Educational Trends Shaping School Planning, Design, Construction, Funding and Operation

National Clearinghouse for Educational Facilities

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What does the future hold for educators and facilities professionals when it comes to planning, building, funding, and operating school facilities? No one can absolutely know beforehand. However, there are many, many indicators of where public education in the United States may well be destined. These indicators take the form of already occurring trends that will change education dramatically in the next forty years. While that seems like a long way off, school facilities built today will likely still be in existence in 2050. This raises a critical question. What are the emerging major trends educators and facilities specialists need to be aware of to better insure that future school structures complement the coming evolution, and possibly revolution, in public education? This question serves as the framework for what is presented in the following pages.

First, though, why is it important to be aware of trends? As futurist Gary Marx (2006) points out, "Identifying, monitoring, and considering the implications of trends is one of the most basic processes for creating the future (p. 326)." Aldridge and Goldman (2007), authors of a book on issues and trends in education, reinforce the need to carefully study trends when they point out that, "People living in the 21st century will experience more rapid changes than in any other period of human history (p. 94)." And, Gene Glass (2008), writing on the possible fate of public education in America, reminds us that the events of today often reshape the future in dramatic ways not now imagined. He states, for example, "The invention of technologies shapes culture in ways that are often unpredictable at the birth of the invention. Television killed dance bands; the Internet is killing book stores (p. 11)."

Will technology, or a yet to be identified phenomenon, "kill" public education as it now exists? If so, what may take its place? If not, what adjustments will be needed to insure that the public education system has a vital and vibrant future? And, what does all of this mean to educators and facilities professionals who are responsible for planning, design, construction, funding, and operation of schools? Not all of these questions can or will be answered here. However, the intent is to provide sufficient information about trends in America to assist educators and facilities professionals to be prepared for an increasingly diverse, conflicted, and constantly evolving world of education.

Presented are fifteen trends that are redefining education in the United States -- and how each relates to the field of school facilities. Some trends are broader, such as those dealing with general population changes impacting on education. Others are specific to education, including trend information on changes in the teaching corps, school size, and organizational structure of schools.

In the concluding section, the cumulative effects of the trends on the brick and mortar place called school are discussed, as well as ways educators and facilities professionals can work in concert to prepare for and to address the trends as they emerge and become full-blown.

Before presenting the updated trends, a note of forewarning is extended to the reader. The first two editions of this NCEF "Trends" work (2002 and 2007) tended to envision a relatively rosy, almost idealistic future for public education. The new version does not. A continuing recession, escalating political polarization, risiing racial/ethnic tensions, a growing national debt, and a widening divide between the haves and the have nots portend a future fraught with unprecedented challenges to and clashes over the form and substance of public education in America. However, while the likely picture that the new "Trends" paints is relatively bleak, the future is not pre-determined. The intent is that this edition serve first and foremost as a vehicle for careful study, reflection, discussion, and thoughtful action by those who will affect and be affected by changing educational conditions and circumstances. As a result, the hope is that the fate of public education may be more positive than trends, if left unattended, appear to indicate. In essence, this work reflects the belief that, as an old adage suggests:

We can't control the future, but we can help shape it.

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Trend 1: The Numbers of U.S. Youth Increase Dramatically

The school-age population in the United States will grow from less than 60 million in 2010 to nearly 80 million in 2050. (U.S. Census Bureau, 2008a)

Synopsis

The number of school-age children in the United States will increase by about 20 million, or nearly 35%, in the next forty years (U.S. Census Bureau, 2008a). On average approximately ninety percent of America's children historically have attended public schools (National Center for Education Statistics, 2009j). Therefore, public education could need space for about 18,000,000 more students than in 2010. Using 600 as the average size for a school, this increase equates to about 30,000 new school facilities between 2010 and 2050. On average, over 750 new public schools per year could be needed over the next four decades just to address the population growth. That number does not include construction required to replace or modernize currently existing schools as they age and deteriorate over this time period. Assuming that education as we know it continues to exist over the coming decades, the need for new schools will be significant.

Consequences

On the surface it appears that educators and facilities professionals can expect a significant amount of work in the area of school construction in the coming decades. However, many confounding variables need to be considered in looking to the future of school facilities construction. First, current depressed economic conditions are not expected to improve for some time (Kennedy, 2010). Even when they do, psychological scars of high unemployment and lost homes will remain for many years afterward. While student enrollments will undoubtedly increase, it is less clear that capital funding will be readily available to meet the certain growth. Overcrowding and continued use of school buildings beyond their useful life may well occur. Significant efforts will be needed to convince taxpayers and politicians to adequately fund school construction over the next forty years.

Second, no one is sure what the ultimate impact of the "virtual" school movement will be on the need for a physical place called school. What is known is that more and more students are opting to take web-based courses (and, in some cases, full degrees) in their homes (Gray & Lewis, 2009). And, many states are beginning to set up and administer their own publicly financed virtual schools as an alternative for requiring students to attend a brick and mortar facility. It is not unrealistic to think that many states will look more and more to technology and virtual schooling in hopes of reducing the tax burden for school construction. Educators and facilities professionals will need to work together to monitor technological and funding trends and be prepared to incorporate their effects into school facilities planning, design, construction, funding, and operation.

Trend 2: The U.S. Student Population Becomes More and More Diverse

The percentage of non-Hispanic white students in schools will decline from 52% in 2010 to 35% in 2050. (U.S. Census Bureau, 2008b)

Synopsis

Forty years ago a vast majority of children (4 out of every 5) in America's public schools were white, non-Hispanic. That percentage has dropped precipitously, with slightly over half of the students in schools today falling into that category. And, projections indicate that within the next forty years white, non-Hispanic children will comprise slightly over one-third of the school-age population. In effect, over the next several decades, America's public schools will become institutions serving multiple minorities, with no single racial/ethnic group being a majority (U.S. Census Bureau, 2008b). The Hispanic school-age population (all races) will grow significantly during the foreseeable future. By 2050 the number of school-age Hispanic children will increase 120% over 2010 numbers. At the same time, as birth rates continue to decline among the white, non-Hispanic population, the actual number of school-age white children in 2050 will be about three million fewer than that of 2010. The black school-age population (non-Hispanic) will show some increase over the coming decades, growing about 15 percent in number, but becoming a smaller percent of the total. Other racial/ethnic school-age populations (i.e. Asian, American Indian), though relatively small individually in terms of total student enrollments, will increase as well, growing from 13% of the whole today to 18% in 2050.

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Consequences

Diversity itself will not be the issue that confronts educators and school facilities professionals. Instead, the real challenge will come from what that diversity represents in this country. In the United States as of 2010, about 8 percent of white, non-Hispanic people were living in poverty. While that is a large number, approaching one out of every ten, it pales in comparison with the two other major racial/ethnic groups comprising the population. Nearly 1 in 4 (23%) of blacks and Hispanics (all races) now live below the poverty line (U.S. Census Bureau, 2008c).

Unless conditions change, what this means for public education in the future is that, as the school population becomes more diverse, an ever increasing number of children in poverty will be entering America's schools. This is important because of the profile of families in poverty. Families living in poverty often have much higher incidences of: a) parents being under-educated; b) only one parent living at home; c) few informal educational resources or opportunities for learning available at home; d) limited health care, with little or none being preventive; and e) low expectations regarding school completion (Moore, Redd, Brukhauser, Mbwana, & Collins, 2009). Living in such contexts, children of poverty often struggle with schooling from the time they enter until dropping out before finishing high school. As a result, they often end up either unemployed or in low paying jobs, perpetuating the cycle (U.S. Department of Labor, 2010).

The growing number of high-risk children coming to school in the future will call for a curriculum and teaching approaches that overcome the negative environmental factors these young people will have lived with from before birth. In turn, educators and facilities professionals will be challenged to provide school structures designed to facilitate such new teaching/learning approaches as they are developed to better assure that children of poverty succeed in the educational process.

Trend 3: The Country Experiences an Ever Growing Number of Older Citizens

The number of people 65 or older living in the United States will increase from about 40 million in 2010 to nearly 90 million in 2050. (U.S. Census Bureau, 2008a)

Synopsis

In just 40 years the senior population in this country will increase by 120%. For comparison purposes, the total population will grow by about 56% (U.S. Census Bureau, 2008a). And, as noted in Trend 1, the numbers of school age children will increase by only around 35%. In 2050, one in every five people in the United States will be 65 or older -- compared to a little over one in nine in 2010. Why this trend is so important to educators and school facilities professionals is that the aging "baby boomer" population will be a political and economic force that must be reckoned with for decades to come (Age Wave, 2009). These seniors will cast ballots in great numbers, carefully voting for initiatives that enhance their quality of life and against proposals and candidates that negatively affect their fixed retirement incomes. On the surface it appears that the country faces a most daunting challenge – a significant need for new school facilities versus an aging population likely to be unwilling to pay for such construction.

Consequences

Educators and school facilities professionals can promote the "buy-in" of the older generation to expending large amounts on school facilities if those seniors see direct benefit to themselves. Schools traditionally have been closed systems, focused almost exclusively on serving children. Baby boomers and future aging generations in growing numbers will have no personal relationship with the schools in their neighborhoods. Because of this, they will see little value in supporting tax increases to build or modernize schools. Educators and school facilities professionals who recognize this, and make a paradigm shift in their thinking as to who schools should serve, are much more likely to be successful in getting construction projects funded. Schools can become wonderful places for both children and seniors, with seniors having access to everything from library materials, to health room services, to dining facilities, to recreational facilities, to the companionship of young people (Bingler, Quinn, & Sullivan, 2003).

Educators and school facilities professionals can also improve the perceptions of the older generation about schools by highlighting the benefits of a quality education for the nation's youth. The youth of today literally are the workforce of tomorrow (Society for Human Resource Management, 2010). Their success in the educational process eventually equates to the quality of life of seniors. The services the older generation

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receives in retail establishments, the availability of first-class doctors and other professionals, and the economic well-being of the country as a whole are tied to young people. If the younger generations are well educated, they are much more likely to become productive workers, raise their standard of living, and support social security and Medicare through taxes they pay. For educators and school facilities professionals, the issue and challenge will be convincing the senior generation that expenditures on America's youth are both directly and indirectly beneficial to the older members of society as well.

Trend 4: An Increasing Number of Special Needs Children Receive A Majority of Their Instruction and Services in Regular Classroom Settings

The number of children classified with some type of disability has grown nearly 45% since 1990. (National Center for Education Statistics, 2009a)

Synopsis

Growing numbers of school-age children are being formally diagnosed with some type of disability requiring service under the Individuals with Learning Disabilities Act (IDEA). In the last thirty years the percentage of students with disabilities has grown from about 10% of the total school population to approximately 13% (National Center for Education Statistics, 2009a). With the school-age population expected to grow to nearly 80,000,000 students by 2050, the estimated special education population could approach 11,000,000 children, or over 4 million more than in 2010. Assuming that current averages continue, ninety percent of the special needs school-age population, or about 10 million, will be served by public schools. This assumes that the percent of the total population identified as disabled remains near the 13% mark. However, since the composition of students is expected to change during the same 40 years, with more and more children of poverty being served, the percentage of disabled students in schools could be much higher.

While the numbers of special needs students have been increasing, how they are served in schools has undergone a dramatic shift as well. Twenty years ago less than one-third of these students received their instruction primarily within the regular classroom setting. However, well over half the special needs children in schools today are served chiefly in a regular classroom, and that percentage has been steadily rising over the past two decades (National Center for Education Statistics, 2009b).

Consequences

The era in which a school was built often can be determined by how and where special education programs are located. In the oldest schools no basic mobility accommodations for special needs children or adults have been provided, much less spaces designed to specifically serve students with disabilities. Eventually attempts were made to serve the disabled through specific program offerings in designated, separate spaces. This generation of schools can be readily recognized because "special education" is a distinct part of the building, often away from the main activities of the school. More recently, educators and facilities professionals have made great strides in providing instructional programs and physical design considerations that accommodate the disabled seamlessly into the mainstream of the school (Greville, 2009).

The demand to provide instruction to special needs children in the least restrictive environment likely will continue to grow. With the special needs population increasing but an aging population fighting taxation, it will be a ordeal for educators and facilities professionals to stretch limited capital budgets to design schools and deliver programs that provide a mainstream learning experience for these children. But, it is a challenge that must be met if all children are to be treated as "first-class citizens" in the educational process (Hutchings and Olson, 2008). Educators and facilities professionals can expect growing numbers of special needs students over the coming forty years. These children will not only require special services, they likely will receive such services predominantly via the regular classroom.

Trend 5: More and More Early Childhood Students Come to School

In 1965 only 27% of children ages 3 through 5 in the United States attended preprimary programs. Forty years later, the percentage has risen to approximately 65%. (National Center for Education Statistics, 2009c)

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Synopsis

The number of children under five years old is expected to grow from 21 million in 2010 to over 28 million in 2050, an increase of 33% (U.S. Census Bureau, 2008a). Thus, the pool of potential students for early childhood programs (preprimary, ages 3 through 5) will be large. Exactly how many of these children may eventually attend school as 3 through 5 year olds depends on whether current enrollment trends stabilize or continue to grow. Since the 1960s the percentage of preprimary-age youngsters going to school has increased each decade. About two-thirds of all 3 through 5 year olds in the United States now participate in a preprimary schooling experience (National Center for Education Statistics, 2009c). And, that percentage is likely to increase over time (National Center for Education Statistics, 2009d). Therefore, educators and facilities professionals will have to prepare for growth in early childhood numbers for two reasons: 1) the raw numbers of preprimary age students in this country will grow substantially over time; and 2) more of these students proportionally probably will participate in early childhood programs.

The growing numbers of early childhood children will not be the only issue. How these 3 to 5 year olds are housed is likely to continue to change as well, putting even more pressure on the need for school facilities for this population. For the past three decades the percentage of 3 through 5 year olds housed in full-day programs has increased by ten percent per decade (National Center for Education Statistics, 2009c). In 1975 about three-fourths of preprimary students attended school for only part of a school day, usually a morning or afternoon session. Now, approximately 60% of all early childhood students attend school all day. If universal education for 3 to 5 year olds becomes the norm in the next forty years, and most of these students attend full day, the need for early preprimary facilities will grow greatly.

Consequences

Analyzing data specific to preprimary children, the 12 million 3 through 5 year olds in 2010 will become 16 million by 2050 (U.S. Census Bureau, 2008a). Assuming twenty students per classroom and assuming 90% of these children will attend public schools, that growth alone may require 200,000 new preprimary classrooms over the coming four decades. Further, another 120,000 new early childhood instructional spaces could be needed to provide full-day facilities for the equivalent of today's preprimary enrollments now housed in half-day settings.

With challenging economic times across the country, and with a growing taxpayer resistance to levies of any kind, the movement to universal 3 and 4-year-old education has slowed. However, during the next forty years preprimary education likely will become a critical part of meeting the needs of the growing number of children of poverty entering schools. The timely intervention that early childhood programs are designed to provide, especially for high risk children, is expected to prove highly cost effective, reducing the need for later remediation, keeping children in school, and generally better assuring they become productive members of society (Coleman, Buysse, & Neitzel, 2006).

Educators and facilities professionals will want to begin considering now how to provide sufficient and adequate future early childhood spaces. A burgeoning 3 through 5 year old cohort of youngsters – more and more of whom will attend school full day – mandate this.

Trend 6: The Likelihood of Smaller Schools Diminishes

> **Since 1995 the average enrollment of public secondary schools has risen about 5% to 816. The mean enrollment of elementary schools has remained relatively constant, averaging fewer than 500 students. (National Center for Education Statistics, 2009e)**

Synopsis

The size of secondary schools has continued to slowly climb over time. A half century ago the average size secondary school was less than 500. By the 1970s that figure had increased to over 700 (Lindsay, 1982). Today the average, as noted above, is slightly over 800 (National Center for Education Statistics, 2009e). Though secondary schools have grown in enrollments in previous decades, since 2000, their average size has remained fairly constant year after year. This raises the question of whether this leveling off is a temporary phenomenon, or if secondary schools will grow bigger or become smaller in the coming decades. At the elementary level schools on average have not really varied that much in size over the last twenty years (National Center for Education Statistics, 2009e). In general, though pulled to build bigger schools to take advantage of economy of scale and pushed for smaller schools for better outcomes, districts have tended on

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average to construct schools comparable in size to what they already have.

Consequences

Data from the most recent ten years do not portend larger or smaller schools in the near future. With this in mind, for the short term elementary schools likely will remain on average in the 475 to 500 pupil range. Secondary schools will not grow greatly in size, if at all, remaining on average around 800 to 850 in student population.

However, as the press of student population growth continues to manifest itself over the next forty years, school size may be dramatically affected. First, as noted before, by 2050 18 million more children are expected in U.S. public schools than currently enrolled. And, at current average school sizes, this could create a need for 30,000 new K-12 facilities within four decades. At the same time a growing senior population will likely fight for lower taxes instead of higher ones.

As a result, districts and states will struggle to find adequate funding to support the mammoth amount of construction anticipated. Consequently, efforts will have to be made to stretch limited capital funds. One approach that will be considered is construction of larger facilities that provide an economy of scale in both capital costs and operational expenses. To accommodate the strong desire of parents and communities for smaller schools, districts and states will utilize "small-within-large" or "school-within-school" approaches (Duke, DeRoberto, & Trautvetter, 2009). In general, over the longer term, average school size may well increase.

Two caveats to this prediction relate to technology and school choice. Schools may become smaller as virtual learning opportunities become more and more common. It is easy to envision a day when most students take a course or two online at home or at their parent's work site. If schools take into account such off-campus learning experiences as part of their master course schedules, the total number of students physically on a campus at any one time might never exceed 50% to 75% of its total enrollment. As to choice, if schooling moves primarily to a model of personal/family elected educational options with vouchers/tax credits, schools may become boutique in nature, with various providers carving out a specialized niche to attract a particular clientele. In any event, educators and facilities professionals will want not only to explore issues of school size in general as part of the long-range planning process, but particularly discuss how to at least provide "smaller" within larger school structures.

Trend 7: Reductions in Teacher-Pupil Ratios Slow

> **In the 1950s the average teacher/pupil ratio in U.S. public schools was 26.9 to 1. Near the end of the 2000s this ratio had dropped to about 15.3 to 1. (National Center for Education Statistics, 2009f)**

Synopsis

In a little over half a century, the average public school teacher/pupil ratio in this country has been cut nearly in half (44% lower today than in 1955). Projections are that the teacher/pupil ratio nationally will continue to drop in the coming decade, reaching a record low of about 14.5 to 1 by 2018 (National Center for Education Statistics, 2009f).

Until 1980, the average teacher/pupil ratio was falling at a rate of about 2 students every five years. More recently the decrease in the number of students per teacher has slowed, with the average ratio dropping by only about one student every decade (National Center for Education Statistics, 2009g).

Consequences

The question becomes: Will teacher/pupil ratios continue to decline over the next forty years? The answer is that it is unlikely, at least to any appreciable amount. A major reason for this is economic. As noted in other trends, school enrollments will grow significantly in the coming decades, requiring large increases in expenditures to build and operate needed new schools. At the same time, great numbers of baby boomers will have disdain for taxes, particularly increasing taxes. Educators will find themselves pressed to find adequate funding for all the different priorities that must be addressed in the future: more teachers and school facilities for higher enrollments; more intervention programs and personnel for a greater and greater number of disadvantaged, high-risk students; lower teacher/pupil ratios; etc.

While smaller teacher/pupil ratios are something almost everyone favors, the reality is that reducing classroom enrollments is extremely expensive. In an elementary school of 500, with 20 students on average in a class, 25 regular classrooms are needed to house the student

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population. Reduce that number to 15 students per regular classroom teacher and 33 classrooms are required. The added cost of reducing the average number of students by five per class is not just the expense of eight more classrooms, but also the compensation for eight additional teachers for the life of the school.

As with school size, teacher/pupil ratios may well be stable or even drop slightly over the next few years. But, the long term trends suggest that teacher/pupil ratios may actually increase – offset by more technology and/or a different staffing model, which are discussed in later trends. In any event, educators and facilities professionals will want to monitor over time what is occurring regarding teacher/pupil ratios and discuss both what a decrease and an increase might mean in planning, designing, constructing, funding, and operating school facilities.

It should be noted that for this trend the numbers of students per instructor are presented and discussed largely as teacher/pupil ratio data. Teacher/pupil ratio data include most certified professional instructors in a school, whether they are regular classroom teachers or instructional specialists. Therefore, the teacher/pupil ratio tends to be lower than actual pupils per teacher in regular classrooms. Teacher/pupil ratio data were used because they are available nationally and historically. The trend issues raised are applicable with either method, though students per regular classroom would be consistently higher.

Trend 8: Grade Span Configurations Continue to Evolve

The number of public schools housing grades PK/K/1 to grade 12 doubled between 1993/94 and 2007/08, from 1,514 to 3,113. (National Center for Education Statistics, 1995 & 2009h)

Synopsis

During the past decade and a half the school grade span configurations of K/PK-5, 6-8, and 9-12 have continued to be the most popular across the nation's public school systems, growing thirty to forty percent in number. Grade span configurations that have lost favor are: a) the elementary span of PK/K/1 to grade 6 (-30%); b) the middle level grade structures of 7 to 8 and 7 to 9 (-23%); and the high school grade span of 10 to 12 (-21%). Interestingly, two older grade span configurations have gained new life. The numbers of PK/K to 8 grade schools have increased by 32% in fifteen years, from 4,566 to 6,049. And, as noted above, the "all grades under one roof" PK/K/1 to 12 configuration has doubled in number during the same period. (National Center for Education Statistics, 1995 & 2000h).

Consequences

One reason for the re-emergence of the K-8 and K-12 grade span models is the interest parents and communities have in children being in environments that provide quality learning, and that promote feelings of physical and emotional safety (Bushaw & McNee, 2009). By staying in the same educational facility for more grades, students do not have to experience the trauma of going off to a bigger, more impersonal school -- either after the elementary years or, in the case of K-12, at all. However, while this trend likely will continue to garner attention, it will not overtake the much more prevalent K-5, 6-8, 9-12 configuration in the foreseeable future.

Part of the reason for this relates to the basic logistics of using existing facilities. The cost of remodeling and adding to existing schools to restructure them to house a different grade configuration may be extremely high (i.e., converting an elementary school to also house secondary programs). As noted earlier, in the coming era of limited resources and reluctant taxpayers, budgets likely are going to be committed to first priority initiatives such as building more public schools to address the influx of 18 million additional students expected over the next four decades. This will leave little in terms of resources to reconfigure a large number of schools to such spans as K-8 or K-12.

This is not to propose that K-8 or K-12 configurations will not continue to get attention as society seeks to return to neighborhood schools directly within communities. But, these configurations are more likely to prosper in smaller public charter school and public school choice settings, as opposed to becoming mainstream for the greater school population. Nonetheless, as educators and facilities professionals look to the future, long range planning topics should include how best to configure grades to promote optimum learning (Hill, 2008).

Trend 9: Time in School Remains Relatively Unchanged

During the 2000s, five states increased the minimum number of days in a school year. Four others reduced the minimum mandated. On average, the range remains 170 to 180 days. (National Center for Education Statistics, 2009i)

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Synopsis

To provide more and/or better quality of time for learning, districts and states have explored: a) adding more school days; b) making school days longer; c) and spreading school days more evenly across the calendar year. Though the concept of extending the time children are in school has been a point of discussion for many years, the reality is that things have remained relatively constant for the past several decades. No state as of 2008 required more than 180 days of annual schooling (National Center for Education Statistics, 2009i). Fewer than 3,000 of the 91,000 public schools across the country were on a year-round schedule (National Association of Year-Round Schooling, 2007). And, several states and districts had explored reducing school weeks by a day, with some actually implementing this approach (Kingsbury, 2008).

Consequences

With continuing concern about controlling school operating costs in rough economic times, the likelihood of extended school days or years is relatively remote. More probable over the coming decades is that "learning time" will be extended through virtual educational experiences. And, this approach may well be combined with reduced number of school days in brick and mortar facilities. By 2050 it is not hard to imagine a state of affairs in which students attend the physical place called school for 3 or 4 days a week, with the remainder of their educational activities occurring at home, parents' places of work, or local community centers via some form of telecommunications. The benefits are twofold. Districts save significant operating costs since support service expenses such as heating and cooling and bus transportation may be reduced by twenty percent or more. And, actual "learning time" might in fact be increased since students could be provided a variety of virtual self-paced enrichment and remediation instructional modules beyond the standard curriculum. Such modules might be completed in the evenings, on weekends, or even in the "off-summer," without increasing operating costs.

As to year-round schooling, the concept has not really caught on as many imagined it would. A major reason is that the concept conflicts with what has become standard social/cultural practice. While year-round education may have unique benefits, a majority of parents and communities still want their children free for summer vacation, off the streets during the days of a traditional school year, and available as teenagers for summer employment. In forty years, year-round education may become the accepted delivery model for schooling. However, if so, the process will be long and slow, as it has been to date.

In any event, educators and facilities professionals will find that school facilities continue to have large periods of "down time" in terms of children not present. What will be a critical consideration is how such time could be best used to the advantage of the whole community (Daily, 2007). As noted earlier, educators and facilities professionals who find ways to integrate schools and communities will have greater success in convincing those communities to support the schooling process, including funding of school construction and remodeling.

Trend 10: School Attendance Lines Continue to Blur and Disappear

> **In 1993 about 80 percent of students attending public schools did so through assignment (prescribed attendance zones). Now, over 25 percent choose the school they attend. (Grady & Bielick, 2010)**

Synopsis

Public school choice continues to grow. More and more districts are instituting programs that allow students and parents to select a school that best meets the interests, needs, and goals of a child. Not only are fewer public school children now required to attend a specific school, many are given multiple options including magnet school and charter school alternatives. These options are being exercised. For example, in 1999/2000 about 350,000 children were attending charter schools. Near the end of the decade of the 2000s that number has risen to 1.3 million students. Related survey data indicate that noticeably more parents (62%) who choose their child's school are happy with that school than are parents (52%) whose children are assigned to a school (prescribed attendance zones). In general, the numbers of public options are growing steadily and parents with those options are more satisfied with the schools their children attend (Grady, & Bielick, 2010).

Consequences

Public school districts and schools continue to serve the vast majority (approximately 90%) of school-age children in the United States (National Center for Education Statistics, 2009j). But, how this is done is changing. Educators are beginning to realize that satisfied

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customers (students and their parents) may make all the difference in whether public education continues to exist. As a result, attendance lines are slowly but surely becoming things of the past as parents and their children are given public education options, not only to meet their needs, but to keep them participating in public schooling.

As this unfolds, real care must be exercised that the transition is inclusive. To date, available data indicate that those more likely to make choices (particularly private vs. public) tend to be white, well-educated, socio-economically comfortable, and located in more suburban settings (Grady & Bielick, 2010). Educators and facilities professionals must work closely together to develop master plans for public choice that geographically, economically, racially/ethnically, and politically extend choice to all constituents. Through proper location of schools of choice, and the types of choices available, this can be a reality. But, careful thought and planning, as well as commitment, will be keys.

Trend 11: Technology Becomes the Future: The Future Becomes Technology

> **Ninety-seven percent of the U.S. public schools report they have instructional computers in their classrooms. And, two out of three teachers are integrating technology into instruction at least moderately. (Gray, L. & Lewis, L., 2008)**

Synopsis

Technology is now incorporated into all aspects of instructional delivery and school operations (Gray & Lewis, 2008). Technology in support of instruction is used for everything from student assessments, to individualized instruction, to grading, and to reporting student progress (Gray, Thomas, & Lewis, 2010). Operationally, schools have embraced technology for such functions as accounting and bookkeeping, staff development, security, bus routing, energy conservation, and maintenance scheduling. While almost all schools are now wired for technology, the next generation of connectivity is rapidly taking hold. About 40% of public schools now report having wireless access. As to variety of instructional equipment available, most schools report having such items as LCD/DLP projectors, electronic whiteboards, and digital cameras. Rapidly emerging trends include: a) increasing numbers of virtual learning experiences (distance courses and fully online schools), b) less and less reliance on paper instructional products (texts, workbooks, and paper are disappearing), c) greater use of hand-held learning devises (smart phones and iPods), and d) individually prescribed curricula generated from technology-based assessments and prescriptions (Johnson, Smith, Levine, and Haywood, 2010).

Consequences

For educators and facilities professionals the challenge of technology over the next forty years is, to say the least, daunting. Technology is advancing at such a rapid rate that it is nearly impossible to plan school structures that remain “cutting-edge” for very long after opening. However, schools planned with the greatest flexibility in terms of adding (and removing) technology will best support continuously emerging technology-based instructional methodologies and operational management approaches.

One note of caution must be added to all of this. While technology will become ubiquitous, it is not to that point as yet, either in America or across the world (Newcastle University, 2009). A great disparity as to the amount of technology, the quality of technology, and the preparedness of instructional personnel to use the technology now exists across America’s schools (Gray, L. & Lewis. L., 2008). Similar to the unevenness related to who makes school choices noted in a previous trend, schools with the most current and comprehensive technologies (and teachers well-trained in their use) tend to serve higher income, well-educated, white, suburban populations. As the student population of the United States becomes more diverse, quality instructional technology will need to be readily available to all children, regardless of economic status, race/ethnicity, or geographic location. Educators and facilities professionals will want to keep this in mind as new schools are constructed, but also in monitoring and upgrading technology in existing, older schools.

Trend 12: Larger Amounts of Instructional Time Continue to be Allocated to Core Subjects

> **Since 2001 nearly 60 percent of U.S. school districts have increased instructional time for English/language arts, and 45% for mathematics. Sixteen to thirty-six percent reported decreasing time for social studies, art, music, and/or science. (McMurrer, 2007)**

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Synopsis

Since the No Child Left Behind legislation was put in place, schools and districts have steadily increased instructional time allocated to curricular areas where state and national testing is focused. Not only are elementary schools increasing the amount of time students participate in English/language arts and math, so are many middle and high schools. For example, over twenty-five percent of high schools report requiring students who do not do well on state academic performance tests to take additional course work in English/language arts and math (McMurrer, 2007).

Further, a recent national movement, the Common Core State Standards Initiative (2010), has proposed that common standards and benchmarks in English/ language arts and mathematics be adopted across the country. While the proposal has caused considerable consternation among strong states rights advocates, many educators and policy makers support the idea that a child, regardless of where he or she lives in the United States, should receive an education that is adequate for successful job or college entry.

Consequences

Educators and facilities professionals have the intimidating task over the next forty years of not only building tens of thousands of new schools, but doing so in such a way that the structures themselves fully and adequately support the instructional programs to be offered. This is not an easy assignment since what should be taught, to what extent, and by whom are evolving in this country. Strong advocates continue to press for a broad curriculum that educates the "whole child" (Association of Supervision and Curriculum Development, 2007). However, the reality is that over the next many years educational resources in this country will be focused on basic subjects and content – with a particular emphasis continuing to be on English/language arts and mathematics (Common Core State Standards Initiative, 2010).

One reason for this is that these two subjects are considered by many as the building blocks for others. Another is that industrialized countries, competing for their share of the world marketplace, consider basic worker language/communication skills and mathematical knowledge essential to economic survival. Third, as noted earlier, continued challenging economic times, combined with increasing percentages of at-risk children in schools over the next forty years, means that education in the main will have to channel limited resources into the basics first, leaving less and less for other areas of the curriculum.

With the strong push now beginning for national standards in mathematics and English/language arts, these areas will continue to garner the greatest interest and consideration of policy makers and citizens in general for years to come. This is not to imply that the arts will no longer be offered in schools of the future, nor that science and social studies/history will be abandoned. In fact, a growing body of research is beginning to indicate that subjects like the arts can improve academic outcomes (Hardiman, Magsamen, McKhann, & Eilber, 2009). But, it does mean that larger portions of school time and school spaces likely will be committed to the "essential" knowledge and skills areas. Educators and facilities professionals will want to plan new schools and remodeling of existing structures accordingly.

Trend 13: Schools Grow Greener and Greener

As of 2010 over 300 schools across the United States had been LEED certified, with another 1,700 seeking certification. LEED is a third party voluntary verification process focused on environmental sustainability of structures and sites. (U.S. Green Building Council, 2010)

Synopsis

Schools are being viewed more and more as a key component of creating and maintaining a sustainable environment (Kats, 2006). In this role schools are expected to accomplish three different tasks: a) to teach children the importance of and how to protect the earth's environment; b) to model environmental best practice in the construction and operation of school facilities, and c) to improve operational efficiency, (thus, saving tax dollars) through green practices that reduce energy costs, control water and wastewater use, and reduce personnel expenditures by creating healthier work environments. While estimates vary, the general rule of thumb is that building environmentally friendly schools costs about 2% to 3% more than would be the case without doing so. However, proponents of green schools argue that when life cycle costs are taken into account, green schools more than pay for themselves (Kats, 2006).

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Consequences

Some local education policy makers are yet to be convinced that green schools are worth the added expense (Hui, 2010). The argument is made that, particularly considering the current economic crunch, spending more to build green schools in effect reduces the total number of building projects that school districts can fund. However, the idea of "going green" has taken firm hold in America. Businesses tout green products, towns and cities boast of green living conditions that promote health and well-being, and various governmental entities from the federal to the local level reward green activities via grants and incentives. As green building materials and construction practices become more common, the cost of erecting green structures, including schools, likely will fall noticeably. And, if longitudinal studies consistently verify substantial life cycle cost savings as a result of building environmentally friendly schools, the movement will not only continue, but become expected and/or required throughout the United States.

In a sense, the concept of building green schools is in its infancy, much like where technology was twenty years ago (Steele-Saccio, 2007). And, as with technology, the likelihood is that "green" practices will be omnipresent in all aspects of the lives of Americans within twenty years. Educators and facilities professionals have a unique opportunity to both educate and model for the country green practices through careful planning and design of both new schools and retrofitted ones. The challenge will be reminding constituents and policy makers to think long term as it relates to upfront costs versus cost savings gained over the life cycle of a structure – not to mention a healthier plant.

Trend 14: Who Teaches Becomes a Critical Question

> **Currently approximately 3.7 million public school teachers are employed in the United States. In ten years that figure could exceed 4.2 million. (National Center for Education Statistics, 2009k)**

Synopsis

If student populations grow as expected over the next forty years, America will actually need nearly 5.5 million teachers, using today's teacher/pupil ratios. That is, by 2050 public school enrollments could call for almost two million more teachers than now employed. Not only will higher education institutions need to recruit and train larger and larger cohorts of would-be teachers, that whole corps will have to be more diverse than it is today. Latest figures for the country indicate that over 80% of public school teachers are white, non-Hispanic (National Center for Education Statistics, 2009l). Hispanic (all races) and black teachers (non-Hispanic) each account for 7% of the total instructional staff. As noted earlier, by 2050, only 35% of the student population is expected to be white, non-Hispanic. If teacher race/ethnic cohort ratios do not change within forty years, public schools will be populated by a diversity of students - but a largely homogeneous teaching corps. A further challenge will be encouraging males to enter teaching. Among public school faculty today, only about 25% of staff members are male (National Center for Education Statistics, 2009m).

Consequences

Recruiting and retaining qualified teachers is a growing challenge in the United States (Alt & Henke, 2007). With the increased range of career opportunities for women today compared to their mothers and grandmothers, universities and schools are finding the potential teacher pool diminishing. Further exacerbating the problem is that relatively low wages and esteem issues have curtailed the number of males who make a profession of education. And, those who do so often enter administration as quickly as possible because of increased pay and prestige. Attracting replacement teachers for the 3.7 million current ones who will retire over the next forty years will require a Herculean effort in and of itself. To also add another two million teachers because of expected enrollment growth may be an impossible task. Further intensifying the problem is the need to greatly diversify the teacher corps as part of the process.

Over time limited resources in general and difficulty in attracting and retaining a qualified teaching corps may combine to be the impetus for a change in the delivery structure in schools (Coggshall, Lasagna, & Laine, 2009). Many expenditures related to operating schools are fixed (utilities, etc.), with educators having few options other than reducing personnel costs to cut or control budgets. As current hard economic times and their memories continue, and taxpayer reluctance grows, policy makers and administrators will seek economies through personnel reductions – with the most obvious target being teaching positions because of their relative abundance.

As a result, the function of the remaining teachers could

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be transformed. In one futuristic vision of what may happen, a smaller cohort of professional teachers assumes a new role of "facilitator of learning," operating much like doctors - diagnosing, prescribing, and coordinating treatment (Coggshall, Lasagana, & Laine, 2009). In this approach, a highly trained and elite corps of professional educators oversees an increasing number of technicians - both instructional and technical. In effect, teachers would diagnose and prescribe while technicians would administer "treatment" through an array of delivery systems.

Whether schools will adopt a "doctor's office" model is not clear at this instant. However, the indicators that some type of major structural change in public education will occur are strong, and growing. Educators and facilities professionals will want to formally include the ramifications of such potential changes in developing and reviewing long-range building programs.

Trend 15: By Necessity Learning Evolves to an Asynchronous and Ubiquitous Process

About a million students currently are enrolled in some form of online learning, and 24 states have virtual schools that serve multiple districts. Virtual learning is growing at an estimated rate of over 20% annually. (Watson, Ryan, & Wicks, 2009)

Synopsis

The Alliance for Excellent Education recently highlighted three education crises facing this country in the coming years. These include: a) an insufficient capacity to prepare students for and to provide post-secondary learning experiences to compete in a global market; b) an impending "funding cliff" that is and will continue to change the organization and structure of education; and c) a looming teacher shortage (Wise, 2010). In general, the argument is made that education as it has been structured and delivered for decades and decades cannot continue to survive, much less flourish.

The underlying problem across all three crises is money, or lack thereof. And, the future does not seem bright in terms of that changing. A winner of the Nobel Prize in Economics, Paul Krugman (2010), lately has suggested that the recession of the first decade of the 21st century is not over and even hypothesizes that the country could yet be headed to another depression. As noted earlier, even if economic conditions improve in the next several years, the memory of the effects of the current unemployment and job woes will drive how many Americans feel about any kind of taxation, much less tax increases. In sum, the funding picture for education, not only in the near term, but for the foreseeable future, is dreary.

Consequences

How does a country provide a quality education to an increasing number of children, more and more of whom will be at-risk learners, while dollars budgeted to education continue to remain stagnant, or even diminish? How can effective learning experiences be delivered when the expectation is that the nation may well have fewer and fewer qualified teachers in the decades to come? And, how will districts address increasing enrollments when adequate funding is not available to construct or update school facilities?
The emerging answer is: Through virtual learning experiences – experiences that occur at any location, at any time, and focus on the topic of choice of the learner (Moe and Chubb, 2009). In this scenario, content materials are developed by the best educators in their respective fields. Highly trained distance delivery experts package the materials for effective use via multi-media devices. Student learning styles, as well as developmental stages and bio-rhythms, are considered as instructional packets are assembled. Learning opportunities become ubiquitous and asynchronous - literally available everyplace and all the time either through handheld devices or via electronic "learning stations" located in homes, at parents' work sites, in local libraries, or within community centers. The argument is made that the result is a delivery system that provides: a) the best of educational materials; b) instructional delivery tied to the uniqueness of the learner; and c) endless choices as to when, where, and how to learn. And, all of this occurs despite diminishing education budgets since personnel, operating, and facilities-related costs are reduced significantly when schooling is largely virtual.

This does not necessarily foreshadow the disappearance of schools within 40 years. In fact, it is more likely in 2050 that some hybrid or blended educational delivery model, involving on-site and online learning, will be prevalent (Means, Toyama, Murphy, Bakia, & Jones, K., 2009). It does, however, strongly suggest that educators and facilities professionals face a different future from what has always been. Thinking differently, particularly in terms of what school facilities will look like and the roles they will fulfill, must become a

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very necessary part of the long range facilities planning process.

The Message the Trends Send to Educators and Facilities Professionals

The author Ursala K. Le Guin may have said it best. "Morning comes whether you set the alarm or not." The same is true of the future. Regardless of how much we may dislike what the coming decades could bring, time will not stand still. Though the picture of the future painted by most of the trends is less than bright, educators and facilities professionals will have to deal with whatever transformations eventually manifest themselves in society and in education. The critical consideration is not "if" but "how" to deal with the issues the trends put forth. One way is to try to react as they occur. However, as mammoth and fast-moving as many of the trends are, this approach may well put educators and facilities professionals in an untenable position – one where today's solutions become tomorrow's problems.

The other option in dealing with the potential effects of the trends is to be pro-active. Instead of waiting for the shifts and their resultant impact to happen, educators and facilities professionals, as noted previously, who thrive and prosper likely will be those who uncompromisingly anticipate and prepare for varying potential futures (National Center for Education and the Economy, 2008). Necessary questions that must be part of this approach include:

a) What are the likely but alternative scenarios that could emerge regarding the framework and configuration of public education in the next several decades (mission, structure, clientele, funding, delivery system, etc.)?
b) What issues, challenges, and hurdles does each scenario present in terms of planning for, designing, constructing, funding, and operating public school facilities?
c) What opportunities, innovations, and advances does each scenario potentially offer for effectively and efficiently creating an optimum learning environment?
d) How can educators and facilities professionals work together not only to meet the consequences of the trends, but to influence the future itself?
e) What adjustments to both the planning process and the actual physical structure of schools need to be made now in anticipation of alternative futures?

Aggressively exploring possible future scenarios and creating contingency plans of action may not assure success. On the other hand, investigating the possibilities could lead to yet unimagined, creative, and innovative facilities-related solutions for everything from potential overcrowding to Baby Boomer reluctance to support schools financially. Though it's not a new tool, planning will continue to be the critical factor in providing school structures that complement and harmonize with the educational system of tomorrow.

Final Thoughts

This edition of "Trends" has painted an uncertain future for public education and, thus, of school facilities planning, design, construction, funding, and operation. However, it is critically important not to ignore or deny the possibilities the trends encompass. Instead, it is hoped that this "Trends" will serve as a starting point around which educators and facilities professionals come together to "think outside of the box," to ask "what if," to wonder "why can't we," and to "consider the unconsidered." Out of shared frank, open discussions of the potential impact of the trends on public education and its school structures will surely emerge new and exciting ideas -- ideas of how to best adapt to and, in some cases, ameliorate the effects of the trends in the best interests of America's children (Chen, 2010).

No doubt the roles of educators and facilities specialists will be affected by a changing future. But, it is also true that educators and educational specialists can help shape that future. The key is to be proactive, beginning now. As an old African proverb reminds us:

> *Tomorrow belongs to the people who prepare for it today.*

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Publication Notes

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