Comparing apples to apples?

The facts about Indiana school construction

A white paper
from FAIR, Inc.

F A I R
Fostering Accuracy, Involvement and Responsibility

What is FAIR, Inc.?

FAIR (Fostering Accuracy, Involvement & Responsibility Inc.) is a non-profit statewide advocacy organization created to bring greater fairness to Indiana's public facility construction process.

We believe that a public facility referendum can provide a legitimate choice only when local voters receive accurate information from both sides. FAIR is working to:

- Educate local officials and provide resources to help them be more effective in working with their communities,
- Enhance public awareness of the inequities in the present system, and
- Help state legislators recognize the need for refinement of the laws.

FAIR is dedicated to helping communities and the governing bodies that serve them make smart investments in their future economic health, and encouraging collaborative decisions between local officials, taxpayers, businesses, and all stakeholders in the community.

Our goal is to foster productive, positive conversations that will lead to sensible investments in the future of Indiana's communities – while preventing divisive battles that can leave long-lasting scars.

Why did FAIR create this white paper?

Over the past several years, school construction issues in Indiana have generated a significant amount of heat, but far too little light. The state's elected officials and others in prominent positions have claimed that Indiana's schools are far more costly than they should be and far more expensive than schools constructed in other states.

Many of those claims have gone unchallenged in the media, leading taxpayers to believe that they are accurate. In reality, an apples-to-apples comparison is nearly impossible to achieve, because of factors ranging from climate differences to the variety of financing mechanisms mandated by each state. When Indiana school construction is placed under the microscope, it becomes clear that costs are quite similar to those in other states.

We developed this paper to help everyone involved and/or interested in the issue of school construction in Indiana better understand the realities, so discussions can focus on the facts, rather than on emotions and hype.

We hope that local school boards and superintendents will find this information useful in responding to questions and criticisms in their own communities. We also hope it will help representatives of the media develop a deeper understanding of the issues surrounding school construction, so their reportage is as accurate and fair as possible.

Finally, we hope that it will call attention to the need for changes in the present referendum system to ensure fairness and factual information.

About the author

Comparing apples to apples: the facts about Indiana school construction has been developed by Scott Flood on behalf of FAIR, Inc. He operates Scott Flood Writing (sfwriting.com), and is serving his third term on the Plainfield Community School Corporation board.

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Comparing apples to apples: The facts about Indiana school construction

In 1632, the grief-stricken Mughal emperor Shah Jahan ordered construction of a mausoleum as a remembrance of his favorite wife. Located in Agra, India, what came to be known as the Taj Mahal is widely considered to be one of the world's most visible expressions of love.

When its name is invoked in Indiana, it's usually without much affection. In recent years, the Taj Mahal's name has often been bandied about by opponents of school construction projects, implying that those projects are unnecessarily costly.

While it's clear that Indiana school corporations are not building mausoleums, there is a widespread public perception that schools and school projects such as building additions are more lavish than they need to be. That perception has been fueled by many elected officials – including the Governor – who suggest that projects in Indiana are far more costly than their counterparts in other states, and who present statistics in support of their claims. Media outlets compound the perception by devoting coverage to the claims and statistics without examining them critically.

Have some school projects been more elaborate and expensive than necessary? There's no question about that. A handful of projects around Indiana accounts for most of the negative attention. But are the vast majority of school projects excessive or unnecessarily costly?

It's a far too complex issue to answer in a quick sound bite. Observers who take the time to analyze everything involved in constructing schools in the state of Indiana and compare them to all the factors from other states will discover that not only are Indiana's costs comparable, but in many cases, are surprisingly low.

In this document, we intend to look beyond the hype surrounding school construction and discern the truth about how Indiana's needs and costs compare to those of other states. Our goal is to foster understanding of the realities of school construction so communities can avoid rancor and work collaboratively.

What makes schools so different?

A common method for comparing construction costs is to divide the total cost by the number of square feet in the building or addition. Examining the cost per square foot is a widely accepted metric among architects and construction professionals, and it's one way that school construction costs are typically evaluated.

When comparing the cost of one new high school gymnasium with another, using cost per square foot can provide a legitimate yardstick. But when a building project is being discussed, critics will often compare its per-square-foot cost with that of other types of commercial structures that have been built in the area. If the other type of buildings faced the same parameters and objectives, that comparison would also be legitimate, but school buildings and commercial structures rarely allow accurate apples-to-apples assessments.

Planned service life. Our communities expect long lives from their school facilities. When architects ask local administrators and school board members how long they anticipate using a new building, the answers normally extend into several decades. "50 years" is one of those most common, and it's not unusual to see Indiana communities continuing to use buildings that are even older than that. Even when an old school building is no longer used for classrooms, it's often repurposed for office space, storage, or other needs.

School board members who suggest that an "old" school should be torn down can expect a firestorm of criticism from the community, whether that's because of nostalgia for the structure or a sense that a "perfectly good" facility is being wastefully cast aside. Instead, local school districts will pump huge sums of money into old buildings to extend their useful lives by a decade or two.

In comparison, most of today's commercial space is constructed with a substantially shorter time horizon. Many developers depreciate their new buildings over short periods such as seven years, and then sell the fully depreciated structures to someone else, so they have no need for long-term durability. It's not unusual to see retailers replace old retail buildings that aren't even a decade old. Structures with shorter useful lives typically cost a lot less to build.

Construction methods. Many of today's commercial structures are erected using prefabricated concrete panels that are "tilted-up" into place and attached to a steel frame. This modular approach reduces the costs of both materials and labor, driving the per-square-foot costs down.

School buildings, on the other hand, tend to be unique structures built from steel, masonry, or a combination of the two. While tilt-up construction is faster and cheaper, warehouses, big-box retailers, and schools are built to very different

needs. For example, most warehouses and big-box retail buildings are large open spaces that are usually not subdivided, while school buildings require discrete classrooms with interior walls and hallways. Acoustic issues are not nearly as important in a warehouse as they are in a school, so there is no need for ceilings. Mechanical systems in a warehouse can use centralized controls, rather than individual in-room settings.

A final (but no less important) consideration involves the learning environment. As the nation has moved forward from the Industrial Age, parents and communities want children to be prepared for the future. We send them to schools for that reason, and placing them into factory-like environments isn't likely to provide the most effective preparation.

Why are today's schools so different from yesterday's?

Will Rogers once claimed that "schools ain't what they used to be, and never was." The fact that he made his observation nearly a century ago suggests that hindsight has always been affected by at least a hint of myopia.

Humor aside, people tend to view today's schools within the context of the schools they attended, whether that was a decade or a half-century ago. That impacts their opinions of school construction projects in two ways. First, their memories of school are limited to their own experiences in the buildings, so they may not be aware of all of the aspects of those buildings or issues that their teachers and administrators faced.

Second, and more important, today's schools are much more multifaceted facilities that address more complex societal issues and greater community expectations than their counterparts a generation or two ago – not to mention more complex educational programming. In essence, schools are constantly being forced to change their physical needs to match the changing (and increasing) demands society is placing upon them.

Special Needs. A significant change that has affected the size of schools and the cost of construction is the tremendous growth of special-needs instruction, including special education and English-language-learner programs for new immigrants and children whose parents don't speak English. It's not unusual for as much as 15 percent of an elementary school's space to be devoted to these programs, including both classroom space and resource areas.

The classroom space required by such programs is larger than enrollment alone would suggest. While a traditional elementary-school classroom might house up to 30 students, children with special needs

It's not a matter of buildings vs. teachers

Opponents to building projects often ask a question that – on the surface – seems valid: "Why are we investing in facilities when we should be spending money on teachers?" The implied message is that school corporations are somehow taking money away from staff costs to pay for building projects.

That may be true in other states, but it's impossible in Indiana. State law mandates the use of fund accounting, with separate funds for different categories of costs. Under state laws (aside from some very limited exceptions), money from one fund cannot be transferred to cover costs in another.

School construction costs are financed through property taxes and paid through what is known as the Debt Service Fund. Costs for classroom instruction – including teacher salaries and benefits – are financed by the state and paid through the General Fund. School corporations cannot transfer money between those two funds, and the money comes from separate sources (property taxes and state funding, respectively). In addition, the amount of money flowing from the state into the General Fund is determined by a formula developed by the General Assembly. Local school boards have no say in how much money is received.

By taking this approach, the General Assembly had the foresight to ensure that school districts would be able to maintain their buildings without creating divisive arguments about whether tax dollars should be used for maintenance or hiring educators.

So there is no way that local school boards or superintendents can divert money for instructional purposes into paying for building construction. A school district that did so would be acting illegally – and the State Board of Accounts audits school finances exhaustively.

(One more note: when state government reduced property taxes by increasing the sales tax, they actually reallocated how the average taxpayer's taxes were paid, and shifted more revenue and control from local government to the state.)

typically require much more intensive and personalized instruction, so the same amount of square footage might only accommodate 6 to 8 students at a time.

Districts that integrate special-needs students into regular classrooms will generally incorporate "pull-out" times, during which those students are taken to another room for intensive instruction.

Even the remediation efforts for general-education students that became widespread upon the enactment of the No Child Left Behind law are usually geared to very small groups of students. If specialized space is unavailable, teachers, paraprofessionals, or volunteers are forced to work with the children in hallways and vestibules – not exactly places that foster concentration.

Schools also need specialized spaces for speech and hearing therapists, social workers, and other professionals whose functions require privacy and quiet. While those roles have become essential in today's schools, most did not exist a few decades ago.

Security concerns. The perception that schools were safe havens for children was shattered in 1999 when a pair of angry students opened fire on classmates and teachers at Columbine High School in Colorado. While the shootings were not the nation's worst example of school violence (amazingly, that took place in 1927, when an angry school board member dynamited a Bath, Michigan school), the availability of 24-hour TV news and Internet coverage propelled the horror into every home and ensured that "Columbine" would become a synonym for tragedy.

Since then, cautious school districts have sought to transform their school buildings from fairly wide-open, welcoming places to secure facilities with carefully controlled access. Video cameras and electronic card access systems became standard, and entryways and foyers were redesigned to limit entry to the buildings, often requiring the construction of entirely new entryways. Consideration is even given to the possibility that someone might drive a vehicle through a school's doors – something school architects of a generation ago never imagined.

Most school administrators worry less about a Columbine-style attack than about a parent who is angry about a custody battle or a disciplinary decision. Some school designs even incorporate a hallway off the main entrance to allow administrators to move a volatile parent away from the public foyer. The added square footage for that kind of design contributes to higher costs.

Fire protection also raises the price tag. Communities usually expect new school buildings to incorporate sprinkler systems to protect students, although the primary purpose of sprinklers has always been to safeguard the structure and contents, rather than lives.

Technology needs. While one might assume that the increased use of technology would actually reduce the amount of space in school buildings, thus far, it has had the opposite effect. That has more to do with educational planning than the needs of the technology. Because computers and other technology are seen as an adjunct to classroom instruction – rather than an alternate or replacement – planners continue to design full-size classrooms and separate "computer labs."

Buildings will serve students for decades. How can today's architects possibly accommodate technology that's not even on the drawing board or in someone's imagination?

The Internet also created a need for rooms to house servers and related equipment, as well as space for cabling and components. Even schools using wireless systems and student laptops quickly discover a very pedestrian requirement: where do you plug in all of those computers? Some designers are incorporating charging stations in student lockers, but even just adding wall plugs means additional costs for wiring and increasing the school's electrical load.

Technology is advancing at a geometric rate, with dramatic improvements appearing every year. When architects design new schools, they recognize that the buildings will serve a community's students for decades. How can they possibly accommodate technology that's not even on the drawing board or in someone's imagination? And how will smart phones and other hand-held devices evolve and possibly play a role in classroom instruction? For now, all architects can do is incorporate as much bandwidth as possible and allocate space in chases and plenums for whatever type of cabling may be used in the future.

Another place where advances in technology have had a significant impact is high school and middle school science labs. Nearly any renovation of a building that's more than a couple decades old will include a floor-to-ceiling reconstruction of the science labs to accommodate the new technology and enhance student safety.

Indiana's construction spending as a share of total education spending was 6.01 percent in 2005, well below the national average of 9.8 percent, ranking Indiana as 34th in the nation.

Student size and activity. While America's "obesity epidemic" may be viewed as hype in some circles, the simple fact is that young people are physically larger than they were a couple generations ago, and not all of that is related to a fast-food diet. Thanks to better nutrition and medical care, children are generally healthier and stronger, and the size of their bodies reflects that.

Larger students require more space. Hallways and locker rooms that were adequate 50 years ago now seem cramped even when they serve the same number of students. Having space to move also contributes to student comfort – and any middle school administrator will tell you that the more tightly students are packed into a space, the more discipline referrals he or she will see.

Educators are also becoming more aware that physical movement is an important part of student development. Beyond physical education classes and recess time, that also involves simple steps such as having students stand up and move to other parts of the classroom throughout the day. Besides reducing the amount of fidgeting, that movement increases students focus and attention, contributing to understanding of the material.

Classroom size. Standards for classroom size are usually established within state government, and many years ago, Indiana officials settled on 900 square feet as the optimum size for an elementary school classroom. Once a classroom reaches 1,000 square feet, code calls for the addition of a second door, so most school districts prefer to keep classrooms below that size.

The size of classrooms plays a bigger role in cost than most people realize. Suppose a school district decides that they want to provide additional space in the classroom for computers, places to hang student coats, or any area where students can gather on the floor to listen to stories. They determine that boosting the size of the room by just ten percent – or 90 square feet – offers the best option. If the entire building has 30 classrooms, that adds 2,700 square feet, and at a cost of $150 per square feet, that decision just boosted the cost by over $400,000.

Environmental issues. Decades ago, energy costs weren't a big consideration. During the winter, most schools used fairly inexpensive boiler systems, and during warmer weather, teachers opened windows to make classrooms more livable. As the school year extended into summer months, and as home air conditioning gradually became commonplace instead of a luxury, schools began to install air conditioning. The energy crisis of the mid-70s spurred drastic changes in school designs in an effort to make buildings more energy-efficient. Among these changes was a trend toward fixed windows that could not be opened, and less reliance on natural light (because walls were better insulators than windows).

Driven by education research and widely publicized cases of "sick" buildings, the trend reversed in the ensuing years. Natural daylight and fresh air were recognized as critical elements of an environment that is conducive to learning and student health.

Those impacts accelerated as awareness of "green" building practices grew. The recently adopted LEED (Leadership in Energy and Environmental Design) standards challenged designers to find ways to increase the amount of natural light. New technology monitors ambient lighting and adapts the use of artificial lighting to match the needs. (However, because of the hours of building operation and weather conditions, a capital investment in artificial lighting is still needed even in buildings that make excellent use of natural light.)

Of course, these sophisticated systems tend to carry higher price tags. Besides the controls themselves, increasing the flow of fresh air without adding mold-causing humidity requires larger motors and mechanical systems.

At the same time that a variety of federal agencies are encouraging "green" approaches to building construction, with a focus on long-term energy conservation, Indiana's General Assembly has placed the challenging obstacles of the referendum process and property tax caps in the path of school districts. While those measures may protect taxpayers from upfront capital costs, they may mean greater energy costs over the lives of the buildings.

How do overall costs compare?

Critics are fond of claiming that Indiana's school construction costs outstrip those of other states, but a review of independent data concludes otherwise. A study by the Center for Evaluation and Education Policy compared cost per square foot and concluded that Indiana's costs were near or below the national average for new construction and middle school additions. While high school and elementary school addition costs were

Average new school cost per square foot, 2009

(Amounts lower than Region 6 in green, higher than Region 6 in red)

Region	Elementary	Middle	High School
National median	$ 185.00	$ 187.50	$ 203.13
1 (New England)	224.14	210.34	341.01
2 (NJ, NY, PA)	384.62	288.46	198.92
3 (DC, DE, MD, VA, WV)	219.78	236.56	206.44
4 (KY, NC, SC, TN)	164.63	175.18	203.41
5 (AL, FL, GA, MS)	167.44	153.22	172.66
6 (IN, OH, MI)	208.82	157.81	170.81
7 (IL, MN, WI)	202.98	177.86	187.87
8 (IA, KS, MO, NE)	173.72	216.67	191.79
9 (AR, LA, OK, TX)	162.50	170.71	181.29
10 (CO, MT, ND, NM, SD, UT, WY)	198.72	218.22	216.87
11 (AZ, CA, HI, NV)	594.82	306.15	524.11
12 (AK, ID, OR, WA)	239.67	275.51	207.25

Source: *School Planning & Management's* 15th Annual School Construction Report

above the national average, CEEP pointed to a very small sample size in the year the numbers were studied.

CEEP also noted that Indiana's construction spending as a share of total education spending was 6.01 percent in 2005, well below the national average of 9.8 percent, and ranking Indiana as 34th in the nation.

School Planning & Management magazine publishes an annual review of school construction spending throughout the U.S. The report, which is based on Dun & Bradstreet data, breaks the nation into 12 regions. Indiana, Ohio, and Michigan make up Region 6.

The chart above summarizes the per-region data. As can be seen, costs in Region 6 actually tend to be well below the national median, with elementary schools as the exception. Even then, five of the 12 regions have a higher average elementary school cost than Region 6.

When the Indiana Department of Local Government Finance published its final set of School Construction Cost Thresholds in 2008 – the numbers school districts were expected not to exceed – they called for elementary schools to cost less than $157.30 per square feet, middle and intermediate schools to be less than $160.60, and high schools to be below $187.00. (Additions to existing facilities averaged about $60/square foot higher).

Based on those thresholds, one could make a compelling case that Indiana school buildings carry costs that are lower than those in much of the rest of the nation. Several factors make a pure apples-to-apples comparison impossible, but the best data available suggests that criticisms of Indiana school construction costs have simply been inaccurate.

Why aren't simple comparisons available?

If Indiana's communities, school district size, approaches to financing, labor costs, and even climate were identical to those other states, a true apples-to-apples comparison of school construction costs would be easy to develop. But because Indiana school districts contend with a variety of unique factors, that kind of comparison is impossible to obtain. Several of the primary reasons follow.

The Biggest Factor: Climate. It may seem ridiculously obvious to note that Indiana experiences four distinct seasons. But when critics compare the way school buildings are constructed here to those constructed elsewhere, that obvious factor is often forgotten.

In most Indiana communities, school is in session from August through May. Additionally, school buildings often host activities during summer break. That means the schools must be able to provide a comfortable learning environment while enduring everything from 100-plus-degree days in the searing August sun to subzero February mornings. While weather extremes may be rare, the buildings have to be engineered around them. In particular, the freeze, thaw and summer heat cycle takes a mounting toll on a building, as the structure grows and shrinks with temperature changes and ground conditions.

In many areas of the country, a simple two-pipe HVAC system can support most needs for conditioning interior spaces. But those systems are less effective in Indiana's climate for a number of reasons. For example, during transition times in fall and spring, it's not unusual to have a need for heat during the morning and cooling as the afternoon sun warms the building. In fact, a building as large as a school may even need heating and cooling simultaneously, because of climate conditions and heat from the bodies of its occupants. At the same time warm air is being introduced to classrooms along the building's perimeter, computer rooms and other spaces closer to the building's center may need to be

cooled to ensure comfort.

Because of that, architects and engineers typically specify HVAC systems that involve some type of staging. For example, a system may be designed with multiple boilers. One of the boilers operates all the time, and the system calls on the others only as needed. In addition, more sophisticated controls and HVAC systems such as four-pipe systems and variable air volume systems may meet the need, but all add substantially to the cost.

In states such as Florida, Texas, Arizona, and California, the lack of winter weather means that there's no need for interior corridors, lobbies, and other circulation space. Many of those school buildings are pods of classrooms with doors opening directly to the exterior. If the schools have a gymnasium or cafeteria facility, it's often a freestanding building that's a short walk from the classrooms. This "campus-style" approach allows architects to take advantage of the temperate climate.

That approach can also have a significant effect on cost. Typically, almost a third of the square footage in an Indiana school is devoted to circulation space. With no need for that space, the Sunbelt schools can automatically lop off a third of materials and labor. Instead of tiled or carpeted hallways, they can pour comparatively inexpensive concrete sidewalks. Rather than HVAC systems sized for large spaces, they can use incremental, self-contained approaches.

In addition, because Sunbelt schools do not undergo the stress of freezing and thawing, the building envelope does not need to be as strong. Thinner exterior walls require less structural strength and support, translating to reduced construction cost. Roofs do not need to be engineered to stand up to a heavy snowfall.

(Interestingly, some of the newer schools in California have been designed with interior hallways and common areas in an effort to improve energy efficiency. What architects there hail as "innovative" would look very familiar to Indiana taxpayers.)

In areas where the weather tends to be more temperate during the summer months, such as the Pacific Northwest, the intermountain West and the Northeast, schools may not need air conditioning, allowing for the use of less elaborate HVAC systems.

School size. Thanks in large measure to past school consolidation, Indiana schools tend to be larger than those in neighboring states. For example, of the 354 Indiana high schools identified by the National Center for Education Statistics (NCES), just 111, or 31 percent, had enrollments of fewer than 500 students. In comparison, 46 percent of Ohio high schools, 56 percent of those in Illinois, and a whopping 70 percent of Missouri high schools had fewer than 500 students.

That's also evident when looking at larger school populations. Roughly 17 percent of Indiana high schools have enrollments of more than 1,500 students. That compares to just 9 percent in Ohio, 13 percent in Michigan, and 8 percent in Missouri and Kentucky. Nationally, NCES reports that the average high school has 876 students (the average middle school has 593 and the average elementary, 446).

When each state's population is divided by the number of high schools, Indiana tops the list with 18,144 residents per high school. Illinois registers just 17,123; Ohio 13,807; and Missouri lags behind at 10,505 residents per school.

How do those numbers relate to school cost? It's simple: larger schools tend to carry higher construction costs. In addition to more square footage devoted to classroom space, they have wider hallways, larger cafeterias, a greater need for gymnasiums, and more common spaces, all of which contribute a significant number of square feet. School population also has a profound effect on the size of athletic facilities. A larger school that competes against other large schools

How does the size of Indiana high schools compare?

(National average: 876 students.)

	Indiana	Illinois	Michigan	Ohio	Kentucky	Missouri
Number of high schools	354	754	721	836	284	570
State population	6,423,113	12,910,409	9,969,727	11,542,645	4,314,113	5,987,580
Residents per high school	18,144	17,123	13,828	13,807	15,191	10,505
Schools larger than 1500 students	60	161	91	77	22	47
Schools smaller than 500 students	111	425	343	386	117	397

Source: National Center for Education Statistics (see note in text about methodology)

will logically need bigger facilities with more seats.

It also suggests that efforts by state leaders to impose even more consolidation will only exacerbate that disparity.

(Note: the NCES figures also include a variety of correctional and other facilities at which high school classes are offered, which inflates the total number of schools compared to measures used by the states. While their raw numbers may be imperfect, their methodology is consistent across the other states that are being compared, so we have chosen to use it here.)

Financing Methods. The total cost of school construction also includes the cost of financing. This is an area in which apples-to-apples comparisons become impossible, because each state finances schools in different ways.

A few years ago, when Indiana state officials began to publicly criticize the cost of the state's schools, they often presented Ohio's costs as a comparison. Unfortunately, that comparison was inherently flawed. In the first place, the numbers that were presented for Ohio typically included only direct construction costs, while the numbers for Indiana schools also included financing costs. In addition, the state of Ohio has been using a different funding mechanism in which the state shoulders a significant portion of the construction costs, while Indiana school districts are required to fund the full cost of projects locally.

Labor Costs. Another factor that makes apples-to-apples comparisons impossible is the disparity in labor costs – not just across the nation, but throughout Indiana. Building costs in areas such as Northwest Indiana, where organized labor is very well-entrenched, are typically higher than in communities in rural areas or along the Ohio River.

What are the impacts of instructional changes?

A century ago, many Indiana students were educated in the iconic one-room schoolhouses. While education has changed in many ways since those days, a fundamental principle has not: most schools continue to be designed to support the concept of a teacher lecturing to a classroom full of students whose desks are arranged in neat rows.

Increasingly, educators are realizing that the skills students need to succeed in the 21st century aren't necessarily best imparted through a lecture-and-listen approach. Employer expectations of greater familiarity with teamwork and self-direction, coupled with the explosion of available information, are leading many schools to refocus education on models in which students play a more active role in learning and are involved in more collaboration. Instead of lecturers, teachers are becoming facilitators and academic coaches who guide those students and provide support when needed. Instead of disparate classes and departments, more schools are adopting learning communities in which a single lesson may involve several different subjects.

What does this have to do with construction? Everything. If a district is moving away from a traditional classroom philosophy, it's not likely to build schools with traditional classrooms. Newer options include "pods," in which small groups of classrooms create a "school within a school" approach. These plans often include central common areas large enough to house students from two or more classrooms for more flexibility in teaching approaches.

Where that really becomes an issue is renovation. Converting a 25-year-old school to a different educational philosophy can be complex and expensive. In addition to all of the expected improvements in technology and other mechanical aspects, the floor plan itself may need to be redesigned. Fortunately, new approaches don't always require overhauls. By applying creativity and innovative thinking, educators and architects may be able to create smart solutions using the available space.

Thanks in large measure to past school consolidation, Indiana schools tend to be larger than those in neighboring states.

How does land factor into cost?

A key factor in school construction costs that receives surprisingly little attention is the land upon which the school sits. In most cases, about 10 to 15 percent of the cost of a new school will be for site development.

One reaction taxpayers often have to new schools in Indiana is that the sites seem so much bigger than those of older schools – and that observation is absolutely accurate. Why have school sites grown? There are many reasons, and most go back to changing expectations on the part of communities and legislators.

Increased use of automobiles is one factor. At the elementary school level in most communities, the number of parents who choose to drive their children to school has been on a steady increase. That necessitates more parking spaces and dedicated drop-off/pick-up areas – even though those areas are used for less than an hour each day. At high schools, a higher percentage of students drives to and from school each day,

Many Indiana schools were designed before the ADA and Title IX laws were enacted, under less-stringent building codes, and long before technology became a central element of classroom instruction.

requiring more student parking spaces and traffic engineering that compensates for the driving habits of teens. In both cases, greater concern about safety leads to designs that isolate bus traffic from students who may be walking to school or transiting from the family car. Such designs typically require more space.

In many communities, schools are expected to provide playing fields to accommodate local youth athletic programs. Zoning and building code issues may also call for a larger amount of open space on the site. Recent federal mandates for handling stormwater have been a key factor in increased site development costs and acreage needs, with detention and retention ponds creating space and safety challenges. Additionally, in some communities, each new stormwater project is seen as an opportunity to fix drainage ills in surrounding neighborhoods, shifting the cost burden to school corporations.

The result is that new schools tend to be built on larger sites. For an elementary school, about 20 to 25 acres is seen as ideal; for middle schools, 50 to 60 acres is the current norm; and for high schools, the minimum is now about 100 acres. In urban areas, or even in fast-growing suburban areas, price may be less of a hurdle than being able to find sufficient acreage.

Beyond the actual per-acre cost, a site may come with other costs that aren't as readily apparent. If the site is three miles from the nearest sewer line with adequate capacity, or a mile from the road that serves as the area's major artery, the cost of the land may actually be less than that of the infrastructure needed to make use of it. If the soil on the site is poor and not easily compacted, it may need to be replaced with better soil. And the topography of the site may demand extensive earthwork before construction can begin.

Elementary school buildings often have multiple age-appropriate playgrounds, each with modern equipment and elaborate safety measures. The teeter-totters and tall slides so familiar to past generations have been replaced with safer equipment. Drainage has become more elaborate, too. All of those factors contribute to higher site costs.

How is past consolidation tied to today's costs?

While the need to build school facilities has always been with us, it seems to some people that school districts are more eager to build than they've been in a long time. Cynics often dismiss the activity as an effort to "keep up with the Joneses" in the next district, but the real driver may be legislative decisions that were made a half-century ago.

In the late 1950s, Indiana's lawmakers implemented efforts to consolidate small rural school districts into larger units, with an overall goal of improving student access to a high-quality education. While the process took several years, it was common to see the new consolidated districts build new high and junior high school buildings to accommodate the larger student populations. This was particularly true throughout the 1960s and early 1970s.

Many of those buildings – and the mechanical systems that serve them – are nearing the end of their original service lives. While school districts may have addressed problems with patchwork solutions, eventually those buildings will require major renovations or even replacement. In addition, many of those buildings were designed before the ADA and Title IX laws were enacted, under less-stringent building codes, and long before technology became a central element of classroom instruction. That suggests that many more construction projects are on the horizon.

Why do schools use costly building materials?

When schools are opened for the first time, local residents who tour the new buildings will frequently point to materials used in the construction as evidence that the school district spent too much money on the facility. Components such as terrazzo flooring, large windowed areas, wide-screen video monitors, and the like are often singled out as unneeded luxuries.

Those critics lose sight of the fact that materials and construction techniques carry two different types of costs. Of course, there's the cost to purchase the component and incorporate it into the building, which is where most of the criticism is focused.

The second is what it will cost the owner to maintain that building over its useful life. Many materials that appear to be more expensive upfront actually cost substantially less over time. A common example is terrazzo flooring. Often derided by critics as "expensive marble" (because it's made from marble chips), terrazzo generally provides far more durability

What's a building corporation?

When taxpayers buy a home, they rarely have enough cash on hand to cover the purchase price. So they borrow money through a mortgage loan, and pay it back over a set period of time. Similarly, school districts normally don't have enough cash on hand to cover the cost of new construction or major renovations, so they borrow what they need.

Typically, when a major school construction project is being undertaken, the local school district will create something called a Building Corporation to handle that borrowing. Most taxpayers are unfamiliar with this step or the reasoning behind it.

Indiana law limits the borrowing ability of local government bodies to two percent of one-third of the total assessed valuation of property in the area served by the body. For example, if a school district serves two townships with a combined assessed valuation of $600 million, that district would only be able to carry a maximum of $4 million dollars in direct (General Obligation) debt – not even enough to build a tiny elementary school.

State law allows a procedure for borrowing more money. Essentially, the school district turns ownership of the new building or facility that is being renovated to a Building Corporation. The building corporation borrows the money by issuing municipal bonds, and leases the building back to the school district. The district pays the amortized principal and interest to the building corporation back over the length of the bonds, and the building corporation turns those payments over to the bondholders. Once the final payment has been made, the building corporation ends the lease and returns the building to the school district.

School boards generally appoint local residents to serve as the board of directors of the building corporation. Directors normally do not receive any compensation for their service, and building corporations do not earn any profits.

Indiana law does allow districts the option of working through a privately held building corporation. This rarely used arrangement involves an independent, for-profit organization that selects its own directors.

and lower costs of upkeep than other materials. A district that opts for less-costly vinyl floor tile to reduce construction costs will need to replace that tile every few years, while the terrazzo will likely last as long as the building itself. Tile generally also requires more daily maintenance than terrazzo. So which the better buy for the taxpayer?

Similar arguments can be made for many of the "costly" materials used in school buildings. Architects examine how long the facility is going to be used, and typically recommend materials that are more durable, and that carry lower ongoing maintenance costs.

In addition, lower-cost materials and components may appear to save money in the short run, but they tend to require more repairs over time, or may create other issues. For example, sophisticated temperature control systems raise building costs, but help to optimize energy use and lower energy costs year after year. Cheaper temperature controls tend to use energy less efficiently, and normally have shorter service lives.

Are schools structurally over-designed?

Decisions made during the design process can have a profound effect on the eventual cost of a building. When schools are being designed, architects and engineers try to balance the cost with the objective.

For example, when comparing schools to similarly sized commercial buildings, some observers suggest that the schools are overbuilt. If you simply look at components such as structural steel, it can be easy to draw that conclusion. Because steel can be costly, the simple answer might be to reduce the size of beams and girders to lower building cost.

But using larger beams and girders allows open areas to be larger, and eliminates the need for columns within classrooms and circulation areas. Most important, it gives districts greater flexibility for reconfiguring existing floor space or adding new space as educational programs and needs change. Older school buildings (particularly the three-story-with-half-basement model so common in Indiana's small towns) were typically constructed with load-bearing walls in each classroom. While that design contributed to the structural integrity that has allowed those buildings to stand for the better part of a century, it makes even "simple" renovations an expensive undertaking.

As another example, school districts often desire a higher level of reliability in their mechanical systems, because a failed boiler can mean no school on a cold winter day. However, most districts lack the internal resources to maintain equipment at the highest levels, so the typical response is to install redundant systems such as multiple boilers. That redundancy provides peace of mind, but it also carries a higher price tag – both for the equipment and for the square feet required to house it.

When comparing practices used in school construction with those of other types of construction, it's important to look beyond the practice to the underlying reason.

Are athletic facilities a source of higher costs?

Much of the controversy about school building projects has focused on facilities for high school athletics, with a handful of particularly controversial projects capturing the media's attention and receiving so much coverage that nobody could blame taxpayers who came away with the impression that those facilities are typical of what's being built today. (They're not.)

One reason athletic facilities take up a larger footprint than they did in past generations is that today's schools are expected to comply with the federal Title IX law that requires equal access to athletics for boys and girls. That law effectively doubled the need for athletic facilities. In pre-Title IX days, many schools did not have girls' teams, and a single basketball gym could easily serve the varsity, junior varsity, and freshman boys' basketball teams. Title IX added three girls' teams to that mix, and schools suddenly had six squads competing for practice and playing time.

In many communities, there's also an expectation that school athletic facilities will be available to non-school participants, such as youth leagues and adult recreation.

Facilities must also be built to a variety of standards, including those of the Indiana High School Athletic Association (IHSAA) and the Americans with Disabilities Act (even if the school has no athletes or spectators with disabilities).

The average "soft" costs nationally for high-school and middle-school projects were 27 percent of the total project cost, and 21 percent for elementary schools. That compares to roughly 20 percent for Indiana schools.

Many schools have shifted their physical education programs away from an emphasis on team sports to a focus on lifelong physical fitness and overall wellness. In terms of facilities, that means traditional weight rooms have been supplanted by fitness centers with the types of equipment normally seen in health clubs.

When examining the cost of athletic facilities, consideration also should be given to their utility. For example, it may cost more to construct a fieldhouse than a traditional basketball gymnasium, but if the fieldhouse is used throughout the week all year long, it may be a more cost-effective alternative. The same holds true for artificial surfaces on outdoor playing fields. While the installation cost may be significantly higher than for a grass field, ongoing maintenance costs tend to be so much lower that the cost difference may not be as big. In addition, artificial fields typically see far more use from more organizations, because they don't have to be protected as carefully as grass fields.

How big a factor are "soft" costs?

Building a new school or embarking on a renovation process involves costs beyond that of site and actual construction. Fees for architects, construction management, financing, advisors, and related costs, along with capitalized interest and local building permits and fees, are customarily lumped together into what are called "soft" costs. State government officials (particularly Indiana's Department of Local Government Finance, which oversaw school construction for many years) have claimed that soft costs in Indiana are far higher than those of other states.

However, the independent American School and University Education Report reported that the average "soft" costs nationally for high-school and middle-school projects were 27 percent of the total project cost, and 21 percent for elementary schools. That compares to roughly 20 percent for Indiana schools.

Are standard designs the solution?

A concept regularly proposed in the Indiana General Assembly is the "little red schoolhouse" idea of developing standardized plans for school buildings, and then either mandating the use of those plans or creating a disincentive that discourages school districts from opting for custom designs.

As with so many ideas, the concept may appear to be sensible, but the execution creates more problems than solutions. The concept treats school buildings as "one-size-fits-all" solutions, but differences in educational philosophies, budgets, and building sites demand individual designs. A school that uses traditional classrooms has different physical needs than one with learning communities.

Consider the impact of terrain and conditions. Central Indiana is very flat, but Southern Indiana is so hilly that designs must often accommodate varying grades. Roofs in the Michiana area have to be engineered to handle significantly greater snowfalls than those along the Ohio River. The area around Evansville has a higher incidence of severe storms and more seismic activity than northern Indiana. These variations make it extraordinarily difficult – if not impossible – to develop plans that are ideal for all areas.

In areas where conditions are very similar, differences in the sites themselves add complexity.

Remonstrance or referendum?

For many years, Indiana school construction projects above a certain threshold were subject to a process called Petition/Remonstrance, through which local taxpayers had the opportunity to object to and possibly block a project.

Once the school district held what is known as a 1028 hearing, at which the project and tax impact are formally presented and taxpayers can state their opinions, there was a 30-day window during which any taxpayer objecting to the plan could obtain 100 signatures and start a remonstrance. At that point, both sides would have an opportunity to obtain as many signatures as possible during a set period. If the pro-construction side obtained more signatures, the project would proceed; if the anti-construction side won, the project was dead.

Following the 1998 Indiana Supreme Court decision that called for an assessment system that more closely reflected the value of properties, the state enacted a system designed to identify their "true tax value."

Some taxpayers (particularly owners of older homes in high-value neighborhoods) reacted to huge increases in their assessed valuation – and subsequently, in their property taxes – with anger and public protests. In 2008, the General Assembly reacted to that anger by passing House Enrolled Act 1001, which among other provisions, replaced the petition/remonstrance process that allowed taxpayers to challenge school construction projects with a public referendum for projects exceeding certain cost thresholds.

With the change, any elementary or middle school project budgeted at more than $10 million – or high school project costing more than $20 million – would have to be approved in a public referendum. Projects below those levels and above $2 million continue to be subject to the petition/remonstrance process.

The change was made despite the fact that the petition/remonstrance process appeared to be working effectively. In the years before the process was replaced, only about half of school construction projects that entered the process were being approved by local voters.

For example, the way a building is oriented affects the impact of sunlight and availability of natural lighting. That's more than a cosmetic issue – it's a significant factor in determining a building's mechanical requirements, such as the needed heating and cooling capacity. The primary direction of daylight determines how much artificial lighting is necessary.

Even when needs are nearly identical, the outcomes may be surprisingly different. Back in 2003 and 2004, Indianapolis Public Schools built six new elementary schools to serve different parts of the city. While each had the same basic components, enrollment, and educational objectives, the final products were quite different, largely because of variations in the sites. The difference may have been as small as moving as varying classroom sizes slightly, but the realities of those minor changes negate any advantages of using standard plans.

Questions also arise about ownership of plans and liability issues. Architects and engineers are extremely hesitant to turn their intellectual property over to the state, especially without some protection from potential liability that may occur down the road. Given the ever-changing building codes, those plans will need to be updated every two or three years, and thus far, it isn't clear who will be responsible for that. Additionally, the state would have to create some type of bureaucracy to manage the plans.

Finally, building costs are less a function of the design process than of current trends in the construction industry. A single set of plans could garner wildly different bids depending upon the area's prevailing labor rates, the current cost of materials, and how much work is already available.

Would design/build save tax dollars?

Another idea that has been floated as a way of reducing construction costs is the design/build delivery system that's often used in commercial projects – particularly for projects with clearly defined specifications, such as big-box retail stores, warehouses, and fast-food restaurants. Instead of hiring an architect to develop plans and then putting the project up for a bid, school districts using this approach hire one organization that takes the responsibility for both designing and constructing the school. In theory, the approach saves time and money.

But once again, the reality is not quite as impressive. The time savings tend to be erased by the rigid selection process that Indiana law demands. Design/build also takes much of the control of the process out of the hands of the school district and puts the design/build contractor in charge of most decisions. It also eliminates the checks-and-balances nature when working with separately contracted architects and builders.

Another negative of design/build is that the approach discourages firms from competing in the area,

Ohio and Michigan have similar referendum processes, but neither state prohibits school officials from speaking publicly about the projects.

because only the largest firms in the marketplace can absorb the investment in the upfront services that are required (and even those firms struggle with the increased risk of tying up funds in a single project). Reducing the number of potential customers tends to drive prices higher and sidesteps the objectives of the competitive bidding that's at the heart of the public works process. The approach typically also carries additional "soft" costs.

Some advocates of design/build point to the ability to "fast track" construction, but that can also be accomplished with traditional building approaches. One disadvantage of fast tracking is that building usually begins before the end result has been fully thought through, and contingencies for changes during construction can minimize anticipated time savings.

What's wrong with Indiana's referendum process?

It's difficult – if not impossible – to argue with the fundamental concept behind Indiana's referendum requirements. A process giving local taxpayers more of a direct say in decisions that will affect their communities' economic and educational health is essentially a sound idea. Although local school board members are legally elected representatives of the taxpayers, the referendum process gives those taxpayers more direct control.

The downside of any referendum is that whether a hotly contested project succeeds or fails, the battles surrounding the vote can leave long-lasting scars in communities. A failed referendum may derail economic development efforts and dissuade potential residents from buying or building homes. Instead of viewing the results as a response to a tax issue, outsiders may come away with the impression that the community doesn't value education or other municipal services.

In addition, avoiding building projects certainly keeps property taxes lower in the short run. But failing to pursue sensible, needed projects will ultimately hurt communities more than temporary tax increases. Delaying needed projects can cause a deteriorating environment, overcrowding, and pushing the physical plant beyond reasonable wear and tear. Because construction costs nearly always rise over time, once the improvements are eventually made, they are likely to be far more costly.

Finally, while a referendum gives taxpayers greater involvement, it doesn't ensure that the taxpayers who actually vote will be well-informed about the important decisions they'll make. The process may focus their attention on near-term tax impacts, rather than on long-term educational needs.

A referendum process should be built upon a level playing field to make it fair for all involved. The present Indiana process is dramatically tilted against school officials in two primary ways:

Size of projects covered. While $10 million may seem like a huge sum to the average taxpayer, anyone familiar with the construction industry knows that amount represents a small project, and definitely far less than the cost of constructing the average school building. That means that even small renovation projects – projects designed to extend the operating life of an existing building or improve its ability to serve the community – will fall under the same rules as brand-new buildings.

In the current economic climate, it is extremely difficult for school districts to obtain success on referenda on building projects of any size, meaning that critically important renovations could be defeated or significantly delayed. Additionally, ensuring that potential voters have the data they need to make informed decisions can be complex and expensive for the school district, and that investment must be made regardless of the outcome.

Preventing fair discussion. Under the present law, once a school district decides to move forward with a building project (a process under which the school board holds what's known as a 1028 hearing and then votes to move ahead), school officials and their representatives are prohibited from speaking publicly in favor of the project.

There is no similar gag order placed on opponents of the project, which means that opponents can say anything they want with the knowledge that school officials will be unable to dispute what they say. In at least one case in an Indianapolis-area district, project opponents circulated inaccurate and highly misleading information about a planned project. When the district's superintendent attempted to respond to that information, the opponents filed a court action, and the local judge issued a gag order that was even more restrictive than what the law called for.

It's also worth noting that school officials are public employees. Prohibiting employees from speaking to those they serve forces them to abdicate their responsibilities,

deprives the taxpayers of another point of view, and could even be construed as a violation of the constitutional guarantee of free speech. (It appears that school board members are not covered by the prohibition against speaking publicly on the project.)

Interestingly, both Ohio and Michigan have similar referendum processes, but neither state prohibits school officials from speaking publicly about the projects under consideration. In addition, Indiana's government has opted not to subject its own projects (as well as projects for state universities) to the referendum process. Taxpayers have almost no say in how state government or university buildings are designed and constructed.

How could the referendum process be improved?

It's a safe assumption that the referendum process is going to become a permanent part of school construction in Indiana, much as it has in states such as Michigan and Ohio. However, the current process is flawed, as described earlier.

To ensure greater fairness, the General Assembly should eliminate the rule that prevents school officials from speaking about the project. While the General Assembly may find it challenging to identify a middle ground that allows officials to discuss planned projects without using taxpayer dollars in outright promotion of those projects, it's only fair to give school officials the opportunity to respond to questions, criticisms, and outright misinformation about projects.

In addition, it would also make sense to raise the threshold for projects requiring referenda to more reasonable levels. Smaller projects would then continue to be covered by the petition/remonstrance process, so taxpayers would continue to have a voice and an opportunity to object, without a need to wait for the next election cycle.

What can schools do to gain community support?

Typically, one of the biggest contributors to failed referenda or petition/remonstrance competitions is a gap between the school district's vision and that of the average taxpayer.

In the past, it wasn't unusual for school districts and other local governments to take a "trust us, we're the experts" attitude, dictating projects to taxpayers who had few ways to object. With the referendum process in place, the voters are now the actual decision-makers, and to be successful in pursuing projects, school officials must do a better job of truly understanding the community's expectations and concerns. They must be aggressive about involving community members in the process.

That's particularly important in districts where parents of school-age children represent a minority of taxpayers. Those districts will need to explain how the proposed project will benefit the community as a whole, and why taxpayers should be willing to make the additional sacrifices involved.

The most effective and productive way to accomplish those efforts is to pursue true collaboration in every step of the decision-making process. Public relations strategies such as convening a citizen's committee to take the heat for a controversial project aren't the answer. Instead, school districts and other local governments must work with constituents to discuss needs, identify trends, explore alternatives, and reach consensus on the best course of action long before anyone starts to think about buying land or designing facilities.

Not only is this approach more responsible to communities and taxpayers; it increases the likelihood that a referendum will succeed. If voters truly understand the underlying needs, see that their concerns have been addressed, and recognize that the proposed solution is the most prudent approach, they'll be far more likely to support it in the voting booth.

Some communities will expect higher-quality materials and more elaborate designs. That's perfectly acceptable – as long as local taxpayers understand that those higher expectations will also bring about higher costs.

Conclusion

School construction in Indiana and its financing are complex matters that are different enough from situations and methods used in other states that critics' comparisons with those states are questionable at best and, at times, fallacious.

Media representatives, thought leaders, elected officials, and other key stakeholders owe it to the state's residents to do more than simply echo criticisms. Taxpayers cannot make informed choices without accurate, unbiased information.

Indiana's taxpayers deserve more objective discussions about construction projects in their communities. If the General Assembly changes the present law to restore school officials' ability to speak to the details of projects, and those officials take a transparent, collaborative approach to developing and explaining those programs, Indiana students and taxpayers will both be served in an effective manner.

Content index

FAIR, Inc. appreciates the assistance and expertise of
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Other sources for the facts detailed in this white paper include

"The Effect of Property Tax Changes on Indiana Public School Corporations,"
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Indiana Department of Local Government Finance

National Center for Education Statistics,
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