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The Feasibility of Remodeling

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the feasibility of remodeling

By G. Kent Stewart

In 1973, G. Kent Stewart joined the educational administration faculty at Kansas State University after spending 18 years in public education in Illinois, Indiana, Delaware and Maryland. He holds degrees from Indiana State University and the University of Illinois; and in 1964, received his doctorate at Indiana University. In addition to teaching and a secondary school principalship, he has spent the past 13 years specializing in educational facility planning. During a 7-year tenure as director of school facilities in the Montgomery County (Maryland) Public Schools, he was responsible for constructing 48 new schools and modernizing and expanding dozens of others.

Feasibility studies are defined in a variety of ways. As far as this brief treatise is concerned, they are studies done by architects and/or engineers to determine whether it is better educationally and financially to remodel or to replace existing school buildings. While the question has important financial implications it is amazing that many school superintendents and their boards of education are reluctant to have a good feasibility study done in their districts. One reason is that some superintendents do not have the time or the staff personnel to instruct the architectural-engineering team; and secondly, some school boards are reluctant to spend the money necessary to have a feasibility study done. The problem is *not* unique to Kansas—it is nationwide; and each year, buildings are remodeled which should have been razed and buildings are razed which could have been remodeled economically. It all adds up to wasted tax dollars in a time of intense public concern over the cost of education.

Suppose an existing building is ready for either modernization or replacement. Suppose further that the estimated cost of replacement is $2,600,000 and the estimated cost of modernization is $1,000,000. Usually, the community and the Board of Education split on which alternative should be chosen. In spite of the apparent soundness of the debate and rhetoric which follows, it is doubtful that any of it is based on sound analysis backed up with factual data. Feasibility studies can help avoid these kinds of conflicts.

The Keystone of a Good Feasibility Study

The key to a good feasibility study is to prepare a precise set of instructions to architects and/or engineers describing exactly what is to be studied. School executives often overlook the importance of this first step and the architect is left with the question of just what he or she is to study the feasibility of! To state simply that the building is to be remodeled is a grossly insufficient instruction. A feasibility study should raise questions such as the feasibility and cost of: new heating equipment, air-conditioning, heavy-up of electrical services, replacement of energy-robbing window sash, removal of certain classroom partitions, expansion of the library, renovation of physical education and athletic facilities, modernization of specialized instructional areas, re-equipping of the kitchen, carpeting for floors, lowered ceilings, new lighting, roof and flashing repairs, meeting fire code requirements and improvements to the site and outdoor game areas. These questions must be included in the charge

or the instruction to the architect. For example a portion of the charge might read . . .

> "You are to determine the feasibility of expanding the library into the adjacent small classrooms on the north and south thereby generating space sufficient to transform the library into an instructional media center. If the transformation can be accomplished, the main reading room will need to contain some 1,200 square feet of space with auxiliary spaces consisting of 150 square feet for a conference room, 400 square feet for a combination workroom and storage room, and 200 square feet for storage of audio-visual and other electronic teaching equipment. The total area would amount to some 1,950 square feet of floor space. The ceilings are to be lowered, the new space to be re-equipped with modern library furnishings and cabinetry and the room re-lighted in accordance with current standards. The floor is to be carpeted in the main reading room and the conference room and because of projected summer use, the expanded facility is to be air-conditioned."

The above example shows the kind of detail the architect and engineer must have to make sound technical judgments about the feasibility and cost of effecting the proposed changes.

If the superintendent of schools does not have the time or the range of experience with facility projects necessary to prepare such detailed instructions, then it is advisable to retain a consultant to write the program of project requirements. Facility consultants familiar with this type of programming can perform the service rather quickly. Even with extensive input from teachers and community leaders the project can still be programmed in a matter of only a few actual days of effort.

The Cost of a Feasibility Study

Feasibility study costs range in direct proportion to the size and requirements of the project being studied and particularly with the availability of architectural and engineering drawings of the original facility. The older the building, the less likelihood there is of having a complete set of drawings from which to initiate study.

From the author's own experience with a wide variety of feasibility studies over a number of years in three states, the cost will usually range from 2 to 3 per cent of the estimated cost of the modernization project. If the project would amount to $1,000,000, then the cost of the feasibility study might range upward to $30,000. This sounds like a great deal of money, but it is money well spent if the results of the study show that it is feasible to remodel at a cost of $1,000,000 while replacement might cost $2,600,000. If the decision is to replace, the money for the study is well spent because a costly boondoggle has been avoided. If the decision is to remodel, the money is also well spent because the architectural sketches (schematic drawings) and much of the engineering work is completed which materially reduces the architectural fee (by 2 to 3 per cent) providing the same architect is used for the total project.

Formulas to Aid Decision-Making

For many years architects and facility specialists have grappled with the problem of developing formulas and guidelines for adding credibility to decisions concerning remodeling versus replacement of school buildings. One such formula suggests:

$$\text{if } \frac{Ce + Ch + Cs}{(Lm)\quad(Ia)} \text{ is less than } \frac{R}{Ln} \text{ then modernization is feasible.}$$

Key:
Ce = Cost of educational improvements, like carpeting
Ch = Cost of health improvements, like better ventilation
Cs = Cost of safety improvements, like fire detectors
Lm = Estimated life of the modernized building
Ia = Index of educational adequacy (0.1 to 1.0)
R = Replacement cost not including cost of a new site
Ln = Estimated life of a new building

Experts in the field are in general agreement that the useful life of a new building will approximate 50 years; however, the estimated life of a remodeled building and the index of its educational adequacy—that is, its adequacy in relation to a new building—are both items of conjecture and here lies the inherent weakness of this formula. Nonetheless, it represents one important tool to aid in decision making.

Suppose architects and engineers had completed a feasibility study on a 1,000-student-capacity high school according to program requirements prepared by an educational facility planning consultant and the estimated cost figures were substituted in the formula as follows:

$$\text{if } \frac{400{,}000 + 200{,}000 + 120{,}000}{(20)\quad(.6)} \text{ is less than } \frac{4{,}000{,}000}{50}$$

$$\frac{720{,}000}{12} < \frac{4{,}000{,}000}{50}$$

$$\$60{,}000 < \$80{,}000$$

it would be feasible to remodel because $60,000 is less than $80,000.

Another formula used widely is based on an estimated unit cost of value per year. This formula suggests:

$$\text{Per Pupil Cost Per Year} = \frac{\text{Estimated Cost of the Facility}}{\text{Number of years of estimated life} \times \text{Number of pupils per year}}$$

Using the above example, the per pupil cost per year for *remodeling* would be:

$$\text{Per Pupil Cost Per Year} = \frac{720{,}000}{(20)\,(1{,}000)}$$

$$\text{Per Pupil Cost Per Year} = \frac{720{,}000}{20{,}000}$$

$$\text{Per Pupil Cost Per Year} = \$36$$

For *replacing* the same school, the formula would yield the following data:

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$$\text{Per Pupil Cost Per Year} = \frac{4{,}000{,}000}{(50)\,(1{,}000)}$$

$$\text{Per Pupil Cost Per Year} = \frac{4{,}000{,}000}{50{,}000}$$

Per Pupil Cost Per Year = $80

The conclusion again is that it is more feasible to remodel than to replace this particular school. (Remember that site costs were omitted from these formula considerations.)

Two other rules of thumb are used in helping determine whether to remodel or replace a facility. First, when remodeling equals or exceeds 50 per cent of replacement cost, replacement should be considered; and secondly, when any two of the following building component systems require replacement, serious consideration should be given to abandoning the building as a school and replacing it entirely. These are:

1. The plumbing system.
2. The heating system, especially if air-conditioning is to be added.
3. The electrical system including lighting fixtures.
4. Complete roofing, flashing, and guttering.
5. Complete fenestration (doors and windows).
6. Structural problems (deep wall cracks, sagging floors, sagging roofs, deep foundation cracks and extensive required tuck-pointing).

Conclusion

The rationale for modernizing schools is threefold—first, to improve the building's functionality in relation to teaching and learning; secondly, to improve health, safety and comfort; and thirdly, to improve appearance. Yet, the overriding question is always money. By having a good feasibility study done supported by sketches and cost estimates, and by using the formulas and guidelines presented herein, a more rational decision can be reached about remodeling versus replacement.

Castaldi, Basil. *Creative Planning of Educational Facilities,* Rand-McNally and Co., Chicago, 1969, Chapter 15.

Council of Educational Facility Planners. *Guide to Planning Educational Facilities,* The Council, Columbus, Ohio, 1969, Chapter 12.

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the final answer

A student attended his first economics class. "Dull," he said and cut every class after that until examinations. The professor smugly okayed his request to take the final. The student was faced with a multiple essay question: Explain how the fishing territorial rights in the Atlantic Ocean affect Iceland, the United States, Finland, and Russia. What is the impact on trade and commerce, the political arena and society? And lastly, how will it affect the fisherman, manufacturer and consumer? The student's first line was "I will answer from the viewpoint of the fish."

"What will you be doing in 1985" by Gus Merkel
in **Journal of Organizational Communication.** 4:3. p. 6