five year olds in the United States now attend full-day kindergarten."

(Snyder 1997)

A general trend in education indicates that more children will be attending full-day kindergarten in the years to come. State policies, funding and improved student attendance all demonstrate the growing public acceptance of the full-day kindergarten.

This section discusses:

- *What the research says about full-day kindergarten*
- *Why full-day kindergarten matters*
- *Barriers and cautions*

What the research says about full-day kindergarten

Academic benefits

- *Positive academic outcomes for all children in all-day kindergarten.* Research since the 1990s has shown consistent positive learning and social/behavioral benefits for children in all-day kindergartens programs. (Rothenberg 1995; Clark 2001)
- *Prepares children for first grade.* Full-day kindergarten offers an immediate payoff in preparation for first grade and relates to success in middle school. (Stofflet 1998)
- *Greater reading growth.* Full-day students experienced significantly greater growth in reading prerequisite skills than half-day students. (da Costa 2000)
- *Higher test scores.* When compared to their half-day counterparts, children in all-day kindergarten scored higher on tests and experienced fewer grade retentions. (Clark 2001)
- *As much as two-thirds the outcome gains are for full-day programs.* Fusaro (1997) performed a meta-analysis of 23 studies and found that all-day kindergarten programs accounted for almost two-thirds of the achievement gains of children in the study.
- *Opinions of administrators.* Twenty-six district superintendents surveyed in Ohio believe that full-day kindergarten increases academic performance and improves first grade adjustments. (Ohio State Legislative Study 1997)
- *Benefit children of lower socioeconomic status.* Full-day kindergartens may be especially beneficial to children of low socioeconomic backgrounds. (da Costa 2000)
- *Do significant differences exist?* The findings of one study indicated that full-day kindergarten students scored higher in all areas than the half-day kindergarten comparison group, however those differences were *significantly* higher in only one area. (Alber-Kelsay 1998) This was one of the few studies that questioned the value of the full-day kindergarten.

Social benefits

- *Higher social skills, more independent learning.* Children in all-day kindergarten were more engaged in child-to-child interactions and made significantly higher progress in learning social skills. Those children experienced more independent learning, classroom involvement and productivity in work with peers. (Rothenberg 1995)
- *More child-initiated activities.* Children in full-day kindergarten spent relatively more time in child-initiated activities and teacher-directed individual work as opposed to whole group, teacher-directed activities. Students also exhibited higher first grade readiness. (Elicker 1997)
- *Full-day students showed no increase in their levels of fatigue.* (Hough 1996)

Why Full-day Kindergarten Matters

For children

- *Better prepared.* All-day kindergarten programs can provide children with opportunities to spend more time engaged in active, educational activities. These students are better prepared for first grade than half-day students.
- *Greater use of small group activities.* Teachers that spend a full day with children have time to structure their classes with more opportunities for small group interactions.
- *Attendance more regular*. Full-day students attend school with more regularity than their half-day counterparts. (Hough 1996)
- *Quality of time spent.* The quality of the teachers and activities are much more influential on the child's development than the amount of time they are actually in classrooms. (Clark 2001)

For teachers and parents

- *Better preparation for first grade.* Parents and teachers of children in all-day kindergarten believe that all-day kindergarten better prepared children for first grade. (Clark 2001)
- *More flexibility.* Parents and teachers cite the benefits of flexibility, more time in child-initiated activities and less stress.
- *Fewer costs for full-day parents.* In general, parents of children in half-day programs need to have additional childcare coverage for the balance of each day. The costs associated with that childcare would be eliminated for students in full-day kindergarten programs.
- *Teachers less stressed by time constraints.* All-day kindergarten teachers report feeling less stressed by time constraints and those teachers have more time and opportunity to get to know the children and meet their needs. (Elicker 1997; Clark 2001)
- *Eliminates the need for buses and crossing guards at mid-day.* (Rothenberg 1995)

Barriers and cautions

- *Increased salary costs.* The district would assume increased costs associated with salaries for additional hours worked.
- *Increased facilities costs.* Full-day kindergartens will require twice as many classrooms as half-day kindergartens. These additions result in cost increases for additional facilities and added custodial and clerical expenses.
- *More time, but not more academics.* Researchers Gullo (1990) and Olsen and Zigler (1989) warn educators and parents to resist the pressure to include more didactic, academic instruction in all-day programs. (Clark 2001)

SECTION 6: MULTIPLE USE FACILITIES

"School buildings, their contents and grounds represent the largest single asset of most communities. Unfortunately, most communities in this country continue to use these resources at a rate that is equal to about 30 percent of the available daylight hours."

John Lyons, U. S. Department of Education (Lyons 2000)

Many of our school facilities suffer from under use. As costs continue to climb, districts have begun to look at new avenues for funds to cover those costs. One consideration has been to share the school facility with the broader community. This section describes two types of multiple uses: shared facilities and co-location of services. Some of the strategies employed in school districts are described in the following sections:

- *Types of use*
- *What the research says abut multiple-use facilities*
- *Benefits of multiple-use facilities*
- *Recommendations*
- *Barriers*

Types of use

- *Cultural and social (community theaters, one-time events)*
- *Youth activities, including daycare (also athletic associations)*
- *Resources and information dissemination (community libraries, computer labs)*
- *Health, leisure, and recreation (swimming and fitness clubs)*
- *Adult learning (graduate equivalency classes, language classes, first aid and community classes)*

What the research says about multiple-use facilities

Shared facilities

- *Communities make use of multiple-use facilities, regardless of type, when those facilities are made available.*
- *Shared use makes more resources available to more community members.*
- *Shared use reduces both initial construction costs and recurring taxpayer costs.*
- *Shared use improves relationships between community members and the school.*

Services co-located in schools

- *Students use the services when they are available.* In high-poverty communities, families and students use the full-service school clinics when the clinics are available. (Walker 1999)
- *Students (especially students of low socioeconomic status) benefit academically when health services are offered in the school.* Students in Dallas Public Schools who have received services from the Youth and Family Centers have: 95 percent fewer discipline problems, 31 percent decrease in course failures, and 32 percent decrease in school absences. (Jennings 2000)
- *Students receive primary health service.* Sixty-six percent of the students attend full-service clinic for primary health reasons when those services are provided. Students who receive mental health services attend the clinics most often (on average of six visits per student). (Jennings, 2000)

The benefits of multiple-use facilities

- *Expands learning opportunities for students.* Examples in this state include the Minnesota Zoo School and the Mall school located in the Mall of America. (Nathan 2001)
- *Co-locates early childhood education into the school.* "Opportunities for learning start at a very early age and providing structured learning experiences for children can be beneficial in later years." Cooperation between schools and early childhood education eases transitions for children and promotes parent involvement. (Lackney 2000)
- *Expands services to students and their families, particularly social services.*
- *Benefits students when services are offered in schools.* Students who use the on-site clinic in schools show improved school performance, are more likely to set goals for the future, have positive attitude towards self, show reductions in behaviors that require disciplinary action, drop out less often, are more likely to re-enter school if they drop out, show improved school attendance, show reductions in substance use and abuse, are more likely to want to go to college, and experience better relationships with peers and family. (Walker 1999)
- *Allows a community to offer programs, facilities and services that it might otherwise not offer.* Examples in the state include Bluff Creek and Chanhassen Recreation Center, Perham Community Center and Northfield Community Recreation Centers.
- *Creates opportunities for families to spend more time together.* Examples in the state include a downtown kindergarten located in a St. Paul bank, the Inter-district school in downtown Minneapolis.
- *Avoids underused schools and costly duplication of resources.*
- *Permits tax funds to be spent in an efficient manner.*

- *Builds broad-based community support for schools.* When community members see the value of schools, they are more willing to pay for the services and benefits. There is more community buy in when people see that funds are used wisely. (Lyons 2000)
- *Reduces vandalism.*
- *Supports the needs of at-risk children.* Youngsters who lives are compromised by severe poverty desperately need support systems that extend well beyond the classroom. (Maeroff 1998)

Recommendations

- *Listen to all voices.* Involve all stakeholders in the planning process.
- *Facilities close to houses.* Locate the facility in a residential area. Recent design theories attempt to place more amenities in close proximity to residential areas. Such facilities may include schools, transportation hubs, parks, libraries, grocery stores and banks. These amenities promote involvement and the safety feature of increased neighborhood surveillance.
- *Community spaces.* Provide community meeting spaces in the facilities to encourage community interaction.
- *School representation for co-located services.* Having a teacher on-site is a vital mechanism for linking health services to educational needs of the student. (Swerdlik 1999)
- *Target areas of greatest need.* Locate clinical services strategically throughout the area of greatest need. (Jennings 2000)
- Staff development opportunities should be considered an important piece. (Agosto 1999)

Barriers

When considering whether schools should be used for multiple purposes, districts should consider these possible barriers or limitations.

- *Architectural design and facility structure may limit uses.* The design of an older school may limit the activities. Also, security of both participants as well as school property must be protected. (Lyons 2000)
- *Rezoning.* Locating school buildings in neighborhood areas must be carefully considered. Will rezoning be *required* to locate a school in a specific place? Will rezoning impede any future commercial development on the site?
- *Liability.* Liability issues may require costly improvements or higher insurance premiums.

- *Maintenance costs.* Normal wear and tear on specialized structures such as, greenhouses, swimming pools, and computer labs may not be recovered through user fees.
- *Lack of capital and operational funds.* The overall costs of constructing a new multiple use facility may be too high for the community.
- *Resistance from the educational community.* Resistance may come from unlikely sources. Principals and teachers may not want to share the facility with the entire community.
- *Consider the impact of extended use on the surrounding community.* Increased traffic, parking, noise, and the number of people in the area may be undesirable in many neighborhoods.

Additional consideration when considering the co-location of services within facilities include:

- *Turf issues.* There are challenges to operating many highly bureaucratized organizations in one space. A big challenge for implementation is the dedication of the collaborative partnership to "stay the course" regardless of resistance or barriers of the very different organizations forming the partnerships. (Jennings 2000)
- *Secure funding.* Sustaining a joint effort requires secure extensive funding. (Jennings 2000)

- *In 1998, annual growth in the home computer market nearly doubled.*
- *At present 98% of all schools are connected to the Internet.* (NASBE 2001)
- *Since 1983, computer use in schools has grown from 250,000 to 8.6 million computers.* (Anderson 1999)

Recent statistics

The growing influence of technology on society in general, and the influx of technology into schools specifically, emphasizes the need to plan and be intentional about incorporating technology into the school design. Yet, research shows that educational leaders are not the ones, in fact, driving the technology agenda in schools.

This section includes information about technology in the schools.

- *Key research findings*
- *Design considerations for technology*
- *Why technology matters*
- *Possible models*
- *Barriers*

Key Research Findings

Relationship between technology and achievement (NAEP 2000)

- *Computer use.* Students who use computers to collect, download, or analyze data have higher average scores than students who have never done so.
- *Better grades.* Students who use the Internet at home on average receive higher grades in school. Conversely, students in schools with high poverty or high racial minorities tend to have less technological experience than their peers. (Anderson 1999)
- *Technology motivates.* Research indicates that technology is a motivator for learning.

Implications for instruction

- *How technology is used is more important than whether technology is being used. Learning outcomes should drive selection of technology.* (Dexter 2001)
- *Technology has greatest impact when it is integrated into the curriculum.* (CEO forum 2001)
- *Schools should consider offering on-line courses for credit.*
- *Care must be taken to ensure that all students have access to technologies.*

- *Policies must be in place that help protect and guide children in the appropriate student use of technologies.* On web site that offers some guidelines is located at: http://www.aasa.org/issues_and_insights/technology/planning.htm

Essential conditions for effective technology use in learning (enGauge 2000)

1. *Build a shared vision for technology in learning.*
2. *Educators must be proficient with their own use of technology including assessment. Professional competency is a priority.* (Lemke 1998)
3. *Ensure equity for all children.* (NASBE 2001; enGauge 2000)
4. *Vision must be translated into practice.*
5. *All students and staff must have access to the technology and support, anywhere, anytime.*
6. *Leaders must be promoters of technology and its implementation.*
7. *Have a long-range plan in place.* (Hansen 2001)
8. *Make an inventory of school culture and attitudes towards technology and computer assisted instruction.* (Hansen 2001)
9. *The school system must have the capacity.* District capacity to master technology includes the technology infrastructure, the professional development of teachers, and the ability to supply technical service and support. (Lemke 1998)

Design considerations for technology (Palecek 2000)

- *Work with a team of architects, trades people, audiovisual experts, and faculty*
- *Prioritize user needs*
- *Determine which instructors will use the room most often*
- *Remember room size, ceiling, height, acoustics, heating and ventilation*
- *Add theft deterrent measures.*

Why Technology Matters

- *Good motivator – "every child is in a front row seat"* (NASBE 2001)
- *Allows for more individualized learning*
- *Improved scores on standardized tests* (CEO forum 2000)
- *Increased application and production of knowledge for the real world.*
- *Increased ability for students to manage their own learning.*
- *Increased ability to promote achievement for special needs students*

- *Improved access to information increases knowledge, inquiry, and depth of investigation.*
- *Helps provide 21st century skills students need for the future.* http://www.ncrel.org/engauge/skills/skills.htm

Possible models

Virtual high schools

The list below provides a cursory scan of virtual high schools which surfaced in a search using "virtual high school" as keywords. There is no current research regarding the impact of virtual high schools on student success. Thus, the social impact of these schools on students is unclear as are the implications to on-site student enrollment and facilities use.

- http://www.kvhs.org/index.real?action=Aboutkvhs
- http://www.eaglechristian.org/online.htm
- http://www.compuhigh.com/programs.htm
- http://www.vhs.ucsc.edu/vhs/pedagogy.htm
- http://www.nvhs.org/default.htm
- http://www.ivhs.org/index.learn?action=Info
- http://mvhs1.mbhs.edu/mvhsproj/bground.html

Barriers

- *Do not expect test scores to rise immediately.* (NASBE 2001)
- *Schools typically fail to revisit seat time, contact hours, and student-teacher ratios after adding new technologies to the school curriculum.*
- *Large schools tend to underestimate the amount of resources and support needed to support large numbers of students.*
- *Schools frequently forget to consider the amount of software and support expenditures in their budget.*