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ABSTRACT

The Government Accounting Agency estimates that one third of the nation's schools are in need of extensive repairs or replacement of one or more buildings. The condition of America's rural schools are at a crisis stage and need to be improved to continue to educate rural youth. This paper profiles the state of rural schools' infrastructure, rural districts' economic problems, and the need to upgrade school facilities. It provides a context for improving rural facilities, including discussions on ways to upgrade systems for technology needs, energy efficiency, and handicap accessibility. Additionally, it offers an analysis of schools in the pre-industrial age, prior to World War II, post war, and in the age of technology. The paper discusses minimum standards for a quality facility, including space standards, heating/ventilation/air-conditioning requirements, public review, and federal funding. Final comments address how inadequate educational facilities can affect instruction, and the role of the school facility within a rural community. (GR)

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# NEED FOR IMPROVEMENT OF RURAL SCHOOL FACILITIES

## Introduction

To understand the need for improvements in the present condition of rural school facilities, it is necessary to review the rural economic conditions in the United States prior to World War II, the Depression Era through the Post World War II Era into the 1990's, which can be referred to as the beginning of technology in education.

Prior to World War II the poor economic condition of Rural America was reflected in the rural educational facilities. Farmers and ranchers, the backbone of rural economics, were in serious financial trouble as a result of the Great Depression. The golden economic years between the end of World War I and October 19, 1929, had misled the agri-industry in the same manner that all industries were misled; the common belief that nothing could go wrong with the "good times" was suddenly found wrong. Many of the rural business operators were over-borrowed on their land expansions and could not make their loan payments. Most agri-business loans in that period included the owner's home farm or ranch as partial security so that in case of loan payment failure, the owner lost everything. Loans were foreclosed and tax values dropped overnight. Educational tax dollars were greatly reduced. Available funds went for salaries and direct operating expenses. Facility maintenance and upkeep was minimized. Construction of new schools was restricted almost entirely to WPA government programs. By 1941, rural economic conditions were beginning to improve but World War II began and new construction that might have gone to rural schools was restricted to

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the war effort. World War II was an economic boom to the rural areas of America and the boom continued into the post war years.

By the end of World War II, the educational facilities of Rural America were in deplorable condition. But, the economic boom created that wealth required to build needed school buildings. The GI Bill was establishing post-secondary education as a must for all citizens who wanted to succeed in their chosen careers. Farm and ranch income was excellent, and wide majorities passed bond issues for new educational facilities and equipment. These new facilities were designed to meet the requirements of teachers specialized in their respective fields of sciences, mathematics, language arts, social studies, vocational arts, fine arts, and physical education. Beginning in the 1960's, new government educational assistance programs were added to the established hot lunch program. In the rural areas, many of these programs were able to utilize facility space available because of reduced student population.

The Post-World War II economic and educational boom continued into the 1960's. Similar to Post World War I, farms and ranches again became larger. New and more efficient equipment was reducing the manpower requirements per acre of operation. Improved fertilizers and land management was increasing production. The temptation to increase the size of farm and ranch operations increased the demand and subsequently the cost of land. Debt service on land again became a major operating cost for agri-business, and, beginning in the late 1960's, farmers and ranchers became more conservative in their support for education. The smaller number of rural families reduced the number of children in the rural school districts.

As farm and ranch ownership expanded in acreage, the burden of school taxes was placed on fewer and fewer citizens. The late 1960's, the 1970's, and the early 1980's were a time of decreased ratio of students per teacher which was a benefit to the rural students. Students with a rural education generally did very well in their post-secondary education and many of the leaders in industry, professions, education, and military came from a rural background. This period might be considered a "golden age" of rural education as the rural facilities were well equipped and the students received a great deal of individual attention. All students had an opportunity to be involved in school activities, which aided in personal development and social skills.

There is an old axiom that goes, "If you do not learn from history, then you will repeat the mistakes of the past." Many farmers and ranchers after World War II made the same mistakes as their predecessors after World War I. Their land expansions, including their home operation, were carrying heavy debt service. The inflation of operating costs, extremely high interest rates and low agri-business prices of the late 1970's put many of the nation's farmers and ranchers into bankruptcy. The rural school districts were again placed in the position of operating with very conservative budgets. As is the case when budgets are tight, new construction is nil and maintenance is underfunded. This was the situation with rural school districts when the 1980's introduced the technology of computers, printers, modems, networking, laser disk players, fiber optic cable, etc. into the educational process. The age of Post World War II school facilities were requiring more costly maintenance. Higher cost of heating fuels and electricity were increasing the operational costs of all schools. Teachers' salary adjustments were long overdue. Computer literacy and audio-visual technology in the educational process was becoming

a priority. Title IX requirements for equality in boys' and girls' athletic activities meant construction of new athletic facilities. All of these needs affected school districts in all parts of the country. The rural economic depression of the late 1970's left the rural school districts ill prepared to meet the educational challenges of the 1980's and 1990's. The situation does not seem to be improving. Recently Thomas Kourlis, Colorado Commissioner of Agriculture, stated that farmers and ranchers are receiving thirty percent less income today than ten years ago for the same piece of land.

History of Rural School Facility Development

Rural school facility development can historically be divided into four major categories. The first two relate to rural populations and shifts. The third category relates to rural population shifts and educational progress. The fourth category relates to the recent impact of technology in education. The four categories are identified as follows:

1) Pre-industrial Age
2) Industrial Age to World War II
3) Post World War II to Age of Technology
4) Age of Technology

Prior to the Industrial Age (middle 1800's), approximately 90% of the population in the United States was involved with farming and ranching. Six years of education for rural families were considered sufficient. A single teacher in a single room rural school building was considered adequate. Proficiency in reading, writing, arithmetic was the educational goal. If a teacher could impart some understanding of history, geography, music, and fine arts, the student received a bonus.

The Industrial Age brought rural families to the cities and to factory jobs.

This type of work brought people with less education into contact with people with more education. Parents wanted a better life for their children and worked hard in order that they would receive an improved education. Formal education gradually moved up to eight years , and by World War II, it was up to twelve years. The rural school districts had entered a major change in the educational process by educating their children through eight years and then paying the school district in a neighboring rural town for a high school education. The high school educational curriculum required studies in the original basics of reading, writing, and arithmetic, plus history, geography, science, music, art, home economics, and shop as the new basics. Drama, marching band, and interscholastic athletics became some of the optional activities available to students who resided in rural school districts and were willing to commute. Some states in association with teaching colleges, particularly those with widespread farm and ranch operations, educated rural students by creating special high schools where the students lived in school dormitories similar to the way college students resided. By the start of World War II, a high school diploma had been established as a minimum basic education for both urban and rural families.

Post World War II, through the GI Bill, introduced post-secondary education to the "average" American family. Very quickly post-secondary education, two year vocational, two year community college, or four year university became the minimum for basic education. The "little one-room red schoolhouse" that was the foundation for an educated America was obsolete. Post-secondary education required a stronger, well rounded, broader secondary education. Broader education required larger tax funding and a larger pool of students to support financially the required specialized teachers.

The farmers and ranchers across the country responded by consolidating school districts, and the late 1940's through the 1960's was a period of the largest consolidation of school districts in history. K-12 educational facilities were built in almost every consolidated school district. The 1970's brought a combination of government programs, court mandates, energy cost inflation, plus building cost inflation to bear on the rural schools at a time when the rural economics were in a declining condition, making it very difficult to finance building programs.

Everything about the way that we transferred, referenced, and accessed information was quickly changing. As the cost and availability of technology dropped to where it was affordable by the average American business, "computers, printers, modems, etc." became a part of the vocabulary. By the 1990's Apple Corporation introduced a personal computer and printer that was affordable by many families. Apple also gave computers to public schools, including rural schools, and, with that gift, introduced the youth of the United States to the world of "high tech." The methods of teachers transmitting information to students has been forever changed. By the middle of the 1990's another major change was taking place that impacted the rural school across the country. People were discovering that their computer allows them, in many cases, to live away from their place of business; they could live in a rural setting to raise their children and yet meet the requirements of their workplace. Rural schools and communities do not have many of the pressures found in city lifestyles that negatively affect family relationships,. In many areas of the country, rural school populations that have been on the decline for years are seeing a growth. It is too soon to project a trend, but that is certainly creating a question mark for the planners of rural school education.

The search for answers is one reason that rural educators all over the country are coming together to share information and problems. There is a general acknowledgement, even by politicians, that there is inequity of education because of the wide disparity of property values and state financing. In Colorado, for instance, the state is being sued by five rural school districts claiming the inequity is unconstitutional. Colorado Governor Romer has publicly stated that he hopes the plaintiffs win the lawsuit because "there is an inequity." Someday, in the foreseeable future that inequity will be resolved because it fair and right that equal education opportunities be available to all people.

Improving Rural School District Facilities Today

The needs of rural school district facilities today fall into four general priorities:

1) Provide maintenance for health, safety, longevity, and aesthetics
2) Upgrade space and systems for technology needs.
3) Improve energy efficiency of structures and systems.
4) Meet ADA requirements for handicapped accessibility.

Maintenance of condition of facilities in many of the rural school areas is in poor repair. The major reason for the poor condition is that the maintenance budget is an easy target during tight budget times. It seems to be very easy to justify cutting maintenance by taking the position that "we will make up for it next year." When recently retired United States Senator James Exon was Governor of Nebraska, he once asked a gathering of college presidents and state agency directors why they found it so difficult to spend maintenance budget on maintenance work. The president of Kearney State Teacher's College (now a part of the University of Nebraska State System) volunteered the following:

"Governor, as I look around this group of leaders, I don't see one person who has achieved his level of leadership because he kept his roofs dry."

It is safe to generalize that most college presidents and school superintendents are aware that dry roofs do not enhance resumes. Year after year maintenance budgets are forced to give way to the priority need of educational tools for students and teaching salaries. Maintenance can only be deferred for a give amount of time because, like the automobile whose oil is not changed, there will be a breakdown and the cost of repair will be many times that of the normal maintenance program. In addition to cost, the lack of maintenance can result in health and safety problems such as carbon monoxide, asbestos, radon, eyestrain, and physical injuries. Building aesthetics are important as studies have shown that a well maintained structure with attractive finishes is less prone to vandalism and, more important, studies have shown a direct correlation between student learning and a pleasant surrounding environment.

In a report to congressional members, the Government Accounting Office cited one third of the nation's schools in need of extensive repair or replacement of one or more buildings. The third serves some 14 million students. Based on estimates by school officials in a national sample, the GAO projects that it will take $112 billion to repair or upgrade America's schools over the next three years to comply with federal mandates that require schools to make all programs accessible to all students. It is also necessary to remove hazardous substances such as asbestos, lead in water or paint, materials in underground tanks, and radon. Most of these buildings are forty to fifty years old and consist of the original building, any number of permanent additions to the building, and a variety of temporary buildings—each constructed at different times.

In Pauley v. Kelly "decent facilities" was specifically defined by one court as "those that are structurally safe; contain fire safety measures, sufficient exits, an adequate and safe water supply, and adequate sewage disposal system, sufficient and sanitary toilet facilities and plumbing fixtures, adequate storage, adequate light; be in good repair; and be attractively painted as well as contain acoustics for noise control."

Working from this definition, the GAO surveyed 10,000 schools in over 5,000 school districts. On the basis of the survey results, the GAO estimated that the nation's schools need $112 billion to complete all repairs, renovations, and modernizations required to restore facilities to overall condition to comply with federal mandates. This amount includes $65 billion needed by one-third of our schools for which one or more entire building needs major repairs or replacement. Another forty percent reported needing $36 billion, or about $1.2 million per school, to repair or replace one or more building features, such as the plumbing or roof, or to make other corrective repairs. Two-thirds of the schools surveyed reported needing $11 billion, or an average of $.2 million per school to comply with federal mandates over the next three years. Some of these mandates include removal of asbestos, lead in water or paint, and radon, while $65 billion is needed to make programs accessible to all students. Furthermore, while 41 percent of all schools reported unsatisfactory energy efficiency, 73 percent of those schools with exterior wall, windows, and doors and 64 percent of those with roofs in need of major repairs reported unsatisfactory energy efficiency.

Damage to structures from natural causes had deteriorated the structure of many schools, such as termites in Louisiana, leaking rooks and windows causing a building to be condemned in Alabama, and raw sewage backed up on the front lawn in the same

Alabama district. Districts with schools built around the turn of the century but still in use report overcrowding, along with lack of ventilation in interior rooms, with windows that cannot be opened. One school district in California reported an elementary school Composed entirely of portable buildings. Another school reported classrooms on second floors with only one exit. In addition to hazardous conditions, schools report that they are unequipped to use modern technology to meet the needs of their students. The GAO Report of April 4, 1995, documented that although at least three-quarters of schools report having sufficient computers and televisions, they do not have the system or building infrastructure to network or connect them to other computers in the building, much less to get on-line to the Internet. Over 14 million students attend about 40 percent of schools that reported that their facilities cannot meet the functional requirements of laboratory science or large-group instruction even moderately well. Over half the schools reported unsatisfactory flexibility of instructional space to implement many effective teaching strategies. Not all students have access to facilities that can prepare students for the twenty-first century, making an uneven playing field for education of all students. Even those in the same district may not have equal access.

To improve instruction, reform advocates recommend that a school use new techniques for teaching and evaluating students and involve them in planning their own education. Groups of students should have access to large data sources, but with existing limitations of buildings, this may not be possible. In order to prepare students adequately for the next century, they must have access to high quality computers, printers, modems, networks, tvs, laser disk players/video cassette recorders, cable TV, fiber optic cable, conduits/raceways for computer and computer network cables, electric wiring that

provides power for this equipment. Data, voice, and video systems cannot operate without the supporting building or system infrastructure.

Education today is not memorizing formulas, dates, places, etc. It is in knowing where that information is referenced and how it is accessed. The successful education process today requires adequate building space, comfortable environment, proper equipment, sufficient electrical power, and a student-teacher ratio of approximately 20-1 all of which impact school facilities needs.

Since the Middle East political problems in the 1970's, the inflationary increase in operating costs for heating and lighting of rural school facilities continues to take a larger percentage of the educational budget. Most metropolitan schools have had adequate budget to schedule replacement of old inefficient (40%-50%) equipment with newer high efficiency (85%-95%) equipment. Most rural schools still operate with their pre-1970's equipment even though there could be sufficient savings in operational cost to pay for the new equipment in a few years. There are national companies, such as Johnson Controls and Honeywell, who will survey the facilities of public institutions, and if savings in operations will pay back the cost of equipment and installation, work out a contract of repayment based completely on the savings incurred. The major problems found in most older rural schools include inadequate building insulation, non-insulated windows, and non-insulated and non-weatherstripped exterior doors, old or non-existent exterior sealant, inefficient furnaces and boilers (40%-50%), and inefficient electrical lighting. With interest rates very low at the present time, it would be an excellent time for rural schools to upgrade their building systems and eventually divert the operation savings directly to educational needs. If the federal government begins to assist rural school education, a worthwhile program would be to upgrade the building systems. This

could allow the ongoing operational savings to shift directly to increasing the budget for technology and quality education.

Another major rural school impact item is the American Disabilities Act (ADA) requirements for handicapped accessibility. In general, most rural school primary buildings were built prior to the federal mandates for handicap accessibility: The buildings, building access, single acting door hardware, adequate side clearance for passage doors, and signage. Rural schools have two basic methods of financing needed changes for handicap accessibility: 1)increase their annual budget(s) for facility improvement and, 2) include the work as part of bond issue financing.

There are many pressures on the rural school budgets today and no answers for school administrators nor for the school boards. Since the 1950's farm and ranch prices have not kept up with the national inflation rate and the last few years have been even worse. Until the farmer and rancher can receive prices for their goods that correspond to the increased cost of doing business, or tax bases are somehow equalized, rural school budgets will remain conservative and the condition of school facilities will continue to deteriorate.

Minimum Standards for a Quality Facility

A major design consideration for rural school facilities is space standards. There are not any mandatory standards specifically for rural schools. The standards that are in place apply to all school facilities and can be found in the national codes. The codes are only mandatory if they have been so established by federal, state, or local ordinances. Many space considerations that have been in place for decades, such as classroom size based upon 30 square feet per student, need to be upgraded because of space required for technology equipment and smaller student/teacher ratios.

National building codes for general construction, heating/ventilating/air-conditioning work, electrical work, and fire protection are usually upgraded annually or bi-annually but do not have any force of law unless specifically enacted into law by the political sub-division involved. In the past, federal and state laws have affected program requirements at the local school district level but usually do not specify a particular code or space recommendation.

By contrast with the above, the American Disabilities Act (ADA) for handicap accessibility has federal regulations which are very specific in exact distances which must be incorporated. In addition, types of drinking fountains, plumbing fixtures, door hardware, and signage are specifically outlined. Violations to the ADA can have severe and/or expensive consequences.

Most states have some sort of required review and approval for public building designs prior to the start of construction.. There is no consistency among the states on the type of review on educational buildings. Some states require very extensive reviews while other states have minimal requirements. Part of the reason for the different approaches could be the different climates, soil conditions, energy requirements, and historical traditions.

Federal funding requirements for titled programs can be general or specific. For example, Title IX requires an equality of programs and facilities for male and female student athletes. Some school districts may offer more athletic opportunities than others, specific activities are not required, only that the activities be balanced. A good example is boys' football. Football is not considered a girls' sport so volleyball is generally considered an acceptable alternate. Some rural schools have a much higher percentage

of subsidized lunches than others. Some rural schools offer a much wider variety of elective activities than others do. Federally funded programs tend to require equality of opportunity among students within the school district rather than equality of facilities and programs among the rural school districts.

How Do Inadequate Facilities Affect Instruction?

Quality of instruction and learning cannot exist in a climate where children are too cold, or in the fall and spring where they are sweltering. Buildings which leak water down the walls or which have structural damage are unsafe for both children and teachers. Radon gas and asbestos are not safe environments for our children. Older buildings were built on landfills, which contain radioactive materials, or in areas which are full of radon gas. Until recent years builders did not take these conditions into account so we are faced with these problems now.

The buildings, which are described in the GAO Report, cannot support technology improvements. If the buildings built 50 years ago have only one electrical outlet per room and inadequate wiring for even existing appliances, it would take a major overhaul to upgrade for addition of Code 5 wiring or for fiber optic cable necessary for computer labs and ITV studios. An example of the problem is that of the superintendent in a school in the West who wired two rooms for computer labs, installed the computers, then had the roof cave in, ruining everything.

In one school in Oklahoma, for instance, the teacher must stop talking or listening to her students when the forty year old heater comes on because it is so noisy. The room temperature is either extremely hot or extremely cold; there is no other option. Because

of faulty air conditioning in the fall and late spring, students swelter in the heat and cannot think about the learning situation. These conditions, however, are only minor Compared to many other districts that are in much worse straits.

The Role of the School Facility in the Rural Community

School buildings in all rural areas serve as much more than classrooms for children. Often the school library serves as the community facility for library services, with access to the Internet as well as to books and periodicals. For instance, one library in Southwest Kansas offers baby-sitting service for parents who want to come use the computers or other materials. Access to e-mail and the Internet are free for local residents. They also offer classes in computer technology. This library serves as a prototype for other communities throughout the country.

Schools often offer after-school or before-school care to parents in the communities. Tutoring, snacks, games, and supervision are available to working parents. In addition, schools are offering family counseling through their own guidance services. Community classes are offered in the computer labs and on ITV for parents in the districts. In addition, many schools use their facilities as business centers, offering copy service and resume writing for their patrons.

For rural districts, as well as for many urban and suburban, athletic events are the social events for the community. The school facilities provide entertainment through these events, as well as through their community theatres. The schools buildings are a place to meet neighbors, pass time, and make friendships.

They are also the heartbeat of the community. If we lose our schools because of poor repair, we shall have lost a vital part of community life.

Summary

The conditions of America's rural schools are at a crisis stage. The Government Accounting Agency estimates that it will take $112 billion to repair, renovate, and revitalize our schools. This deplorable condition has come about because maintenance money was used elsewhere; maintaining our schools in good repair was not of the highest priority. If we are to have world-class schools, we must bring our buildings up to code for meeting the challenge of delivering curricula in keeping with technology and demands of the next century, as well as meeting the challenge of federally mandated programs.

We live in the wealthiest nation on earth. Our nation was founded on the principle set forth by Thomas Jefferson that a democracy depends on an educated populace. We cannot afford to let our rural schools fall into disrepair and to close for lack of support and care. Our children in rural America deserve better.

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