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ABSTRACT

Cost issues associated with year-round schools (YRS) are examined in this paper, which asserts that the cost of operating a YRS program depends on a district's classroom space and student population. YRS is recommended if there is a need to utilize classroom space or school facilities more efficiently to accommodate a student population that exceeds a district's available classrooms. Use of the multiple-track plan, as opposed to the single-track plan, can yield substantial savings in both operating and capital costs. The simulation-cost model is recommended as the optimal approach for analyzing the cost of YRS. This paper explains four cost-analysis categories for examining YRS and traditional-calendar school (TCS) costs: avoided, transition, projected operating, and incidental costs. A formula that combines the four cost categories and the simulation-cost model is offered as a way to compare a YRS budget with a simulated TCS program budget. A conclusion is that YRS programs have the potential to reduce educational costs in communities experiencing population growth. However, other factors, such as academic program efforts and social considerations of the stakeholders, must be incorporated into the information system. Two figures and four tables are included. (LMI)

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Cost Analysis of Year Round Schools: Variables and Algorithms

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Cost Analysis of Year Round Schools: Variables and Algorithms

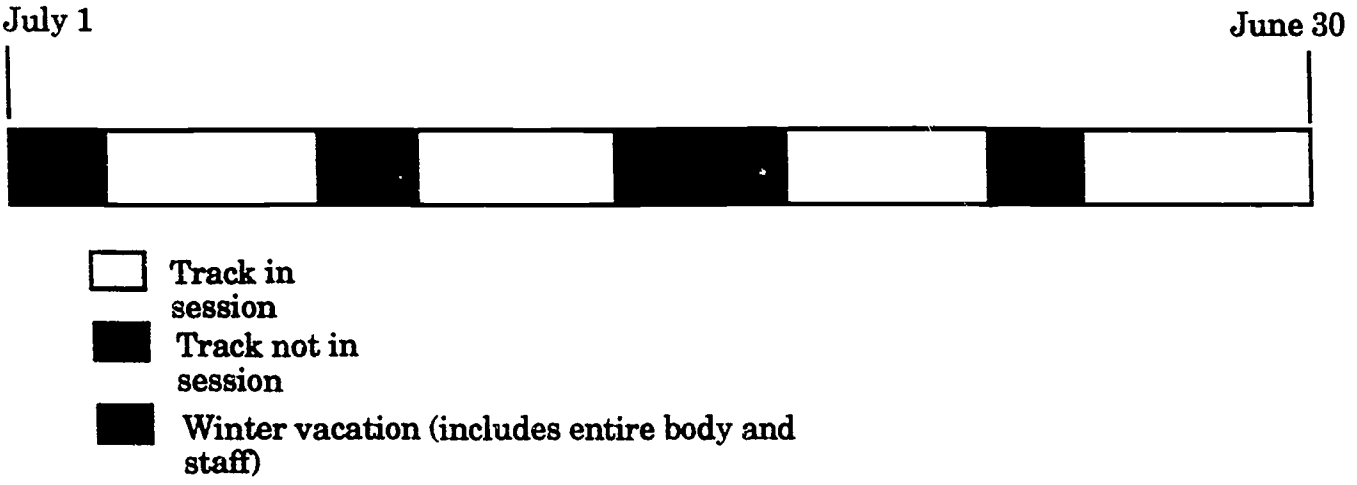
Mention the term Year Round School (YRS) to a group of students and they might feel as if a judge had just sentenced them to life in prison. Mention this term to parents and they would start to ask about their family vacations. Use the term Year Round Schools with school administrators and school board members and they would think that the cost of running the district would increase. All of these scenarios are quite likely given experiences of school districts that have considered but not implemented YRS. The topic examined in this paper addresses cost issues associated with Year Round Schools.

Does YRS cost less than operating a traditional school year program? The answer depends on a district's classroom space and student population (Brekke, 1984). Before any school district converts to YRS, they must first ask the major question "Why should we change?" Why would a school district that has been operating under a Traditional Calendar School (TCS) approach want to make such a dramatic change? One answer is classroom space. If the following question is on the mind of school administrators then YRS may be a desirable alternative. "Is there a need to utilize classroom space or school facilities more efficiently to accommodate a student population that exceeds a district's available classrooms?" If the answer is no, then there is little economic need to convert to YRS. However, if the answer is yes, then YRS is a way to utilize facilities at a level that will accommodate an increase in enrollment and save the school district the capital costs of increasing the school districts' physical facilities (Brekke, 1984).

Year round schooling can be implemented as a Single Track Plan or Multiple Track Plan. In the Single Track plan (see Figure 1), students are in school for the same number of days and the school building is being used for the same number of days as if it were operating under the traditional calendar. There is no net increase in school facilities usage but the vacation period is provided in four segments rather than one extended period during the summer.

Figure 1

Single Track Plan

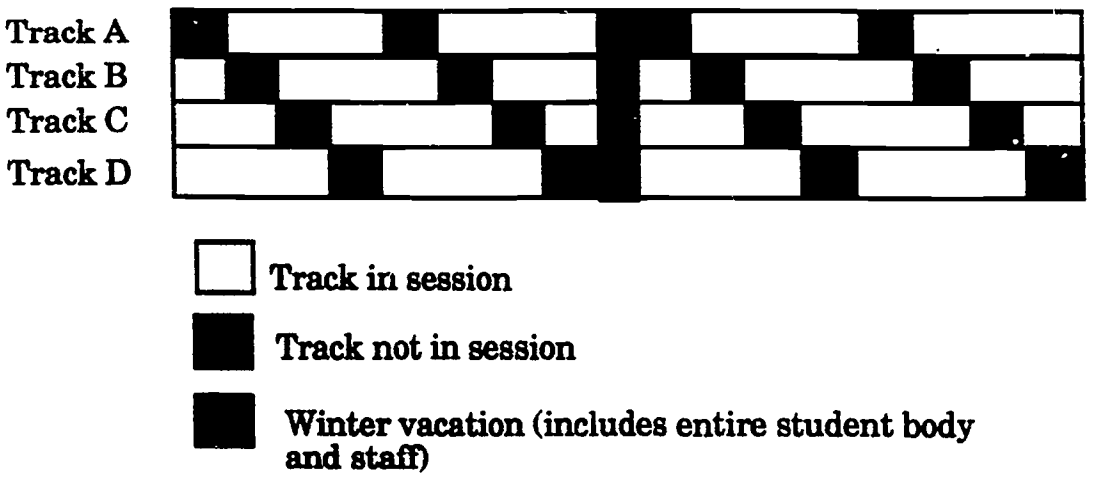


(Ballinger, Kirschenbaum & Poinbeauf, 1987)

Under the multiple track plan exhibited in Figure 2, a school's capacity to accommodate an additional 33% more students can result. This increase in capacity can yield substantial savings in both operating and capital costs (Ballinger, et al., 1987).

Figure 2

Multiple Track Plan



(Ballinger, et al., 1987)

The multiple track plan breaks up student attendance periods so that a rotation take place. For example when Tracks A, B, and C, are in school, track D is on vacation. When D returns, A goes on vacation. If the school building can accommodate 300 students at one time with this multiple track attendance plan in place an increase occurs in use of the building enabling 400 students to be served. In this case school facilities are used more efficiently, but what about the costs associated with operating this YRS program? The remainder of this report discusses an approach for conducting a cost-analysis of YRS to answer the preceding question.

Three basic approaches for carrying out a cost analysis of a YRS program occurring in the literature are: (a) Comparison of the budget for YRS with the budget for prior years with a TCS; (b) Comparison of the budget for the YRS with a "matched" TCS; or (c) Comparison of the budget for a YRS with a simulation of what it would cost to deliver the same educational program under TCS, (Baker, Pelavin, & Burnett, 1978). Under the first two approaches errors occur in comparing YRS to TCS costs due to: inflation, the natural evolution in the type of program offered under each plan and the inherent difficulty of matching schools on multiple variables. The optimal approach for analyzing the cost of YRS is to develop a simulation cost model. This approach is based on producing a detailed accounting of the YRS's educational program and then generating estimates regarding what it would have cost to operate the same curricular program in a TCS at the same site for the same year (Baker, et al. 1978). By using the present year's cost for only one school, the challenge of comparing "matched" schools and controlling for inflation are removed. Using this approach, the annual cost of running the school is examined and compared via the YRS and TCS systems.

The following cost analysis categories for examining YRS and TCS costs have been proposed by Quinlan and associates (1987): Avoided Costs, Transition Costs, Projected Operating Costs, and Incidental Costs. Avoided costs may result in the greatest savings to a school district. These costs include the capital costs associated with the construction of

new buildings or the cost of purchasing or leasing portable buildings. To illustrate, in 1987 it was estimated that construction costs were $100 per square foot for new school buildings in California. Using the space per student ratios recommended by the California State Board of Education (i.e., 55 square feet per student would be needed for elementary grades; 75 square feet for each 7th and 8th grade student; and 86 square feet for 9th through 12 grade students) a 24-classroom elementary school to accommodate 720 students would have cost nearly $4 million dollars while a secondary school addition to accommodate 720 students would have cost more than $6 million dollars. A much less expensive alternative would have been to rent portable units. The annual cost of renting portables, for 720 students at that time was $144,000 (Quinlan, et al., 1987).

The avoided cost savings benefit of YRS can be shown by actual example. During the 1984-85 school year, the Oxnard school district elementary enrollment increased by 644 students. If these students had been housed in TCS classrooms the district would have needed one additional school. It was estimated that it would have cost approximately $5 million dollars to erect new facilities in that district. Whereas, under the YRS Schedule, Oxnard School district experienced a total operational cost benefit totaling $908,061 (Brekke, 1986). By converting to YRS in 1976, Oxnard school district saved $16 million in new building costs over a thirteen year period (Brekke, 1989). Table 1 presents an abbreviated list of cost elements which Oxnard and other school districts have identified as costs to be grouped under Avoided Costs if a multiple track YRS approach has been adopted by a school district.

Table 1: Avoided Costs

- Construction of new building and surrounding infrastructure (streets, sewer, water, electrical)
- Rent of portable buildings
- Employment of new staff and personnel
- Added cost of maintenance of new campus
- Set up costs for new facility (telephones, e.g.)
- Furniture
- New equipment and curricular resources
- Double sessions

The second cost category, transition costs, include the following processes: (a) feasibility study, (b) additional administrative planning time, (c) teacher in-service programs, and (d) increased public relations and communication with community leaders, parents, and patrons. The most critical expenditures are for communications with community leaders, parents and patrons and teacher in-service programs. These constituencies must be informed about the benefits of YRS and why the administration of the district is promoting this approach. Table 2 presents representative transition costs for districts to account for in detail as their schools implement YRS.

Table 2: Transition Costs

- Feasibility studies of current campus facilities
- Administrative planning time schedules
- Continuation of current teacher contracts
- Hiring of some new teacher staff
- Teacher in-service training for YRS
- Public relations in the community

It is recommended that the third type of cost, projected operating costs be subdivided into fixed and variable costs. Table 3 presents products and services under each of these categories. Generally, the values for fixed costs would remain constant for TCS and YRS while the variable cost items would differ between the two approaches.

Table 3: Projected Operating Costs

Fixed
- Extra textbooks (instructional resources)
- Nonconsumable supplies (technology equipment)
- Teacher and student furnishings

Variable
- Teachers' salaries (additional contract time)
- Increase of administrational salaries
- Increase of clerical and maintenance salaries
- Utilities
- Consumable supplies, i.e. paper, etc.
- Transportation

A convenient metric for determining projected operating costs is to determine the average cost/student across fixed and variable operating costs then multiplying this value by the projected enrollment. The algorithm for the average cost per student is to sum the fixed costs and then divide this value by the number of students served plus per student variable costs plus per day variable costs, adjusted for the number of students served for program components within the school. This algorithm expressed in symbols becomes:

$$\text{Av OC/S} = \sum_{i=1}^{i} \frac{fci}{N} + \sum_{j=1}^{j} \left(\frac{VC}{S_2}\right)_j + \sum_{k=1}^{k} \left(\frac{VC^* \times ad}{Sd}\right)_k$$

AvOC/S = Average Operating Cost/Student
fci = fixed cost variables (1 . . . i)
N = total number of students
VC/S_2 = variable costs/students (1 . . . j)
students = number of students in program component where N>S
VC* = different variable costs (1 . . . k)
ad = additional days of school session
Sd = product of students in program components x days of program component

Total Projected Operating Costs = AvOC/S x N

The final cost category, incidental costs takes into account cost adjustments which are not directly related to funding the school's program. Absenteeism and vandalism are two elements which have frequently been reduced when YRS programs have been instituted. To illustrate, Oxnard school district reported not only a reduction of school absences but also dramatic reductions in losses due to burglary and vandalism after YRS was implemented. School officials attributed these phenomena to schedule effects of YRS (Brekke, 1986). Table 4 provides a list of incidental costs which may represent community needs and characteristics rather than special requirements of the YRS programs.

Table 4: Incidental Costs

- Absenteeism of Students
- Vandalism and Crime
- Attendance of Faculty
- Storage Space for off-duty teachers
- Student job opportunities
- Recreational activities provided in community

Combining these cost categories (i.e., Avoided Costs, Transition Costs, Projected Operating Costs, Incidental Costs) with the simulation cost model enables a comparison of a budget for YRS with a simulated budget for a TCS program. Costs associated with each category would be determined and summed together, then these category costs would be combined as follows.

YRS budget = Actual Operating Costs + Transition Costs + Incidental Costs

TCS budget = Avoided Costs + Projected Operating Costs

In terms of the relative influence exerted by the various cost variables Quinlan and associates (1987) have reported that major expenditures are associated with **avoided costs**, while actual and projected **operating costs** have been found to average nearly the same on a per student basis across the models. **Transition costs** generally are modest in

comparison to avoided costs , and **incidental costs**, if they influence the situation at all, appear to reduce the expense of year-round programs.

In summary, it is evident that YRS programs have the potential of reducing educational costs in communities experiencing population growth. However, other considerations, such as, efforts on academic programs and social considerations of students, parents, teachers, administrators and school patrons must be incorporated into the information system as school leaders decide whether to adopt YRS programs in their school districts.

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