

"...the point is that all the school reforms on earth are worthless if kids have to come to school in buildings that destroy their spirits."

Johnathan Kozol, *Savage Inequalities* (1991)

1.1 THE STATE OF PUBLIC EDUCATION IN THE U.S.

There is a crisis in America's public educational system that can best be described as a quagmire of conflicting socio-economic, political, bureaucratic and cultural problems and issues. The crisis has reached its highest proportions in the major urban centers of the U.S. Kozol (1967) was one of the first to critique the conditions of urban schools in his book *Death at an Early Age*, and continues to argue for the continuing deterioration of urban schools more than two decades later in his book *Savage Inequalities: Children in American Schools*, published in 1991.

There are numerous reasons cited for the current crisis in U.S. schools in general, and urban schools in particular:

- Conflicting *societal influences* -- national and local politics and ideology, public opinion and the litigious legal climate (desegregation, teacher unions, etc);
- Deteriorization of the *socio-economic conditions* which have plagued inner-city communities for decades -- loss of jobs, middle class flight from the central city, crime and violence, drug and alcohol addictions, poverty, hunger, homelessness, the AIDS epidemic, teenage pregnancy, single parent households and child abuse (Wilson, 1987);
- Internal *public schooling debates and issues* -- gridlocked educational policymaking, bureaucratic structure and governance of urban school boards (Borman & Spring, 1984), school organization, tracking and ability grouping, drop-outs, testing procedures, and in-service training for the management of multi-cultural classrooms.

Bringing the crisis full circle is the ever-present ideological dimensions of schooling -- bringing the inequities of society such as class, race, gender and ethnicity directly into the classroom setting (Kretovics & Nussel, 1994).

In response to these pressing problems, and fueled by the domestic recession and international economic crisis and escalating competition of the early 1980s, a new round of educational reform debates ensued. Poorly performing schools were blamed for the failing economy and the U.S. loss of competitiveness abroad, a recurring theme in the history of public schooling in the U.S. (DeYoung, 1989).

There have been numerous calls for educational reform at the national level, starting in 1983 with the release of "A Nation at Risk" report. The Bush Administration's Break the Mold Schools Program, and The New American Schools Development Corporation (NASDC), which have advocated reforms such as extending the school

day and the school year, school choice programs and voucher systems (Chubb & Moe, 1991). The so-called privatization of the public schools (school adoptions, institutionalized partnerships and collaborations, and business-supported programs for children at risk) include projects such as Whittle Communications Edison Project, EAI's Alliance for Schools That Work, Coca-Cola Foundation's Valued Youth Program, Chevron and Ford's Project 2000. These projects call for increased curriculum and testing standardization, outcomes-based education such as portfolios and other new forms of assessment (Wiggins, 1993), as well as rhetorical calls to totally "restructure", "re-engineer" and "continuously improve" the educational system.

A recent 1993 report from American business leaders assessing the educational reform movement, "Ten Years After A Nation at Risk" (cited in Walsh, 1993), concluded that schools have made little progress towards the goal of improved quality of education. Business leaders are not the only group who are dissatisfied by the results of educational reform: educational leaders, teacher unions and the public-at-large are not convinced that reforms have or will make a difference. Compounding the consensus on reform failure is the continued lack of willingness on the part of school organizations to embrace and respond to change (Sizer, 1991; Sarason, 1971).

1.2 THE STATE OF PUBLIC SCHOOL INFRASTRUCTURE

As a result of the present crisis in American schools, resources have been generally diverted to educational reform measures at the expense of the physical infrastructure of the school system. In short, the deteriorating state of school facilities have been virtually ignored by the public and educational policymakers alike.

In 1989, the Education Writers' Association released a study of the condition of school buildings which found that 49% of all schools nationwide were built in the 1950 and 1960s primarily to meet the increasing demand for schools for baby-boom children (as reported by Walker, 1993); inferring that approximately 41,000 public school buildings will need major renovation or refurbishing between 1995 and 2000 (Goldberg & Bee, 1991). Many of these buildings were constructed of cheaper building materials, flat roofs, and built to last no more than 20 years without some form of major repair. In addition, these buildings, although often claimed by their designers to provide flexible space, have not met this standard. The study also found that 21% of buildings nationally are more than 50 years old and are located primarily in the inner-cities. These buildings have been especially neglected and are in need of major repair and renovation due to short-sighted maintenance and repair policies. The most alarming finding of the study was the fact that over 25% of the buildings were considered inadequate for educational use by state facility directors as a result of serious maintenance and repair needs, environmental hazards, and overcrowding, and another 33% of these buildings will be at capacity due to population growth and other educational demands in the near future.

Solutions proposed to overhaul the educational system disregard and in some cases completely abandon the pressing day-to-day operational needs and physical comfort of teachers and students, forcing them to implement educational reforms in dilapidated, over or underheated, environmentally toxic, poorly furnished, unsupplied classrooms.

Examples of physical deterioration can be found in many schools across the U.S.:

- In New York, at Boys High in Bedford-Stuyvesant district of Brooklyn, paint is peeling, toilet stalls lack doors, and due to drinking fountains spouting rust, teachers dole out water from insulated jugs in the classrooms (Jackson, 1993).
- In Alabama's Choctaw County, where eight rural schools were built in the 1930s, the window sashes are so frail that the panes pop out in high winds or bad weather, and sewage overflows within the buildings (Jackson, 1993).
- In Chicago, at Caldwell School, students have had to put up with rain and wind seeping through most of the 192 windows at the facility for the past ten years, and shoddy repair work has left many windows permanently closed by plastic and plywood. Because of complaints of cold, building heat has been turned up so high that other parts of the building swelter to as much as 86 degrees. (Ortiz, 1993).
- In Milwaukee, 73 of the 110 school buildings in the District were built before WWII and a large number are over 100 years old and in desperate need of repair and maintenance (Lawrence, 1993).
- The District of Columbia Commission on Public Education (1989) cited 11,000 fire code violations in 152 schools in the nation's capital alone. In addition, the study cited fire doors that don't work, classroom doors that don't close, broken toilets, crumbling plaster, potholed playgrounds and malfunctioning heating systems among other problems with the learning environment.

These are not isolated cases. Recently, a national poll of administrators found that 59% of 5,370 buildings surveyed were described as in poor to barely adequate condition (as reported by Jackson, 1993).

As Kozol (1991) has stated in his book *Savage Inequalities*, "the point is that all the school reforms on earth are worthless if kids have to come to school in buildings that destroy their spirits." Kozol and other social critics have expressed their belief that "the notion that the schoolroom is secondary to the schooling is used as an excuse for pushing the issue of crumbling buildings far down the education agenda" (Jackson, 1993; 6).

Issues Beyond Physical Deteriorization

In many ways, this physical deterioration is symbolic of what is wrong with our educational system: a general lack of concern with the educational environment as a whole and an overreliance on reform rhetoric to solve the problems of urban schools. In fact, the physical deterioration of school buildings is only one aspect of what is ailing the facilities in which teaching and learning takes place.

Overcrowding Conditions

First, and most importantly, overcrowding conditions in existing schools due to a steady increase in population of school-aged children continues to be a problem for school districts around the country. The Educational Research Service recently reported an analysis of the latest Census Bureau statistics concluding that the estimated 45,630,000 school-age children in 1990 are projected to increase in number to a high of 49,011,000 in 1998, a 7.4 percent increase (as reported in Graves, 1993).

The population projections by ethnic group indicate that between 1990 and 2010, the school-age population of African-Americans, Hispanics, and other races will continue to grow faster than that of whites and with many in the urban centers of the U.S. (as reported in Wilson, 1989).

Links between Educational Program and School Design

Second, existing classroom layout and design created for earlier eras of instruction are not suitable to current instructional methods and educational philosophies. Some buildings are still organized for late 19th and early 20th century factory models of schooling in which classrooms are organized for 30-40 pupils in rows and columns along double loaded corridors.

During the 1960's in the U.S., challenges to traditional education forced a radical change in educational philosophy. Educational reform movements favored a teaching model along similar to the British informal education model; individualized, self-directed study. As a result, open education, and its complementary physical counterpart, the open classroom, were soon espoused (Barth, 1972; Kohl, 1969; Gross & Murphy, 1968). In terms of architectural interventions, the open space classroom was a milestone in the history of classroom design, replacing the conventional 'egg-crate' school plan. It has been reported that as many as fifty percent of all schools built between 1967 and 1970 were open space design (Weinstein, 1979).

In the 1980s and 1990s, the earlier egg-crate designs of the 1950s and the pod and cluster open classroom arrangements of the 1960s and 1970s fail to provide the most supportive and effective use of space required for today's reliance on new technology. For instance, open classrooms have been closing up gradually over the past twenty years due to problems concerning noise and privacy, while egg-crate classes continue to be unsupportive in implementing multiple instructional strategies such as individualized instruction and cooperative learning. New forms of classroom space configurations are only now being considered in relation to educational reforms, such as designs for small schools, small classrooms, portfolio studio arrangements and computer technologies (Genevro, 1990; California Department of Education, 1990; Moore & Lackney, 1993).

Facility management

Third, there is currently a lack of responsive facility management services to maintain and operate, update and modernize existing school buildings to adequately meet the needs of teachers and students. For example, abuses in the custodial system of the New York Public Schools have been linked to custodial neglect and the decrepit disrepair of schools in the district (Slater, 1992). In Chicago, a housing court judge resorted to appointing an outside consultant to do much needed window repair work to a South Side school when the Chicago Board of Education failed to deal with the ten year old problem (Ortiz, 1993).

The problem of poorly responsive facility management is primarily a result of deferred maintenance policies due to the lack of general operating funds. In most cases communities draw maintenance and repair funds from the state and local funding which makes up the majority of their budgets. Larger projects such as additions or new schools commonly come from bond offerings taken to voters. However, due to the shrinking community tax base, bond offerings are having more trouble being passed, and as a result more resources normally used for maintenance

are often used elsewhere. Reduced funding can be directly linked to reduced, underpaid support staff who are, in many cases, poorly trained.

A more fundamental problem however, may be that most facility management services are not functionally integrated with either educational policymaking or budgetary processes. Decisions are not made in ways which look comprehensively at a problem. Such is the case with the Milwaukee Public Schools (See Chapter 2). A building plan proposed in 1992 by the district's superintendent was resoundingly defeated by taxpayers who insisted that resources go first to boosting academic averages and increasing the number of teacher aides. The Superintendent argued that it would be much harder to improve the district's curricula and academic achievement without first addressing the district's infrastructure needs at the same time. The result is that unfortunately, very little has been done to date to adequately address either problem (Lawrence, 1993).

Teacher in-service training

Finally, there is a lack of in-service training of teachers in how to effectively utilize and maintain their classroom space to support their instructional efforts, and to date, there is no literature concerning this topic. What the scope of the problem may be, or how to develop strategies to inform teachers in the use of instructional space in unknown.

Design collaboration

An issue which receives much attention in construction trade and school administrator professional journals (see any issue of *American School and University*, *CEFPI Journal*, *School Business Affairs*, or *American School Board Journal*) is that of collaboration of school staff in the design of new school facilities. Unfortunately, the collaboration which takes place rarely includes the public or the occupants for which the schools are intended to support. When these individuals are involved the level of involvement is superficial at best (See Chapter 5). School staff are often not involved until more fundamental design decisions are resolved (such as site planning and building layout and configuration); limiting staff input to interior classroom design issues.

Current models of the educational facility process were originally developed during the dramatic educational system reforms of the 1960s in which state involvement in school finance and governance expanded to include the planning of facilities. Many educators believe that "state legislatures, regulatory agencies and product manufacturers have had more effect on school design and equipment than educators themselves"⁴. Contrary to recent rhetorical calls for participation by educators in the planning and design process, few educators have traditionally been involved in a process that has been consistently controlled by architects and by educational administrators and planners, both state and local.

Scope of the problem

The national scope of the problem of the ailing school infrastructure has been well documented. In 1990, the Educational Writers Association estimated that a total of \$143 billion will be required to overhaul the nation's urban school buildings which number approximately 84,580 (reported by Jackson, 1993). Over 50% of schools in

⁴Harold Hawkins, The Interface Project, Texas A&M University, quoted in *Education Week*, February 21, 1990.

the US were built in the 1960s with a projected life of 35 years, meaning that over 42,000 school buildings will need major renovation or refurbishing between 1995 and 2000 (Goldberg & Bee, 1991). The New York City Public School system alone has reported the need for \$24 billion in construction over the next decade to repair and upgrade the system's 1,053 school facilities (*Education Week*, V12: 16, January 13, 1993).

In comparison, school districts spent a total of \$10.73 billion in 1992; \$4.57 billion in new construction (which represents approximately 500 new school buildings), and \$6.16 billion in additions and modernizations (Abramson, 1993). This figure represents a fraction (less than 5%) of the \$220 billion spent on public education in 1992. It is clear from the amount of dollars being spent on new and existing schools that these numbers come far short of the need. Despite these well-documented statistics, there is little agreement among teachers, administrators, public officials, or the public at large regarding their significance, or even whether school buildings themselves play a fundamental role in educational outcomes to warrant attention.

Given the limited financial resources available for education, the question then becomes one of determining the areas of the educational environment that should receive funding. The answer is simply those areas which show the greatest substantial contribution to the improvement in the overall quality of the educational process. The decisionmaking process for resource allocation should include recognition of the facility itself. In many cases, the facility's value is either ignored or discarded at some phase in the decisionmaking process. It must be emphasized that the improvement of the educational environment should be integral and comprehensive. Educational policymakers must evaluate all facets of education concurrently to achieve the greatest degree of success in the decisionmaking process.

1.3 THE IMPACT AND ROLE OF THE PHYSICAL SETTING ON LEARNING

To justify the expenditures to the physical infrastructure of public schools several related questions must be addressed: First, to what degree of effect has the reportedly deteriorating physical infrastructure had on education over the past decade? Secondly, what is the impact and role of the physical environment of the school in achieving the bottom-line academic achievement goals set by current educational reform?

The Effect of a Deteriorating Physical Infrastructure on Education

It is unclear whether the first question can be satisfactorily answered with any degree of certainty. Little empirical research has been conducted which addresses the effects of a deteriorating physical environment on the educational process. At most, anecdotal evidence is offered in media accounts of neglected classroom conditions in which teachers and students struggle with the elements. As a result, only negative reports of the physical environment are publicized and no explicit mention of their possible effects on schooling are offered. It is clear from media accounts and public opinion that negative images of the physical environment are seen as symbolically representing the neglect of the educational system in providing a quality education for children.

There are some reports which call attention to the environment's affect on learning. Edwards (1991) has claimed that building conditions harm student performance, and

estimates that improved facilities could lead to a 5.5% to 11% improvement on standardized tests. Johnson (1990) found that the school's physical environment influences the intentions of even the best teachers to continue in teaching. More generally, it has been suggested that students attitudes about education are a direct reflection of their learning environment (Carnegie Foundation, 1988). Finally, Donald Moore of *Designs for Change*, a Chicago-based organization which conducts research on big city schools, believes that a humane school environment can contribute to educational effectiveness, but beyond that, "believes that students, teachers, and parents have a right to experience a decent humane school environment for its own sake, since schools are not only institutions intended to achieve certain student outcomes, but also small communities in which students and adults spend a substantial portion of their lives" (Moore, 1991; 20-21). Beyond these few examples, little direct evidence exists that supports these assertions that the school facility impacts learning.

The Impact and Role of the School Building on Academic Achievement

What is empirically known about the impact and role of the school building on academic achievement was addressed by the research literature during the educational reforms of the 1960s. Interest in empirical research on the physical environment of the school and its impact and role in schooling was at its peak during a 20-year period beginning with the creation of the Educational Facilities Laboratory (EFL) in 1958 founded by the Ford Foundation to encourage and guide constructive changes in school facilities. Research significantly decreased in the late 70s after the demise of the open classroom movement and the rise of the conservative back-to-basics reform movement of the 1980s.

During this period, research on the physical environment included the analysis of the relationship between student and teacher behavior and attitudes, and student achievement measured through standardized test scores, with such physical variables as acoustics and noise, lighting, temperature, seating position, classroom furnishing layouts and design, windowlessness, class size and density, school size, and open versus traditional classrooms. Where these features of the physical setting have been examined for causal linkages to student achievement there has been minimal empirical support (see Weinstein, 1979). Since Weinstein's review, class size and school size research have been the most notable physical variables which have gathered significant evidence for a direct effect on student achievement (Achilles, 1992; Bourke, 1986; Glass et al., 1982; Barker & Gump, 1964).

There is considerable evidence that the physical setting directly effects both teacher and student behavior and attitudes. Literature is available on all the physical variables mentioned above in the previous subsection supporting the effect on behavior and attitudes. Research on open space schools provide one such example of this evidence. Open space schools, for instance, frequently lead to increased interaction among teachers, who feel a greater sense of autonomy, satisfaction, and ambition. They also place a higher value on evaluation by their colleagues than teachers in conventional schools. Open space schools generally appear to enhance students' participation: feelings of autonomy, willingness to take risks, persistence at a task, and an opportunity to meet more with teachers during the day, and engage in a greater variety of activities (Meyer, 1971 as reported in Weinstein, 1979).

Why such limited, ambiguous results in over twenty years of research? Is the physical environment insignificant to education or is there something missing in the

mode of research to account for the lack of positive findings? There are two identifiable reasons for the lack of substantial findings:

A question of methodology

There are many problems with methodology (see Weinstein, 1979). The most significant methodological problem is the mode of measuring academic achievement. The dilemma for environmental psychologists is that they must at some point in their research accept conventional time-honored methods of gathering information on student performance if they are to demonstrate a connection with what educators consider evidence of achievement. However, the methods by which achievement is defined and evaluated in schools is coming increasingly under question. Traditionally, achievement has been measured through the use of standardized multiple choice test scores. New proposals are challenging the validity of these methods and proposing alternative assessment strategies such as portfolios which fall under the rubric of outcomes-based education (Wiggins, 1993). As part of this debate, standardized tests have come under attack as true measures of academic ability. Claims against standardized tests include inadequate quality of materials, tests based on false assumptions, questionable test reliability and validity, and bias toward middle and upper-class whites which perpetuates and even exacerbates existing inequities in educational services particularly for minority students and those from low-income families (Neill & Medina, 1994).

Lack of theoretical models

The field has operated without a comprehensive theoretical framework from which to progress and build on previous research findings. The research does not seem to build on any collective understanding of what direction research should take. Weinstein (1979) and Gump (1987) are the only comprehensive reviews to date on the topic of the physical setting of the school. As a result, research conducted thus far has not been derived from an explicit theoretical model which takes into account the contextual variables of the educational environment such as socio-economic variables, organizational structure and policy. In addition, the majority of the research examines direct relationships between achievement and physical variables without considering mediating effects of other physical, psychological, social and pedagogical factors.

Based on the findings of previous research, the general consensus of educational policymakers and public alike is that school buildings do not have a measurable effect on learning outcomes as measured by student achievement test scores. Seeing no real improvement in test scores over this period of great liberal experimentation in education, educational critics declared open education and classrooms a failure or at least not effective enough to continue programs and research in this area. This general perception has contributed significantly to the corresponding lack of public support measured in both tax dollars and general moral support for proactive school building programs across the country in the 1980s, despite the paradoxical increase in public school construction during the same period (Abramson, 1993).

Despite the lack of evidence and lack of public support for the notion that school buildings affect student achievement, many educators who work in school settings on a daily basis accept, almost axiomatically, that the physical setting of the school has an affect on the teaching and learning which takes place within their school. Anecdotal examples are cited continuously by educators directly involved in the daily operations of their schools. One junior high school student in Alabama summed up

the feelings of many educators faced with the rhetoric of reform when she stated: "They're always talking about 'we're the future of America,' and they won't even give us a decent place to learn" (Jackson, 1992; 6). Many individuals inside and outside the educational system feel that the issue of the role and impact of the school on student performance has yet to be resolved.

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