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ABSTRACT

The report addresses itself to a basic need for educational planning--a data base for comprehensive planning--and documents the development of a planning information system at the completion of the third stage in a proposed 15-stage process. As such, the report is only in its initial phases of development. However, it is being disseminated on a limited basis in order to inform educational planners about the nature of this particular task and to solicit comments and criticisms from readers as part of its evaluation. The document defines comprehensive educational planning; presents a planning model; describes a planning information system for a local educational agency; and discusses its various components, including the base data system, data trees, and data reports. It then presents detailed illustrations of the use of the data system in obtaining a raw profile, an algorithmic profile, policy/environmental conditions, and projected alternate states. The document concludes with a description of preliminary field testing of the model. (Author/DN)

A DATA SYSTEM FOR COMPREHENSIVE PLANNING IN EDUCATION

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FOREWORD

Modern-day educational planners face an extremely difficult task of providing quality education to large masses of students in view of decreased revenues, soaring costs, shifting populations, and changing educational programs. Such a challenge requires that a far greater emphasis be placed on planning for schools than has been the case to date and necessitates the development of improved techniques specially designed for educational planning.

Project Simu-School is intended to provide an action-oriented organizational and functional framework necessary for tackling the problems of modern-day educational planning. It was conceived by a task force of the National Committee on Architecture for Education of the American Institute of Architects, working in conjunction with the Council of Educational Facility Planners, International.

The present report addresses itself to a basic need for educational planning - a data base for comprehensive planning - and documents the development of a planning information system at the completion of the third stage in a proposed fifteen-stage process. As such, the report is only in its initial phase of development; however, it is being disseminated on a limited basis in order to inform educational planners about the nature of this particular task and to solicit comments and criticisms from readers as a part of its evaluation. It is hoped that the concepts being developed for this task will be of some use to educational planners at all levels of planning.

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What Is Comprehensive Educational Planning?

Comprehensive Educational Planning is a continuous process of (1) establishing goals, (2) gathering data, (3) forming and assessing alternative means of goal achievement and (4) making decisions about these alternatives. Comprehensive Educational Planning must consider both immediate and long-range alternatives. It must be multi-dimensional and integrate all levels of education with other societal agencies. People involvement and coordination are key activities in the process.

Levels of Planning

Education in this country is basically a function of state government, but the states have created various local school systems or sub-systems to carry out this function. Local school systems in turn have established various types of schools and agencies, also sub-systems, to provide desired learning experiences. Planning should occur at all three levels. Although the process is essentially the same at all levels, the data needs are strikingly different.

Borrowing from the military model, planning for the state educational agency has been termed strategic planning; for the local educational agency, tactical planning; and for the individual school, operational planning. Planning at each level provides some constraints on planning at the lower levels; such planning must also take into account the planning at other levels. Each level of planning is also affected by its many coordinate governmental and community systems within which it operates.

The Planning Model

The process of comprehensive educational planning is graphically presented on the following page (Figure 1). In the model, rectangles are used to designate processes and circles are used to designate products of processes.

In the initial phase, the end products of the planning endeavor are clearly identified and stated and the detailed resources--personnel, financial and time needed to complete the total planning process--are outlined. The product of this planning phase is often referred to as the "plan for planning".

Developing the Data Information System and establishing goals for the system are shown as interacting phases since much of the initial data has direct implications for goals and the establishment of goals effects the kinds of additional data that need to be collected and analyzed. The Data System, the primary topic of this paper will be discussed in detail in the following section.

Establishing the goals of the system may well be the most elusive, yet the most challenging in the entire planning process. It is imperative that well-defined goals be established before planning can proceed. If the goals are not ordered according to importance or resource priority, they must be accompanied by a brief statement of overarching principles which will permit decision-making when goal conflict arises in planning or implementation. It is also important that goals be further defined into more specific objectives which can be measured.

Sub-optimizing the means of goal achievement is the heart of the planning process. The quality of the final product of the planning process will, in large part, be determined by the ability of planners

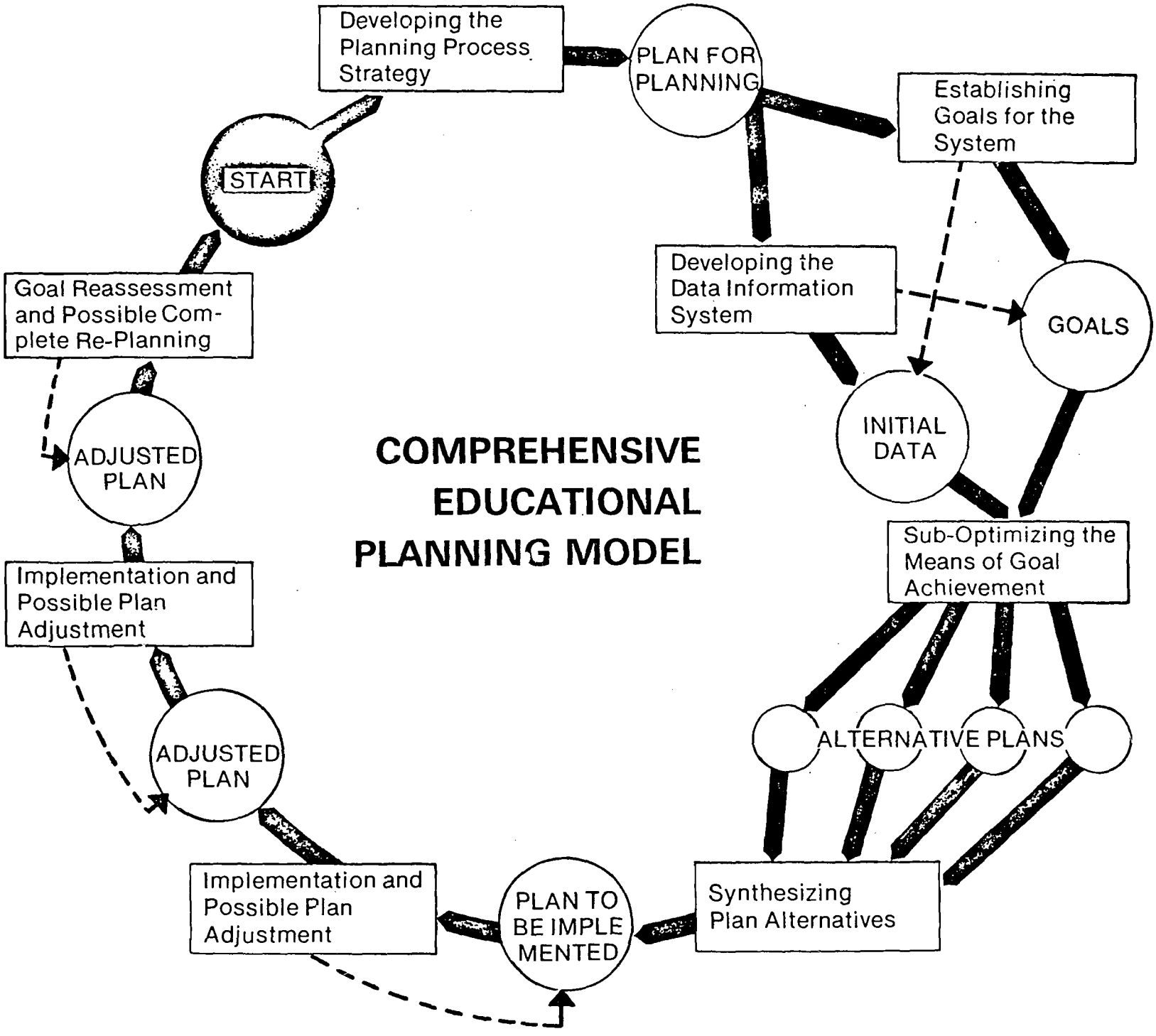

COMPREHENSIVE EDUCATIONAL PLANNING MODEL
Developing the Planning Process Strategy
PLAN FOR PLANNING
Establishing Goals for the System
START
Developing the Data Information System
GOALS
INITIAL DATA
Goal Reassessment and Possible Complete Re-Planning
ADJUSTED PLAN
Sub-Optimizing the Means of Goal Achievement
Implementation and Possible Plan Adjustment
ALTERNATIVE PLANS
ADJUSTED PLAN
Implementation and Possible Plan Adjustment
PLAN TO BE IMPLEMENTED
Synthesizing Plan Alternatives

FIGURE 1

to create viable alternatives from which the final plan can be synthesized. Each alternative plan must have a basic strategy by which the goals can be achieved and an array of service systems to implement the plan.

Synthesizing Plan Alternatives requires decision-makers to consider each of the elements of the alternative plans and blend them into the ultimate plan to be implemented.

While implementation is not a formal phase of the planning process, it must occur before the plan adjustment phase is undertaken. As implementation gets under way, product evaluation procedures must be initiated in order to provide data for decision-making about plan adjustments. This phase operates on the assumption that the goals of the system are still valid and plan adjustments are needed to better meet the established goals.

While the plan adjustment phase need not involve every phase of the comprehensive educational planning process, it is imperative that goal reassessment be initiated periodically so that the complete planning process can be recycled should the goal reassessment indicate the desirability of doing so. A common problem among organizations is that of remaining relevant. Periodic goal reassessment is essential to insure continuing relevance.

The process of involving students, staff, and lay community members and the process of evaluation have not been included as distinct phases in the comprehensive educational planning model, not because of lack of importance, but because they permeate much of the planning process.

A more detailed illustration of the planned implementation of the planning model in a large urban school system can be found in Appendix C.

A Planning Information System for a Local Educational Agency

Purposes and Principles

Four major purposes of the planning information system are: (1) to store and retrieve data, (2) to generate summaries, (3) to generate alternatives, and (4) to evaluate and synthesize the alternatives.

Five principles should guide the development of the data system. First, the data system must be comprehensive in scope and depth yet contain just the right amount of data. Too much data or the wrong data are almost as harmful as insufficient data.

Data must be well organized and easily accessible. Data is useless if it cannot be quickly located and processed when needed. In many cases, this simply means a carefully organized filing system. In a large district, it is almost imperative that a computer system be utilized.

The data system must be continuously updated. Equally important to adding new data is the discarding of unnecessary and outdated information from the data system.

The final principle is that planning information must be shared and the system must be well coordinated with other data systems--both educational and community systems. It is imperative that certain operational planning data of each school flow easily into the planning information system of the LEA and equally important that certain tactical planning data of the LEA flow easily into the strategic planning information system of the state educational agency. It is also important that the management data system of the LEA be coordinated with the plan-

ning information system. This linkage of a PPBS input-output analysis system with the planning information system is illustrated in Appendix D.

Figure 2 summarizes the various sources of data for comprehensive planning. Each planning level has inputs from its super-system, from its sub-systems, and from its many coordinate systems and agencies. Examples of data flow from coordinate systems might include: zoning and land use information from the city or regional planning agency, enrollment data from non-public schools, and recreational programs offered by various local agencies, such as, churches, city parks and recreation department, YMCA, or private companies.

The Base Data System

Figure 3 shows the many facets and interrelatedness of the base data system. The system consists of four levels of data.

The raw profile data (Level 1) includes most of the initially collected raw unprocessed data needed to run the system. This level provides a profile of each person, learning activity, resources, and process which affects the system. Raw profile data on a student would include such elements as name, date of birth, sex, academic record, and learning characteristics. Raw profile data on a learning activity would include such elements as: activity identification, duration of the activity, students and staff involved, and location of the activity. More detailed illustrations of raw profile data can be found in Appendix A.

Algorithmic profile data (Level 2) is raw profile data converted to more useful form by simple algorithms. Much of the algorithmic profile data is simply summations of Level 1 data into useful categories. For example, student data might be grouped according to grade, school,

DATA INPUTS for COMPREHENSIVE EDUCATIONAL PLANNING

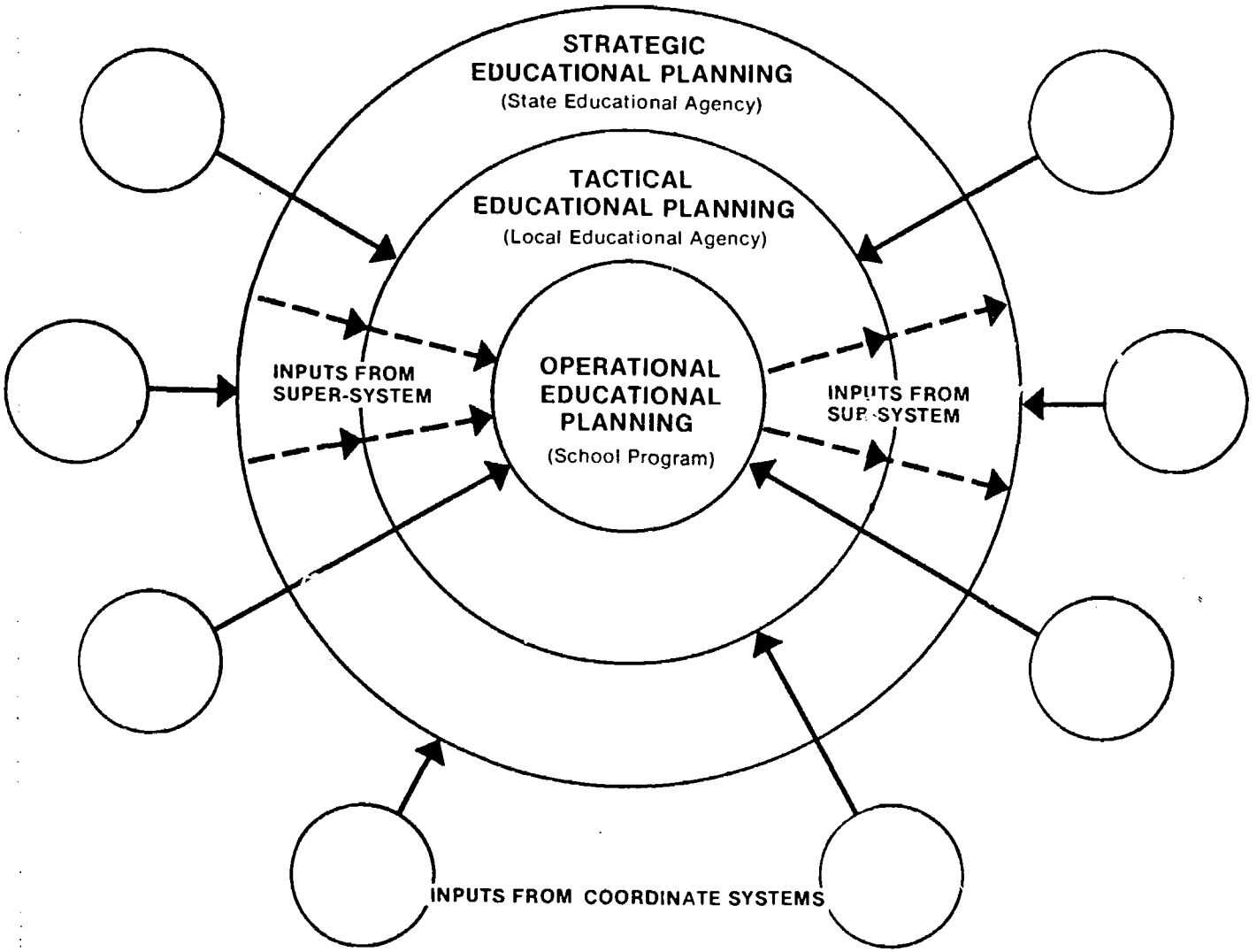
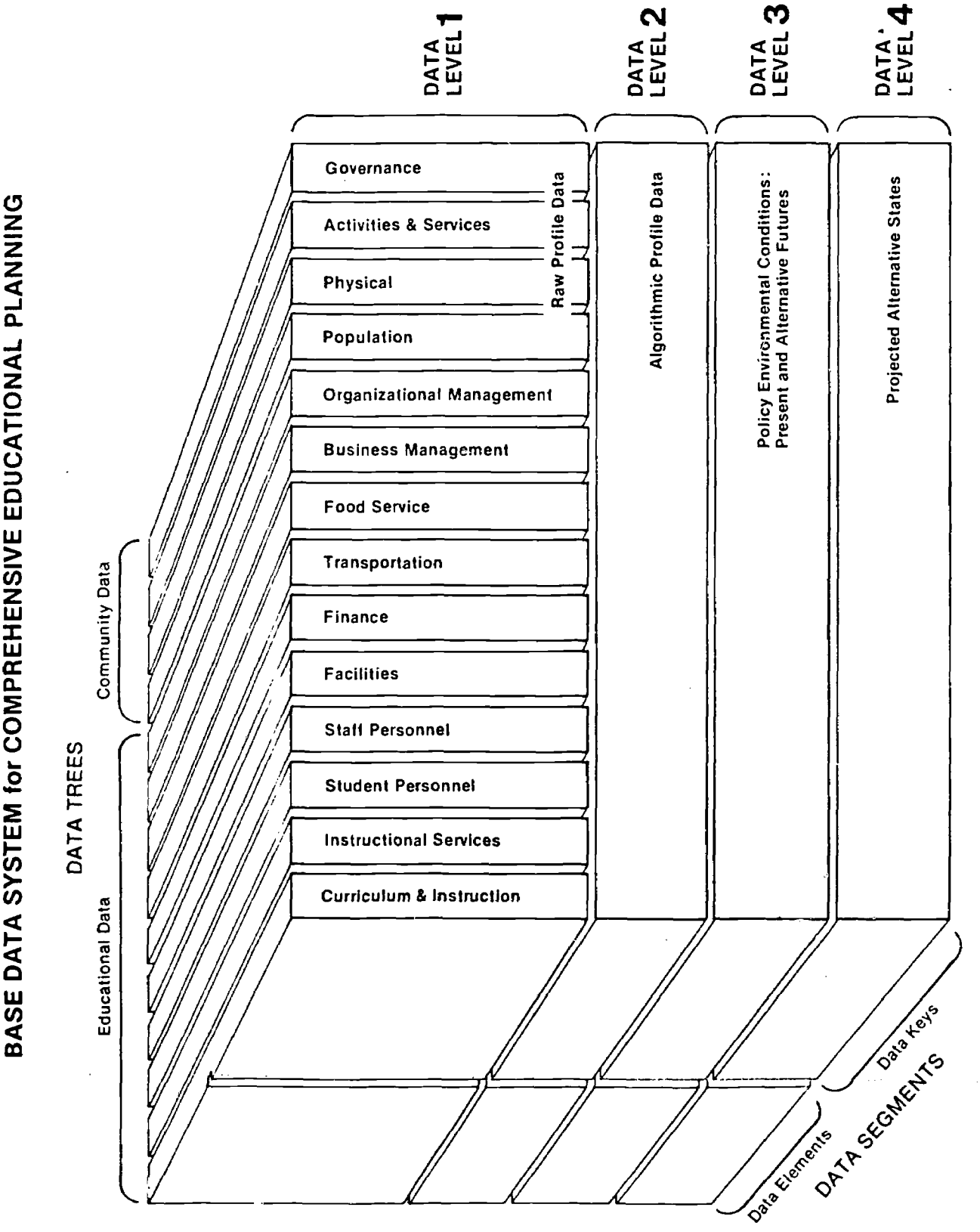


FIGURE 2

FIGURE 3


BASE DATA SYSTEM for COMPREHENSIVE EDUCATIONAL PLANNING
DATA TREES
Community Data
Educational Data
DATA LEVEL 1
DATA LEVEL 2
DATA LEVEL 3
DATA LEVEL 4
Governance
Activities & Services
Physical
Population
Organizational Management
Business Management
Food Service
Transportation
Finance
Facilities
Staff Personnel
Student Personnel
Instructional Services
Curriculum & Instruction
Raw Profile Data
Algorithmic Profile Data
Policy Environmental Conditions: Present and Alternative Futures
Projected Alternative States
Data Keys
Data Elements
DATA SEGMENTS

curricular area, learning difficulties, sex, race, or any combination. Level 2 data also consists of various data comparisons such as student-teacher ratio, average class size by curricular area, staff ratios by sex or race by schools, or student yield per housing unit. Additional examples of algorithmic profile data (Level 2) can be found in Appendix B.

Policy environmental conditions (Level 3) includes those data which describe present or alternative policies which affect the resource inputs and outputs of the system. Policy environmental conditions may be simple or complex. For example, the policy on class size may merely state that the desired average class size is 28. This presumes variation but does not describe the limits of tollerable variation. A more complex policy statement might add that no class groups will be formed for fewer than 10 students and that no class groups will exceed 35. Other examples of policy environmental conditions might include entrance age of students, negotiated salary provisions, required courses, racial mix tollerance of students and/or staff. Additional examples of policy environmental conditions (Level 3) can be found in Appendix B.

Projected alternative states (Level 4) results from various combinations of Level 1, 2, and/or 3 data. Projected alternative states can often be derived by use of computers involving complex formulas and/or simulation models. For example, class size policy might be combined with staff assignment policy and projected patterns of student course elections to produce the number of staff required and further combined with salary policies to produce dollar resources required. Other examples of projected alternative states might include projected cost of various salary schedule changes, projected income from alternative appropriation bills and projected teacher turnover.

Not all projected alternative states are derived from rigorious mathematical calculations or computer simulations. Prose descriptions of alternative personnel recruitment plans or alternative instructional strategies are also examples of Level 4 data.

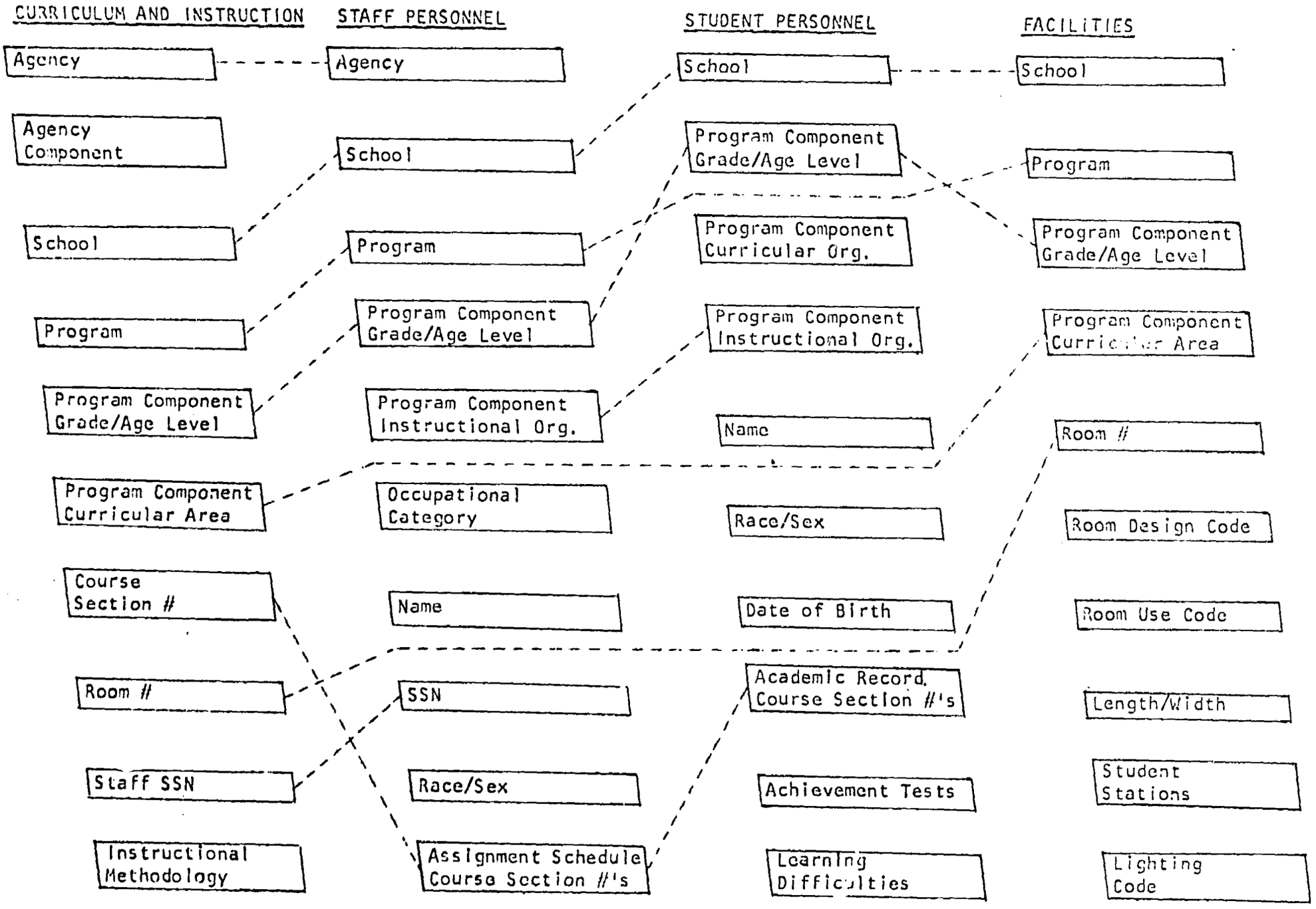
A detailed illustration of a computer simulation model for projecting staff personnel needs will be given in the next section and additional examples of projected alternative states can be found in Appendix B.

Data Trees

For easier and quicker processing, the raw profile data are organized into ten educational and four community data trees (See Figure 3). The primary criterion for determination of the data trees is to collect in one tree similar types of data which will permit the generation of the maximum amount of upper level data without going outside the tree. However, the ultimate number of data trees must be a delicate balance between a few large trees and many small trees because considerable processing will be between and among trees.

In order to facilitate data processing, certain data segments are designated data keys. The keys are used for summation of data within the tree and also for linkage between trees. The summation keys are organized in a branching manner. For example, in the Curriculum and Instruction Tree (See Figure 4), the first key is the local educational agency. The agency is then broken into agency components or planning areas which in turn are composed of individual schools. Schools are divided into programs and program components such as curricular area and so on down to an individual course section upon which most of the raw profile data are collected. Therefore individual elements about

FIGURE 4
DATA LINKAGE AMONG DATA TREES



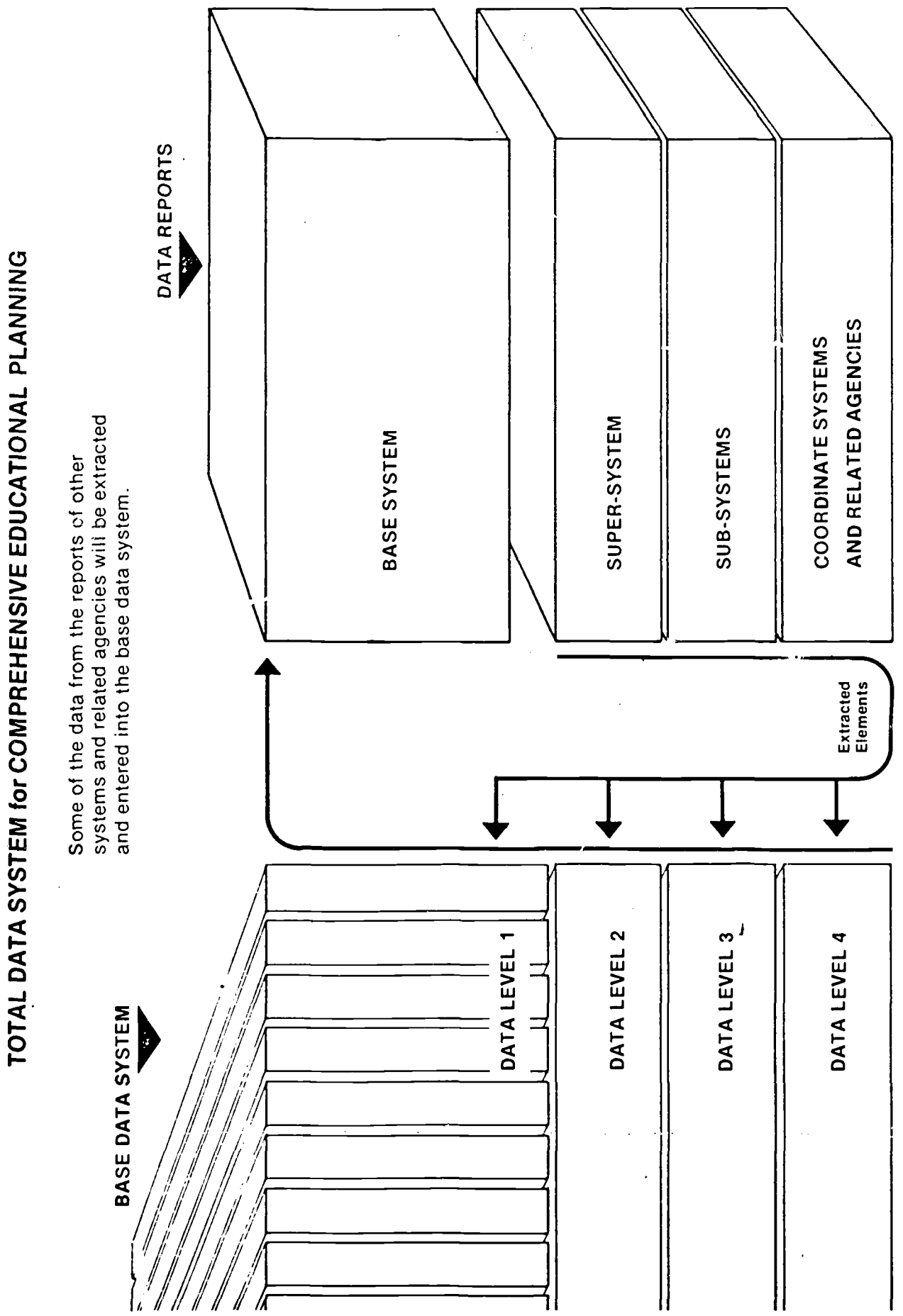
all course sections, such as instructional methodology, can easily be summed by curricular area, school, or any other summation key.

Figure 4 also shows the function of the keys for data linkage among the trees. Four data trees are presented in the figure--Curriculum and Instruction, Student Personnel, Staff Personnel, and Facilities. Under each tree are shown significant keys and some of the other data elements within each tree. Examination of the dotted lines indicate possible linkage from one tree to another. For example, the Curriculum and Instruction and the Staff Personnel trees can be linked by the course section and/or staff social security number so that detailed information about curriculum and instruction can be correlated with detailed staff information from the staff personnel tree. Both keys are necessary when a course section is being taught on a team basis. The course section key is also found in the Student Personnel tree so that detailed student characteristics and student output data can be related to curriculum and instruction and staff inputs. Similarly, through the Room/Space key, detailed curriculum and instruction data can be related to detailed facility data. These are but a few examples of the myriad possible linkages, correlations, and summaries which are provided by the data system.

Data Reports

Figure 5 shows that the total data system consists not only of the base data system but numerous reports generated from the base data system and reports from other systems and agencies. These reports may be in a variety of forms -- some may actually be stored in the computer, subject to call-up on a cathode ray tube, others in prose, and still

FIGURE 5


TOTAL DATA SYSTEM for COMPREHENSIVE EDUCATIONAL PLANNING
Some of the data from the reports of other systems and related agencies will be extracted and entered into the base data system.
DATA REPORTS
BASE SYSTEM
SUPER-SYSTEM
SUB-SYSTEMS
COORDINATE SYSTEMS AND RELATED AGENCIES
Extracted Elements
BASE DATA SYSTEM
DATA LEVEL 1
DATA LEVEL 2
DATA LEVEL 3
DATA LEVEL 4

others in map or chart form. Many of the reports from other agencies are stored and used in the form received.

This figure also illustrates that certain data elements are sometimes extracted from the reports of other agencies and become integral parts of the base data system of the local educational agency. Such use demands cooperation and coordination with other agencies in order that the data will be compatable with the base data system of the local educational agency.

Detailed Illustrations of the Use of the Data System

The major reason for creating a Planning Information System (PIS) is to provide evaluated input information to the decision makers of an LEA. This section of the report seeks to illustrate the use of the PIS in obtaining this "evaluated input information" for decision making; it may be remembered that the PIS was intentionally structured to facilitate this process since Level 3 contains a specification of the alternatives and Level 4 is nothing more than the projected states resulting from those alternatives. In this section there will be two series of illustrations: (1) the first series deals with the staffing implications resulting from changes in the operations/environment of the District and (2) resource allocation considerations arising when considering the funding and implementation of new projects in order to realize school district goals.

All the examples in the first series use as common data the PIS Level 1 and Level 2 data shown in Exhibit 1. The data for this series has its genesis in the Student Personnel Tree and the Staff Personnel Tree as shown in the two columns headed by the entries "Student Number" and "Teacher SSN" of Level 1 data in Exhibit 1. Level 1 data for all the teachers and all the students in the LEA are summarized into the entries shown in Level 2 of Exhibit 1. For example, the Couse Selection data in the Student Personnel Tree are linked to the Staff Personnel Tree (by the Teacher's Social Security Number -- "Teacher SSN") and also this Course Section is related to the Teacher Certification Area to which it belongs; this information is summarized into the entry "AVERAGE NUMBER OF CLASSES TAUGHT PER TEACHER IN A CERTIFICATION AREA",

Illustration of Rationalized
DECISION-MAKING USING PIS
Levels of Data and Computer Models
Exhibit 1

LEVEL 1: Raw Profile

Teacher SSN	Student Number
Certification Areas	Demographic Data
Degrees	Site
Experience	Building
Major/Minor Duty Codes	Room/Space
Teaching Evaluations	Course Selections(s)
Race/Sex	Instruction Mode(s)
Teaching Subject Areas	Section(s)
Pay Grade -- Pay Step	Teacher SSN

LEVEL 2: Algorithmic Profile

RUN ID
RUN DATE
PERIODIC DATA (RG)
- YEAR OF RECORD
- NUMBER OF SECONDARY PUPILS IN SYSTEM
- NUMBER OF SECONDARY TEACHERS IN SYSTEM
- SECONDARY LEVEL PUPIL/TEACHER RATIO
- NUMBER OF ELEMENTARY PUPILS
- NUMBER OF ELEMENTARY TEACHERS
- ELEMENTARY PUPIL/TEACHER RATIO
- AVERAGE NUMBER OF CLASSES PER SECONDARY PUPIL
- AVERAGE NUMBER OF CLASSES PER ELEMENTARY PUPIL

CERTIFICATION AREA DISTRIBUTIONS (RG)
- RACE/SEX
- PAY GRADE-PAY STEP
- CERTIFICATION AREA
- NUMBER OF PUPILS IN CLASSES
- FRACTION OF SECONDARY PUPILS IN A CERTIFICATION AREA
- NUMBER OF CLASSES HELD IN A CERTIFICATION AREA
- SIZE OF AVERAGE CLASS IN A CERTIFICATION AREA
- AVERAGE NUMBER OF CLASSES TAUGHT PER TEACHER IN A CERTIFICATION AREA

SUBJECT AREA DISTRIBUTIONS (RG)
- RACE/SEX
- PAY GRADE-PAY STEP
- SUBJECT AREA
- NUMBER OF PUPILS IN CLASSES IN A SUBJECT AREA
- FRACTION OF SECONDARY PUPILS IN A SUBJECT AREA
- NUMBER OF CLASSES HELD IN A SUBJECT AREA
- SIZE OF AVERAGE CLASS IN A SUBJECT AREA
- AVERAGE NUMBER OF CLASSES TAUGHT PER TEACHER IN A SUBJECT AREA

line 21 under Level 2, Exhibit 1. It should also be noted that the data in Level 2 are presented in a compact format which is explained in Appendix B; this format was used in order to save space. Exhibits 2 - 5 all use the Level 1 and Level 2 data found in Exhibit 1. To facilitate understanding, the Level 3 and Level 4 data presented in these four exhibits differ in format from either Level 1 or Level 2 data contained in Exhibit 1. Considering Level 3 data in Exhibit 2, it may be seen that a policy alternative is stated as "Constant Salary Structure for 1972-1973 through 1975-1976". This form of presentation is considered easier to grasp than specifying the individual salary structure control values listed in Appendix B, Level 3, "TEACHER BASE SALARY CONTROL" (bottom of first page of Level 3 data).

Level 4 data is presented in tabular form to facilitate comparisons among Exhibit 2 through 5, inclusive. For each projected year (i.e. 1972-1973 through 1975-1976) four descriptors are presented: (1) the count and cost of teachers <u>required</u> to conduct the specified educational program in September; (2) the count and cost of teachers <u>remaining</u> at the end of the school year -- June; (3) the number of teachers who will <u>terminate</u> from one September to the following September and, (4) the count and cost of teachers who should be <u>hired</u> in order to provide the needed number of teachers to conduct the specified educational program for the <u>next</u> year. Thus, in 1972-1973 7,030 teachers are required in September, 3,687 of which are elementary teachers; the cost of these teachers if $67,095,900 and $35,431,000 respectively (according to Exhibit 3). Of the 3,687 elementary teachers hired for September, 1972, 3,666 will remain in June of 1973; 406 will terminate before September, 1973 and 410 must be hired in order to

EXHIBIT 2
Reference Case: Invariant Operations

LEVEL 3: Policy/Environmental Conditions

a. Present: See LEVEL 2
b. Future: Enrollment Constant 1972-73 through 1975-76
Constant salary structure for same years.
Constant Pupil/Teacher ratios for Elementary and Secondary Levels for same years.

LEVEL 4: Projected Alternate States

YEAR	---REQUIRED---		---REMAIN---		TERM	---HIRE---	
	Count	Cost	Count	Cost	Count	Count	Cost
			DISTRICT-WIDE VALUES				
73	7032	670959	6900	598453	842	974	74904
74	7032	673970	6951	607447	842	921	70831
75	7032	678390	6948	612690	818	903	69317
76	7032	682402	6946	615826	820		

Note: Cost figures in hundreds of dollars.

operate the school system for the 1973-1974 school year according to the policy/environmental conditions (specified in Level 3 data) applicable to the 1973-1974 school year. These values come from the data projected and stored in Level 4 data; for example, the count and cost of teachers which must be hired for each projected year may be found in Appendix B (the last page of Level 4 data) under the repeating group (RG) labeled "HIRED TEACHERS -- SUBJECT AREA". It may be seen that within that repeating group are found the PROJECTED YEAR, PAY GRADE-PAY STEP, SUBJECT AREA, NUMBER OF TEACHERS, and COST OF TEACHERS. The interpretation of these values and their relationships within the repeated group are explained in the first page of Appendix B.

The Level 3 data (Policy/Environmental Conditions) may be summarized as follows:

Exhibit 2: Base Case:

A. Constant enrollment for four years.

B. Constant salary structure for three years.

C. Constant Pupil/Teacher ratios for Elementary and Secondary levels.

Exhibit 3: All conditions of Exhibit 2 maintained except that enrollment will be changed as follows:

A. Secondary enrollment will decrease 5% per year.

B. Simultaneously, Elementary enrollment will increase 1.4% the first year and then decrease 5% per year for years 2 through 4, inclusive.

Exhibit 4: All conditions of Exhibit 2 maintained except salary will be increased 5% the second year, 10% the third

year, 0% the fourth year, while enrollment is changing as specified in Exhibit 3.

Exhibit 5: All conditions of Exhibit 2 obtain except that the Pupil/Teacher Ratio for Elementary and Secondary levels will individually be reduced by 1 per year. Simultaneously, enrollments will behave as in Exhibit 3 and salaries will change as in Exhibit 4.

It may be seen that Exhibit 2-5 represent a series of alternatives beginning with maintenance of status quo (Exhibit 2) and accumulating one change for each new exhibit. For example, Exhibit 3 maintains all conditions of Exhibit 2 except a change in Enrollment; Exhibit 4 maintains all conditions of Exhibit 3 except a change in Salary; Exhibit 5 maintains all conditions of Exhibit 4 except a change in Pupil/Teacher Ratio. Hence, comparisons between cases will show the effect of changing one variable.

A. Discussion of Exhibits 1-5:

Exhibit 2 represents a situation in which all variables are maintained in a constant state over the four-year planning horizon, resulting in 7,032 teachers required for all four years, as shown in Exhibit 2, Level 4, "REQUIRED". Yet, these 7,032 teachers cost approximately 1.8 million dollars more in 1975-76 than 1972-73. This phenomenon arises from two facts: (1) the court-ordered integration of the faculty of the LEA occasioned significant increases in resignations among teachers with 5 or less years of experience, presumably because seniority was a chief factor used to determine who should not have to transfer. Thus, low seniority, low salary-cost teachers were leaving the District in ever-increasing numbers; (2) the excess supply of

teachers which has appeared recently had apparently increased the retention by the LEA of its more senior teachers, especially since these teachers have been least affected by the crossover resultant from staff integration. The upshot of these two factors has been an aging of the staff of the LEA which, according to the salary table, results in an increasing salary expenditure by the LEA of approximately 1.8 million dollars for the same number of teachers.

Examination of Exhibit 3 reveals that the approximately 15% decrease in Elementary and Secondary Enrollment during the planning horizon results in approximately a 12% decrease (7032-6195) in the number of required teachers between 1972-73 and 1975-76, with a cost reduction of $6,559,300. However, the big impact of the declining enrollment is in the number of teachers who need to be hired. Comparison of Exhibit 2 with Exhibit 3 indicates that 410 Elementary teachers must be hired in September, 1973 while only 200 teachers (a decrease of 51%) need to be hired in September, 1975. The projected hiring levels will be of vast importance to the Personnel Department of an LEA, since they take into account both the staff attrition rates and the reduced demand for teachers as a result of enrollment decreases.

The only difference between Exhibit 4 and Exhibit 3 is that salaries increase as specified under Level 3. Thus, the number of teachers ("Count") who are required, remain, terminate, or will be hired are identical in Exhibits 3 and 4; only the "Cost" figures differ resulting from the salary increases. Comparison of the cost of required teachers as indicated in Exhibits 3 and 4 for each of the projected years will indicate the accumulated effect of the pay raises from year to year (District-Wide Values only presented).

EXHIBIT 3
ELEMENTARY AND SECONDARY
ENROLLMENT DECLINE

LEVEL 3: Policy/Environmental Conditions

a. Present: See LEVEL 2
b. Future:

All conditions of Exhibit 2 maintained except that enrollment will be changed as follows:

(1) Secondary enrollment will decrease 5% per year.
(2) Simultaneously, Elementary enrollment will increase 1.4% the first year and then decrease 5% per year for years 2 through 4, inclusive.

LEVEL 4: Projected Alternate States

YEAR	---REQUIRED---		---REMAIN---		TERM	---HIRE---	
	Count	Cost	Count	Cost	Count	Count	Cost
			DISTRICT-WIDE VALUES				
73	7030	670959	6900	598453	842	807	62067
74	6865	661055	6803	597881	809	529	40692
75	6522	638803	6465	581162	727	457	35089
76	6195	616189	6149	561807	676		
			ELEMENTARY				
73	3687	354310	3666	324006	406	410	31591
74	3669	355594	3653	326400	396	237	18254
75	3495	344787	3485	318149	358	200	15488
76	3327	333714	3324	309520	323		

Note: Cost figures in hundreds of dollars.

EXHIBIT 4
SALARY INCREASE PLUS
ENROLLMENT DECLINE

LEVEL 3: Policy/Environmental Conditions

a. Present: See Level 2

b. Future: All conditions of Exhibit 2 maintained except salary will be increased 5% the second year, 10% the third year, 0% the fourth year, while enrollment is changing as specified in Exhibit 3.

LEVEL 4: Projected Alternate States

YEAR	---REQUIRED---		---REMAIN---		TERM	---HIRE---	
	Count	Cost	Count	Cost	Count	Count	Cost
			DISTRICT-WIDE VALUES				
73	7030	670959	6900	628427	842	807	65191
74	6865	694153	6803	690648	809	529	47006
75	6522	737899	6465	671351	727	457	40560
76	6195	711826	6149	674977	676		
			ELEMENTARY				
73	3687	354310	3666	340208	406	410	33175
74	3669	373379	3653	376987	396	237	21091
75	3495	398241	3485	367462	358	200	17895
76	3327	385454	3324	371807	323		

Note: Cost figures in hundreds of dollars.

Year	Difference in Cost Between Exhibit 3 and Exhibit 4
73	-0-
74	3,309,800
75	9,909,600
76	9,563,700
Total	$ 22,783,100

Hence, the pay raises will cost 22.7 million dollars in the next three years; the annual incremental costs are shown in the preceding table. These increase costs take into account the reduced number of teachers required due to enrollment decreases specified in Exhibit 3. In other words, if enrollment did not decrease the cost of salary increases would be significantly greater.

If, simultaneously with the enrollment decreases of Exhibit 3 and the salary increases of Exhibit 4, the Pupil/Teacher Ratio for Elementary and Secondary Levels is allowed to be reduced by 1 for each year, the count and cost of teachers will be as shown in Exhibit 5. Reduction of class size (Exhibit 5) tends to increase the number of teachers required (Exhibit 3), while Exhibit 2 presents a constant-number-of-teachers required. It is of interest to contrast these 3 cases in terms of the number of required teachers. The following table presents this information:

NUMBER OF REQUIRED TEACHERS

Year	Exhibit 5 - Exhibit 4	Exhibit 5 - Exhibit 2
73	-0-	-2
74	264	97
75	512	+2
76	743	-94

The decreasing class size ultimates in an increasing number of required teachers as shown in the Column "Exhibit 5 - Exhibit 4". Examination of the right-most column of the above table indicates the relative

EXHIBIT 5
DECREASING PUPIL/TEACHER RATIO PLUS
INCREASING SALARY PLUS
ENROLLMENT DECLINE

LEVEL 3: Policy/Environmental Conditions

a. Present: See LEVEL 2
b. Future: All conditions of the Exhibit 2 maintained except that the Pupil/Teacher Ratio for Elementary and Secondary levels will individually be reduced by 1 per year. Simultaneously, enrollments will behave as in Exhibit 3 and salaries as in Exhibit 4.

LEVEL 4: Projected Alternate States

YEAR	---REQUIRED---		---REMAIN---		TERM	---HIRE---	
	Count	Cost	Count	Cost	Count	Count	Cost
			DISTRICT-WIDE VALUES				
73	7030	670959	6900	628427	842	1071	86585
74	7129	715525	7052	709399	858	840	74549
75	7034	783949	6958	709092	819	798	70892
76	6938	780174	6867	733769	807		
			ELEMENTARY				
73	3687	354310	3666	340208	406	349	44400
74	3809	384660	3786	387247	419	399	35554
75	3767	422938	3744	387969	403	371	33032
76	3713	420995	3701	403493	386		

Note: All cost figures in hundreds of dollars.

virility of the two offsetting conditions, i.e., the decreasing enrollment and the decreasing class size. The values presented in that column indicates that the accumulative effect of the 5% per year decrease in enrollment overcomes the effect of the reduced class sizes as may be seen by the fact that the net effect of these two forces is a reduction in the number of required teachers of about 95 per year. It is also worth noting that the 743 additional teachers required for 1976 (see the center column above) result in an increased salary cost of approximately 6.8 million dollars above the salary cost shown in Exhibit 4. The reader may also wish to examine the changes in hiring requirements and the total cost of the required teachers for the two situations represented in the table aboce; space does not permit a detailed discussion here.

B. Discussion of Exhibits 6-10:

This series of examples deals with a familiar capital-rationing problem: the optimal allocation of scarce educational resources to a slate of competing new projects whose total budget requests are greater than the amount of resources available. In order to understand this decision-making situation, it is necessary to consider the steps which led to its development:

1. LEA educational goals were articulated and quantified for for measurement.

2. Present and desired values of these quantified goals (called indicators) were measured/specified, resulting in the determination of Indicator Gaps, representing the difference between the present and desired values. These Indicator Gaps represent a measure of educational need.

3. Weights are assigned to the Indicators to represent the goal hierarchy within an LEA.

4. Available discretionary money (funds above basic operating expenses) is determined and specified for the required number of years into the future.

5. Cost and benefit information about each of the projects is summarized from the PIS data base, Level 1, using such information as Student Achievement scores, Costs, Course Section Enrollments, Teacher Assignment Information, etc.

6. Level 3 (Policy/Environmental Alternatives) values are specified such as total budget for projects, maximum amount to be spent on any particular project, minimum number of students who must be serviced by a project, maximum number of students who can be serviced by a project in any particular year, etc.

7. Within these Level 3 constraints, the proposed projects compete for funds in yearly cycles.

8. Level 4 data, such as optimum sets of projects (specifying for each project whether or not it is funded, the number of students serviced by it, and the cost for each project), expected Indicator changes and projected Indicator Gaps are presented for evaluation. The Level 4 data presented represents the optimum selection of projects from the slate of proposed projects and the optimum specification of service levels for those projects where service level is defined as the number of students participating in an educational project given the Level 3 data specified by the investigator, e.g.:

a. The priorities (weights) assigned to the goal indicators.

b. The minimum and maximum number of students permissible for a project.

c. The amount of discretionary money available for a particular year.

d. The maximum amount of money that may be spent in a given year for a project.

Hence, given the conditions specified above, the results stored in Level 4 represent the best slate of projects which can be selected on a cost-benefit basis.

Exhibit 6 contains a condensed listing of the Level 1 and Level 2 data applicable to Exhibits 6 - 10; these Level 1 and Level 2 data are in the same format as their counterparts for Exhibits 1 - 5. Level 3 data are presented in Exhibit 7, 8, and 10. Exhibit 7 contains a listing of the 26 projects competing for funding over a 3 year planning horizon. Also included are the specification of the fixed cost, variable cost, minimum and maximum number of students which a project may serve, the maximum amount of money which may be spent on a particular project, and the minimum duration of a project in years. Fixed costs represent the cost incurred when operating a proposed project with the minimum number of students. These costs include salaries for at least one teacher (or the minimum number of teachers for the minimum of students), special supplies, facilities, and other set-up costs. Variable costs are the cost per student for each student added to the service level of the project above the minimum number of students. Projects with a "Duration" value of, say, "2" are projects which, if selected one year, must be selected the following year.

Exhibit 8 contains additional Level 3 data, namely financial information. As indicated, the investigator may specify the total revenues and operating expenses applicable to an LEA X number of years

into the future, and the resulting total budget for special projects. Also shown in Exhibit 8 are certain Level 4 data such as the actual amount of new project expenses allocated by the computer model. Level 2 data shown in Exhibit 8 (useful for comparison purposes) are the Total Project Budget Requests and the Percent of Unsatisfied Requests. The left-most columns of Exhibit 10 indicate the Indicator Names and associated weights (priorities) specified by the user. The "Present Value" shown in the next column of Exhibit 10 are Level 2 values; the "Desired Value" shown in the next column are Level 3 data. The column labeled "73-74 Gap" and the columns to the right of it are Level 4 data and will be described subsequently.

Level 4 data is presented in Exhibit 9, to wit, the optimal project selections for the years 1973-74 through 1975-76 inclusive. For each of these years the Exhibit indicates not only the projects which were selected and rejected but for each project the optimal number of students which it should serve and the associated cost. At the bottom of the exhibit for each year, the total number of students served by the selected projects and the total cost of all those projects is indicated. Additional important Level 4 data is also contained in Exhibit 10. Beginning with the column labeled "73-74 Gap" the Indicator Gap resulting from the operation of the selected projects specified in Exhibit 9 is calculated and tabulated. Also shown is the final value of the particular Indicator after the 3 year planning horizon has expired so that the final value of the Indicator may be compared to its initial value ("Present Value") and the Desired Value. To facilitate this comparison, the right-most column "Per Cent Gap Reduction" is included to show how much of the initial gap (the difference between the Desired Value and

the Present Value) has been reduced by the optimal slate of projects selected and specified in Exhibit 9. Thus, the projection of the impact of the operation of the selected projects upon the prioritized goal structure of the LEA is presented in Exhibit 10. The meaning of the data in Exhibits 9 and 10 is that given the Level 3 data specified by the user there is no better selection of projects or service levels (as displayed in Exhibit 9) which will result in a greater Percent Gap Reduction, as shown in Exhibit 10; i.e., the selections shown in Exhibit 9 is the best that can be done.

Illustration of Rationalized
DECISION-MAKING USING PIS
Levels of Data and Computer Models
Exhibit 6

LEVEL 1: Raw Profile

- Student Number
- Demographic Data
- Site
- Building
- Room/Space
- Course Selections(s)
- Instruction Mode(s)
- Section(s)
- Student Performance Evaluation(s)
- Project Cost Components
- Indicator Definitions

LEVEL 2: Algorithmic Profile

RUN ID
RUN DATE
ELEMENTARY STUDENTS
SECONDARY STUDENTS
NUMBER OF INDICATORS
NUMBER OF PROJECTS
STRATEGIC PLANNING PROJECTS (RG)
- PROJECT NUMBER
- PROJECT NAME
- FIXED COST
- VARIABLE COST
- PERCENT STUDENTS ELEMENTARY
- PERCENT STUDENTS SECONDARY
- NUMBER OF RELATED INDICATORS
- RELATED INDICATORS (RG)
  - RELATED INDICATOR
  - RELATED ELEMENTARY/SECONDARY CODE
  - RELATIONSHIP COEFFICIENT

EXHIBIT 7

LEVEL 3: Policy/Environmental Conditions

PROJECT SUMMARY

	No.	Name	Fixed Cost	Variable Cost	Minimum Students	Maximum Students	Maximum Budget	Duration
1975-1976	1	SWRL	0.	42.	0	3,000	112,000.	1
	2	LLL	0.	167.	0	5,000	600,000.	1
	3	HUFFMAN	0.	151.	0	10,000	1,800,000.	1
	4	BRL SULLIVAN	0.	63.	0	6,000	450,000.	1
	7	MULTICUL. SOC. ED.	6,000.	10.	600	2,000	19,500.	1
	10	CAREER DEVEL. CTR.	1,680,000.	1,103.	1,400	2,000	5,000,000.	1
	11	BI-LINGUAL PROGRAM	560,000.	640.	800	3,000	1,000,000.	1
	12	MULTI-AGE	3,000.	529.	5,000	8,000	3,500,000.	1
1974-1975	13	SP. ED. RETARDED	7,000	72.	80	84	45,000.	1
	14	SP. ED. EMOT. DIST.	6,000.	72.	70	77	40,000.	1
	15	SP. ED. SPEECH	14,000.	72.	170	200	95,000.	1
	16	SP. ED. DEAF	1,000.	72.	10	20	25,000.	1
	17	SP. ED. PART. SIGHT	1,000.	72.	10	20	40,000.	1
	18	SP. ED. BLIND	1,000.	72.	10	34	5,000.	1
	19	SP. ED. CRIPPLED	10,000.	72.	120	132	70,000.	1
	20	SP. ED. LANG./LEARN.	4,000.	72.	51	75	27,500.	1
	24	EARLY CHILDHOOD	208,000.	200.	1,000	2,500	525,000.	1
	25	MATH PROGRAM	0.	70.	0	1,200	90,000.	1
1973-1974	5	READING CLINICS	0.	0.	0	1,000	150,000.	2
	6	AAA SCIENCE	0.	38.	0	1,000	40,000.	1
	8	LEARNING THRU PIANO	0.	64.	0	500	26,000.	1
	9	SUZUKI VIOLIN	0.	70.	0	500	30,000.	1
	21	CATS (SCIENCE)	0.	40.	0	500	6,000.	1
	22	PHYSICAL ED.	0.	30.	0	1,000	10,000.	1
	23	ART PROGRAM	0.	40.	0	500	6,000.	1
	26	NEW SCIENCE PROJECT	0.	30.	0	1,000	30,000.	2

EXHIBIT 8

FINANCIAL SUMMARY

LEVEL 3: Policy/Environmental Conditions

TOTAL FUNDS	250,000,000.	260,000,000.	260,000,000.
BASE EXPENSES	242,000,000.	253,400,000.	255,000,000.
TOTAL BUDGET FOR PROJECTS	8,000,000.	6,600,000.	6,000,000.
CONTINUING EXPENSES	-0-	-0-	139,000.
DISCRETIONARY MONEY	8,000,000.	6,000,000.	4,861,000.
NEW PROJECT EXPENSES	7,999,299.	6,599,885.	4,857,220.
TOTAL PROJECT BUDGET REQUESTS	11,659,500.	13,665,000.	10,092,000.
PERCENT UNSATISFIED REQUESTS	30.9%	51.7%	61.2%

EXHIBIT 9

LEVEL 4: Projected Alternate States

OPTIMAL PROJECT SELECTIONS FOR:

	No.	Name	1973-1974 Students	1973-1974 Cost	1974-1975 Students	1974-1975 Cost	1975-1976 Students	1975-1976 Cost
1975-1976	1	SWRL	1,333	55,986	2,666	111,972	2,666	111,972
1974-1975	2	LLL	1,916	319,972	Rejected		3,196	533,732
1973-1974	3	HUFFMAN	6,622	999,922	5,235	790,485	10,000	1,510,000
	4	BRL SULLIVAN	3,571	224,973	Rejected		Rejected	
	7	MULTICUL. SOC. ED.	1,300	13,000	1,950	19,500	1,950	19,500
	10	CAREER DEVEL. CTR.	1,818	2,141,054	1,400	1,680,000	1,400	1,680,000
	11	BI-LINGUAL PROGRAM	1,487	999,680	800	560,000	799	559,360
	12	MULTI-AGE	5,000	3,000,000	5,000	3,000,000	Deleted	
	13	SP. ED. RETARDED	84	7,288	84	7,288	84	7,288
	14	SP. ED. EMOT. DIST.	77	6,504	77	6,504	77	6,504
	15	SP. ED. SPEECH	200	16,160	200	16,160	200	16,160
	16	SP. ED. DEAF	20	1,720	20	1,720	20	1,720
	17	SP. ED. PART. SIGHT	20	1,720	20	1,720	20	1,720
	18	SP. ED. BLIND	34	2,728	34	2,728	34	2,728
	19	SP. ED. CRIPPLED	132	10,864	132	10,864	132	10,864
	20	SP. ED. LANG./LEARN.	75	5,728	51	4,000	75	5,728
	24	EARLY CHILDHOOD	500	108,000	500	108,000	1,000	208,000
	25	MATH PROGRAM	1,200	84,000	1,200	84,000	1,200	84,000
1974-1975	5	READING CLINICS			1,000	139,000	1,000	139,000
	6	AAA SCIENCE			Rejected		Rejected	
	8	LEARNING THRU PIANO			406	25,984	406	25,984
	9	SUZUKI VIOLIN			428	29,960	428	29,960
1975-1976	21	CATS (SCIENCE)					150	6,000
	22	PHYSICAL ED.					Rejected	
	23	ART PROGRAM					150	6,000
	26	NEW SCIENCE PROJECT					1,000	30,000
			25,389	7,999,299	21,203	6,599,885	25,987	4,996,220

EXHIBIT 10

LEVEL 4: Projected Alternate States

Indicator No	E/S	Name	Wt	Present Value	Desired Value	73-74 Gap	74-75 Gap	75-76 Gap	Final Value	Percent Gap Reduction
11	E	LANGUAGE ACHIEVEMENT	10	0.050	0.250	0.159	0.129	0.079	0.171	60.5%
12	E	MATH ACHIEVEMENT	7	0.002	0.040	0.030	0.023	0.020	0.020	47.3%
13	E	SCIENCE ACHIEVEMENT	3	0.001	0.020	0.013	0.007	0.006	0.014	68.4%
14	E	SOCIAL STUDIES ACHIEVEMENT	3	0.001	0.040	0.028	0.017	0.011	0.029	71.1%
15	E	PROPORTION RCV MUSIC/ART INSTR.	3	0.500	0.700	0.200	0.196	0.191	0.509	4.5%
16	E	PROPORTION PASSING	5	0.950	0.980	0.028	0.026	0.024	0.956	20.0%
9	S	PROPORTION GRAD CLS ATTND PHSE	8	0.700	0.800	0.098	0.096	0.094	0.706	6.0%
10	S	1 MINUS DROPOUT RATE	8	0.096	0.985	0.023	0.021	0.018	0.967	28.0%
11	S	LANGUAGE ACHIEVEMENT	5	0.040	0.100	0.058	0.054	0.050	0.050	16.7%
12	S	MATH ACHIEVEMENT	10	0.003	0.024	0.017	0.014	0.011	0.013	47.6%
13	S	SCIENCE ACHIEVEMENT	10	0.001	0.045	0.041	0.038	0.030	0.025	31.8%
14	S	SOCIAL STUDIES ACHIEVEMENT	5	0.000	0.010	0.008	0.007	0.006	0.004	40.0%
15	S	PROPORTION RCV MUSIC/ART INSTR	3	0.300	0.400	0.096	0.093	0.090	0.310	10.0%
16	S	PROPORTION PASSING	5	0.940	0.960	0.019	0.019	0.018	0.942	10.0%

Preliminary Field Testing of the Model

Formative evaluation has been made continuously throughout the development of the data system model. Review and revision has occurred at each stage of development as the base team met and conferred on various components of the model. An outside educational planner, who did not participate in the actual development of materials, was also asked to review materials and offer comments throughout the developmental stages.

Although not intended as a formal evaluation, the model was "field tested" on 16 central office personnel from three local educational agencies who listened to a presentation of the data system model and completed an evaluation instrument (Exhibit 11).

Of the 128 potential responses concerning the concepts, organization, comprehensiveness, and usefulness of the data system model, all but 5 were favorable responses and three of those five were responses indicating lack of understanding the concept in question.

On the more detailed analysis of the various data trees, the overwhelming consensus was that practically all data keys and other non-key elements would be useful for planning purposes. Of the 2438 potential responses, only 144 or less than 6 percent indicated a particular data element was inappropriate or unnecessary for educational planning at the local educational agency level.

In response to the open-ended questions concerning the data trees, most respondents made additional positive statements about the organization and comprehensiveness of the data trees rather than extensive suggestions for further modification or addition of data elements.

EXHIBIT 11

EVALUATION OF THE PLANNING INFORMATION SYSTEM

Please indicate the extent of agreement-disagreement with each of the following statements about the planning information system model which has been presented by circling:

SA, if you strongly agree
A, if you agree
D, if you disagree
SD, if you strongly disagree
U, if you do not understand the concept or data element

SA A D SD U 1. The concept of collecting data from super-systems, sub-systems, and coordinate systems is a meaningful concept and useful for educational planning.

SA A D SD U 2. The organization of the base data system into four data levels provides an organization of data that is meaningful and useful.

SA A D SD U 3. The ten data trees related to the educational data provide a comprehensive set of categories into which any needed profile information about the community can be stored and processed.

SA A D SD U 4. The four data trees related to community profile data provide a comprehensive set of categories into which any needed profile information about the community can be stored and processed.

SA A D SD U 5. The separation of data reports from the base data system is a useful way of delineating the total planning information system.

SA A D SD U 6. Although I may not understand all of its intricacies, in general, the information system model presented is thoroughly understandable.

SA A D SD U 7. The planning information system model presented is quite comprehensive.

SA A D SD U 8. I believe the planning information system model presented will be a useful way of dealing with information related to comprehensive educational planning.

Attached to this sheet you will find one or more data trees. Using the same scale as above, indicate the extent of your agreement-disagreement that each data element is likely to be useful and should be included to provide profile data on each person, program, resource, and process which affects the local educational agency planning process.

After completing your evaluation of the data elements, please respond to the following questions (write your responses on the back of the data trees).

1. Are there other keys (Section 1 of the data tree) around which you think the profile data might desirably be summarized?

2. Are there broad areas or categories of profile data elements which should be added to one or more of the trees?

3. Are there any specific elements of profile data which you think should be added?

Trees:	D	SD	Total D & SD No.	Total D & SD %	Total U No.	Total U %	Total Respondents
Curriculum and Instruction Keys	4	0	4	9%	1	2%	44
Curriculum and Instruction Elements	76	0	76	11%	53	7%	720
Instructional Services Keys	0	0	0	0%	0	0%	24
Instructional Services Elements	0	1	1	0%	3	1%	252
Student Personnel Keys	1	0	1	5%	1	5%	21
Student Personnel Elements	7	2	9	9%	2	2%	102
Staff Personnel Keys	0	0	0	0%	1	3%	32
Staff Personnel Elements	7	1	8	3%	4	2%	232
Financial Resources Keys	0	0	0	0%	1	11%	9
Financial Resources Elements	0	0	0	0%	1	1%	184
Transportation Keys	0	0	0	0%	2	17%	12
Transportation Elements	5	0	5	5%	1	1%	93
Educational Facilities Keys	0	0	0	0%	1	6%	18
Educational Facilities Elements	33	1	34	12%	22	8%	282
Food Services Keys	1	0	1	17%	0	0%	6
Food Services Elements	2	0	2	8%	0	0%	25
Business Management Keys	0	0	0	0%	0	0%	10
Business Management Elements	5	0	5	3%	6	4%	153
Organizational Management Keys	0	0	0	0%	0	0%	10
Organizational Management Elements	0	0	0	0%	4	5%	86
Population Keys	0	0	0	0%	0	0%	7
Population Elements	0	0	0	0%	0	0%	18
Physical Keys	0	0	0	0%	4	67%	6
Physical Elements	0	0	0	0%	6	16%	38
Activities and Services Keys	0	0	0	0%	0	0%	8
Activities and Services Elements	3	0	3	·16%	0	0%	19
Governance Keys	0	0	0	0%	0	0%	4
Governance Elements	0	0	0	0%	1	4%	23
Total Keys	6	0	6	3%	11	5%	211
Total Elements	138	5	143	6%	103	5%	2227
Total Keys and Elements	144	5	149	6%	114	5%	2438

With the overwhelming positive response toward the data system model and the data trees, it was deemed unnecessary to make further modifications before moving into the next stage of the developmental process outlined in the initial proposal for the development of this data system model. Therefore, the report used in the "field test" along with this section concerning the results of the preliminary field test are being presented as the final report of this developmental project.

APPENDIX A

RAW PROFILE DATA TREES

LEVEL 1

1. Curriculum & Instruction
2. Instructional Services
3. Student Personnel
4. Staff Personnel
5. Finance
6. Transportation
7. Facilities
8. Food Service
9. Business Management
10. Organizational Management
11. Population
12. Physical
13. Activities and Services
14. Governance

Simu-School - LEA Comprehensive Educational Planning Project

Data System - Raw Profile Data Level 1

CURRICULUM AND INSTRUCTION TREE

I. Curriculum and Instruction Keys

1. Agency: LEA, Joint vocational school district, Parochial school district, YMCA, Parks and recreation, etc.
2. Agency Component: Decentralized unit or Planning area
3. School: Madison High School, Montgomery County Tech., Jefferson Elementary
4. Building: Academy, North building, East Annex, etc.
5. Program: Direct instruction, Indirect instructional support, Student support, Institutional support, Independent operations
6. Program Component-Age or Grade Level: Nursery, Kindergarten, Grades 1-14 or Age group, Adult education
7. Program Component-Curricular Organization: General, College prep, Honors, Career education, Special education, etc.
8. Program Component-Instructional Organization: Departmentalized, Team teaching, Non-graded, Multi-age grouping, etc.
9. Program Component-Curricular Area: Mathematics, Science, Automotives, Orthopedics, Slow learners, etc.
10. Course or Activity Title: Art 1, Geometry, French club, Debate, Stock market, Flower arrangements, etc.
11. Instructional Mode: Action (laboratory), Interaction (seminar), Reaction (lecture-demonstration), Multi-modal, etc.

II. Raw Data Collected on each Section

1. Section identification
2. Number of minutes per class session
3. Number of meetings per schedule cycle
4. Duration of this course in weeks (36, 18, 12, 9, 8, 6, 4, 3, 2, 1)
5. Enrollment (number)
6. Room assignment for class section (room identification number)
7. Course taught by (single teacher, discipline team, inter-discipline team)
8. Identification of personnel assigned to this section

The entries for the following data items will be chosen using the following scale: (1) extensive (greater than 75%); (2) considerable (50% to 75%); (3) frequent (25% to 50%); (4) some (5% to 25%); (5) limited (1% to 5%); (6) less than 1% or none).

Extent to which course content is derived from

9. Adopted course text(s)
10. Other text(s)
11. Variety of supplementary materials
12. Teacher and pupil cooperatively created substance

13. Teacher created substance
14. Pupil created substance
15. Other

Extent to which the course includes

16. Career education content
17. Sex education content
18. Environmental education
19. Drug abuse education
20. Alcohol abuse education
21. Safety education
22. Consumer education
23. Library science
24. Patriotism
25. Minority studies
26. Other state required content

Extent to which course content is organized around the following

27. A discrete subject matter discipline
28. The interrelationships of two or more discrete subject matter disciplines
29. Pre-determined instructional objectives for this course
30. Pupil-teacher developed instructional objectives

Extent to which the course is directed toward the following types of objectives

31. Psychomotor
32. Cognitive
33. Affective

Extent to which the following participate in decision-making regarding the content and organization for this course

34. Central office staff
35. Building administrators
36. Department head
37. Team of teachers
38. Teacher
39. Pupil
40. Parents
41. Craft and/or other specialists committee
42. Other citizens

Extent to which the following participate in decisions regarding the selection of curriculum materials

43. Central office staff
44. Building administrators
45. Department head
46. Team of teachers
47. Teachers
48. Pupils

49. Parents
50. Craft and/or other specialists committee
51. Other citizens

Instructional materials - frequency of use

52. Adopted texts
53. Other texts
54. Other printed materials: hard bound
55. Other printed materials: soft bound
56. Filmstrips
57. Records
58. Tape recordings
59. Films
60. Video-recordings
61. Learning kits
62. Learning games
63. Maps
64. Charts
65. Globes
66. Other learning materials
67. Other community resources

Instructional strategies - frequency of use

68. Reaction (group and/or lecture-demonstrations)
69. Interaction (small group discussions)
70. Action (learning by doing, independent work, etc.)
71. Discovery method
72. Simulation
73. Video-recordings
74. Computer assisted instruction
75. Field trips
76. Building media center with materials used in class
77. Outside resource persons (speakers, etc.
78. Building media center with students sent to center
79. Variation of strategies to accommodate pupil differences

Instructional methodologies - frequency of use

80. Programmed instruction
81. Teacher prepared instructional packages
82. Contract fulfillment
83. Criterion-referenced objectives fulfillment
84. Outdoor education
85. Montessori
86. British informal education

Extent to which the following guidance services are used in connection with this course

87. Counselor assistance in classroom
88. Information received from counselor affects course content or method
89. Counselor provides materials to use in class
90. Students excused from class to receive counseling

Extent to which the following psychological services are used in connection with this course

91. School psychologist assistance in the classroom
92. Information received from psychologist affects course content or method
93. Psychologist provides materials which are used in the classroom
94. Pupils are excused from class for conferences with psychologist
95. Behavioral modification used on the advice of a psychologist

Extent to which other specialized personnel are used in connection with this course

96. Speech therapists work with pupils in the classroom
97. Speech therapists assist in preparing course content or method
98. Speech therapists provide materials to be used in this class
99. Speech therapists work with pupils out-of-class
100. Art specialists work with pupils in the classroom
101. Art specialists assist in preparing course content or method
102. Art specialists provide materials to be used in this course
103. Art specialists work with pupils out-of-class
104. Music specialists work with pupils in the classroom
105. Music specialists assist in preparing course content or method
106. Music specialists provide materials to be used in the class
107. Music specialists work with pupils out-of-class
108. Physical educational specialists work with pupils in the classroom
109. Physical educational specialists assist in preparing course content or method
110. Physical education specialists provide materials to be used in this class
111. Physical education specialists work with pupils out-of-class
112. Other specialists work with pupils in the classroom
113. Other specialists assist in preparing course content or method
114. Other specialists provide materials to be used in this class
115. Other specialists work with pupils out-of-class

Extent to which the following pupil evaluation and/or grading methods are used in this course

116. Letter or percentage grade
117. Pass - fail
118. Written narrative evaluation given to pupil
119. Check list rating scales
121. A system indicating effort applied

Evaluation techniques - frequency of use

122. Pupil-teacher evaluation conferences
123. Teacher-parent evaluation conferences
124. Pupil-teacher-parent evaluation conferences
125. Teacher does home visitations for pupil evaluative purposes
126. Pupil-peer evaluation provided for by teacher
127. Pupil self-evaluation provided for by teacher
128. Pupil evaluated by more than one teacher

129. Conferences scheduled between teachers to evaluate pupils
130. Conferences scheduled between teacher and counselor to affect pupil evaluation
131. Conferences scheduled between teacher and psychologist to affect pupil evaluation

Extent to which pupil evaluation is based on the following

132. Academic achievement
133. Ability to function independently
134. Ability to plan and use time efficiently
135. Effort expended toward course objectives
136. Attainment of course objectives
137. Behavior (conduct)
138. Peer-relations
139. Teacher-pupil relations
140. Learning style
141. Use of personal resources
142. Use of material resources
143. Ascertained pupil attitude toward class

Extent to which the following participate in program evaluation

144. Central office staff
145. Building administrators
146. Department head
147. Course teacher(s)
148. Other teacher (s)
149. Pupils
150. Parents
151. Craft and/or other specialist committees
152. Other citizens
153. Specialists from outside the LEA

Extent to which the following items are a part of program evaluation

154. Degree of individualization of content
155. Degree of individualization of instructional methods
156. Grade level appropriateness
157. Appropriateness of materials
158. Appropriate construction of objectives
159. Pupil evaluation procedures
160. Organization of content
161. Sequential order of content
162. Appropriateness of instructional strategies
163. Pupils' attitudes toward program
164. Parents' attitudes toward program
165. Teachers' attitudes toward program
166. Administrators' attitudes toward program
167. Overall pupil achievement
168. Relative cost of program
169. To what extent are pupils meeting the course objectives
170. To what extent are the objectives of the course fulfilling the need of pupils

171. To what extent are teachers actualizing their potential
172. To what extent are administrators actualizing their potential
173. To what extent are other staff members actualizing their potential
174. To what extent is the community actualizing its potential

III. Raw Data Collected on each School

175. Number of periods or modules per day
176. Length of periods or modules
177. Length of lunch period
178. Number of days in schedule cycle
179. Are classes scheduled during lunch period
180. Average percent of student-directed time outside course periods

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Data System - Raw Profile Data Level 1

INSTRUCTIONAL SERVICES DATA TREE

I. Instructional Services Data Keys

1. Agency: LEA, Joint vocational school district, Parochial school district, YMCA, Parks and recreation, etc.
2. Agency Component: Decentralized unit or Planning area
3. School: Madison High School, Montgomery County Tech., Jefferson Elementary
4. Building: Academy, North building, East Annex, etc.
5. Program: Direct instruction, Indirect instructional support, Student support, Institutional support, Independent operations
6. Program Component-Curricular Organization: General, College prep, Honors, Career education, Special education, etc.
7. Program Component-Instructional Organization: Departmentalized, Team teaching, Non-graded, Multi-age grouping, etc.
8. Program Component-Curricular Area: Mathematics, Science, Automotives, Orthopedics, Slow learners, etc.

II. Data Collected on Instructional Materials

1. Room(s) where the materials in items 4 through 31 are stored
2. Personnel identification of individuals assigned time to work with these materials
3. Total annual expenditure for purchase of materials stored here

Number and adequacy of instructional and learning materials stored and available for use. Value each element for adequacy using the following scale: 1) more than adequate, 2) adequate, 3) less than adequate, 4) seriously deficient

4. Texts: issued to students
5. Texts: multiple or supplemental
6. Printed materials: hard bound
7. Printed materials: soft bound
8. Filmstrips
9. Records
10. Tape recordings
11. Films
12. Video-recordings
13. Learning kits
14. Learning games
15. Maps
16. Charts
17. Globes
18. Calculators
19. Models
20. Other learning materials
21. Filmstrip projectors and previewers

22. Record players
23. Tape recorders
24. Language masters
25. Film projectors
26. Video-tape recorders
27. Television sets
28. Opaque projectors
29. Overhead projectors
30. Computer terminals
31. Other audio-visual equipment

III. Data Collected on Guidance Counseling Services

32. Personnel identification
33. Average number of students assigned per counselor
34. Average number of contacts per week with teaching staff personnel
35. Average number of contacts per week with school administrators
36. Average number of contacts per week with parents of children
37. Average number of group guidance sessions conducted per week
38. Average number of individually administered tests per month
39. Number of group administered tests per year
40. Average number of referrals received from teaching and/or administrative staff per week
41. Average number of students initiating contact per week
42. Average number of students contacted through guidance counselors' initiative
43. Room(s) assignment

IV. Data Collected on Speech and Hearing Services

44. Personnel identification
45. Number of hours per week assigned to this school
46. Number of students served
47. Meetings per week
48. Average length of meeting
49. Percent of time working with individual
50. Percent of time working with groups
51. Room(s) assignment
52. Average number of contacts per week with teachers of students receiving this service

V. Data Collected on Psychological Services

53. Personnel identification
54. Average number of student contacts made per week
55. Source of referrals by percentage
    Student self-referral
    Teachers
    Administrators
    Guidance counselors
    Parents
    Outside agencies
    Other

56. Average number of parent conferences per week:
57. Average number of tests administered per week
58. Average number of conferences with teachers and/or building administrators per week
59. Average number of students referred to non-school agencies per month
60. Room(s) assignment

VI. Data Collected on Tutorial Services

61. Type of tutorial service code (neurological, home instruction, remedial reading, musical, etc.)
62. Personnel identification
63. Average number of contacts per week
64. Average length of meeting
65. Average number of contacts with parents of tutee per month
66. Average number of contacts with teachers of tutee per month
67. Source of referrals by percentage:
    Student self-referral
    Teachers
    Administrators
    Guidance counselors
    Psychologist
    Parents
    Outside agency
    Other
68. Location of tutoring (room(s) assignment or not on school property)

VII. Data Collected on Special Events

69. Type of special events code (assembly program, career days, field days, etc.)
70. Personnel identification
71. Number of meeting times or events per year
72. Average length of meeting or event
73. Average number of student participants per meeting or event
74. Room(s) assignment

VIII. Data Collected on Extra Curricular Activities

75. Name of extra curricular activity
76. Personnel identification
77. Number of meeting times per week
78. Average length of meeting
79. Duration of activity in weeks
80. Average number of student participants
81. Average number of times per month this activity requires use of school transportation
82. If participation is limited, state maximum number
83. Financial support code (LEA, operating funds, student fees, other)
84. Annual expenditure for activity

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STUDENT PERSONNEL DATA TREE

I. Student Personnel Data Keys

1. Agency: LEA, Joint vocational school district, Parochial school district, YMCA, Parks and recreation, etc.
2. Agency Component: Decentralized unit or Planning area
3. School: Madison High Schools, Montgomery County Tech., Jefferson Elementary
4. Program: Direct instruction, Indirect instructional support, Student support, Institutional support, Independent operations
5. Program Component-Age or Grade Level: Nursery, Kindergarten, Grades 1-14 or Age group, Adult education
6. Program Component-Curricular Organization: General, College prep, Honors, Career education, Special education, etc.
7. Program Component-Instructional Organization: Departmentalized, Team teaching, Non-graded, Multi-age grouping, etc.

II. Raw Data Collected on the Individual Student

Identification Information

1. Name
2. Student identification number
3. Date
4. Address
5. County and state of last previous residence
6. Date of birth
7. Place of birth
8. Sex
9. Ethnic characteristic code

Tests and Other Personal Profile Data

10. Academic record (schedule, credits, grades)
11. Intelligence test(s) (name, date, score)
12. Aptitude test(s) (name, date, score)
13. Achievement test(s) (name, date, total score, sub-scores)
14. General interest inventory(ies) (name, date, score)
15. Occupational interest inventory(ies) (name, date, score)
16. Personality inventory(ies) (name, date, score)
17. Attitudinal inventory(ies) (name, date, score)
18. Self-concept inventory(ies) (name, date, score)
19. Educational aspiration code (high school diploma, two-year technical school diploma, associate degree, bachelor's degree, etc.)
20. Physical and health characteristics code (asthma, sight loss, loss of hearing, etc.)
21. Learning characteristics code
22. Learning difficulties code

23. Instructional services received code (tutoring for neurologically handicapped, home instruction, etc.)
24. Health services received code (eye test, hearing test, etc.)
25. Extra-curricular activities code
26. Offices held code
27. Honors code
28. Leisure time activities code
29. Work experience code
30. Date of entrance into school
31. Number of days absent by year
32. Father identification code (living at home, living and not at home, deceased)
33. Mother identification code (living at home, living and not at home, deceased)
34. Bus assignment

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STAFF PERSONNEL TREE

I. Staff Personnel Keys

1. Agency: LEA, Joint vocational school district, Parochial school district, YMCA, Parks and recreation, etc.
2. Agency Component: Decentralized unit or Planning area
3. School: Madison High School, Montgomery County Tech., Jefferson Elementary
4. Program: Direct instruction, Indirect instructional support, Student support, Institutional support, Independent operations
5. Program Component-Age or Grade Level: Nursery, Kindergarten, grades 1-14 or Age group, Adult education
6. Program Component-Instructional Organization: Departmentalized, Team teaching, Non-graded, Multi-age grouping, etc.
7. Program Component-Curricular Area: Mathematics, Science, Automotives, Orthopedics, Slow learners, etc.
8. Occupational Category: Teacher, Nurse, Bus driver, Secretary, etc.

II. Data Collected on Individual Staff Member

Identification Data

1. Name
2. Maiden name
3. Social Security number
4. Present status (assigned, on leave, released, terminated)
5. Current address
6. Date of birth, county and state
7. Sex
8. Ethnic characteristic code

Present Employment Data

9. Assignment schedule and date
10. Extra duty code (football coach, music director, etc.)
11. Present contract code (one year, one year probationary, etc.)
12. Expiration date of present contract
13. Present position on salary or wage schedule
14. Present total contracted salary
15. Foundation salary
16. Beginning date of most recent employment in this district
17. Total number of years experience by type in this district (do not count current year)
18. Participation in fringe benefits code
19. Participation in study groups and/or committees code
20. Days absent per year and date
21. Total accumulated sick leave (do not count current year)
22. Position performance appraisal
23. Date when tenure received

24. Grievances filed and date
25. Level of grievance resolution code
26. Duration of leave by dates
27. Last promotion: from what position and date
28. Last transfer: from what position and date
29. Reason for transfer code
30. Reason for release code
31. Reason for termination code

Grade and Type of Certificate or Licensing

32. Types and grades of certificates and/or licenses by state issue and date of expiration

Educational Data

33. High school graduation code (LEA, same county, same state, etc.)
34. Past high school institutions from which degrees or certificates have been received
35. Highest degree or certificate received code
36. Number of past high school credits beyond last degree or certificate
37. Total number of semester hours attained
38. Date of most recent post-high school credit earned
39. Major teaching fields
40. Total number of in-service credits attained

Pre-Employment History

41. Last previous position held
42. Location of last previous position
43. Assignment of last previous position
44. Dates of last previous position
45. Employer at last previous position
46. All previous experience code (teacher, secretary, painter, bus driver, etc.)
47. Total years of previous credit by type code (teacher, administrator, non-certificated)
48. Experience by geographical areas code (same city as LEA, same county, same state, etc.)
49. Experience by LEA location code (central city urban, non-central city urban, suburban, rural)
50. Total sick leave accumulated

Personal Data

51. Marital status code
52. Ages of children
53. Physical health code and dates
54. Citizenship code
55. Bilingual competency code
56. Hobbies and/or special talents code
57. Travel code
58. Honors and awards

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FINANCIAL RESOURCES DATA TREE

I. Financial Resources Data Keys

1. Agency: LEA, Joint vocational school district, Parochial school district, YMCA, Parks and recreation, etc.
2. Agency Component: Decentralized unit or Planning area
3. School: Madison High School, Montgomery County Tech., Jefferson Elementary

II. Data Collected by School

1. Revenue from student fees
2. Revenue from internal accounts by account code
3. Revenue from sale of consummable supplies
4. Revenue from sale of other items
5. Revenue from fines
6. Other revenue received

III. Data Collected by Agency

7. Assessed valuation of personal property in local district
8. Assessed valuation of real property in local district
9. Local district tax rate for operating monies
10. Local district tax rate for bond retirement
11. Delinquent tax receipts
12. Total annual local property tax receipts for operating monies
13. Total annual local property tax receipts for bond retirement
14. Total tax rate on property by governmental subdivision code
15. Other local non-property tax receipts for local district
16. Property tax receipts not collected by local district but distributed to it by other governmental units
17. Non-property tax receipts not collected by local district but distributed to it by other governmental units
18. Appropriations received from local governmental units other than school districts
19. Tuition from patrons for regular day school
20. Tuition from patrons for adult education
21. Tuition received from other school districts
22. Other tuition received
23. Transportation fees from patrons
24. Earnings from permanent funds and endowments
25. Earnings from temporary deposits and investments
26. Overhead charges paid to operating fund from revolving accounts
27. Rent for use of school facilities
28. Rent from other property
29. Gifts and bequests received
30. Miscellaneous revenue from local sources
31. Revenue from intermediate district sources

32. Revenue from State by categorical code
33. Non-categorical revenue from State
34. Other State revenue
35. Federal money received from State by categorical code
36. Non-categorical money received from federal government through the State
37. Other revenue from federal sources
38. Revenue from sale of bonds
39. Revenue from short-term loans
40. Revenue from long-term loans
41. Revenue from sale of real property
42. Revenue from sale of equipment
43. Revenue from sale of other items
44. Revenue from insurance recovery
45. Transportation revenue received from other school districts
46. Miscellaneous revenue received from other school districts

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TRANSPORTATION UNIT FAMILY TREE

I. Transportation Unit Keys

1. Agency: LEA, Joint vocational school district, Parochial school district, YMCA, Parks and recreation, etc.
2. Agency Component: Decentralized unit or Planning area
3. Program: Direct instruction, Indirect instructional support, Student support, Institutional support, Independent operations
4. Program Component: (Regular routes, Non-public, Extra curricular, etc.)

II. Data Collected on Each Bus

1. Bus number assigned
2. Designate fleet assignment
3. Mileage registered on odometer at beginning of year
4. Age
5. Pupil capacity
6. Condition code (new, good, average, poor)
7. Use code (regular or spare)
8. Name of regular driver
9. Storage location
10. Storage cost if private location
11. Last date of servicing
12. Last date of major overhaul
13. Type of transmission (standard or automatic)
14. Body type code
15. Chassis type code
16. Power steering (yes or no)
17. Two-way, short-wave radio (yes or no)
18. Internal and external P.A. system (yes or no)
19. Classification of accident code
20. Engine size code
21. Engine type code

Data Collected on Trips

22. Number of miles
23. Number of pupils transported
24. Pupil age or grade level transported on trip
25. Subject area related to trip
26. Driving time
27. Lay-over time

Data Collected on Total Transportation Service Program

28. Total overhead costs
29. Listing of all other vehicles in transportation
30. Total cost of inservice education for transportation personnel
31. Total costs for other use of transportation equipment not accounted for

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EDUCATIONAL FACILITIES TREE

I. Educational Facilities Data Keys

1. Agency: LEA, Joint vocational school district, Parochial school district, YMCA, Parks and recreation, etc.
2. Agency Component: Decentralized unit or Planning area
3. School: Madison High School, Montgomery County Tech., Jefferson Elementary
4. Building: Academy, North building, East Annex, etc.
5. Program: Direct instruction, Indirect instructional support, Student support, Institutional support, Independent operations
6. Program Component-Age or Grade Level: Nursery, Kindergarten, grades 1-14 or Age group, Adult eduction
7. Program Component-Curricular Organization: General, College prep, Honors, Career education, Special education, etc.
8. Program Component-Instructional Organization: Departmentalized, Team teaching, Non-graded, Multi-age grouping, etc.
9. Program Component-Curricular Area: Mathematics, Science, Automotives, Orthodpedics, Slow learners, etc.

II. Raw Profile Data Collected on Room or Definable Area

Identification Data

1. Number (I.D.)
2. Floor level in building
3. Date of last remodeling or rennovation
4. After school hour-use code
5. Code number of department or grade level

Maintenance Data

6. Date of last interior painting
7. Date of last interior wall washing

Code Data

8. Number of fire extinguishers
9. Toilet provisions for the handicapped
10. Emergency shower and/or emergency eye washes

Function Data

11. Room design code
12. Room use code
13. Equipment adequacy code
14. Learning mode(s) used
15. Number of student learning stations
16. Number of spectator seats

Quantity Data

17. Length (feet)
18. Width (feet)
19. Height (feet) (minimum when not uniform)
20. Number of operable walls
21. Number of demountable walls
22. Cost of latest remodeling or rennovation

Quality Data

23. Air conditioning code
24. Air conditioning control code
25. Heating controls code
26. Lighting code
27. Lighting control code
28. Lighting quality code
29. Sonic environmental control code
30. Sonic quality code
31. Number of AC 110 convenience outlets
32. Number of AC 220
33. Number of DC outlets
34. Number of sinks with hot and cold water
35. Number of sinks with cold
36. Number of shower heads
37. Number of water closets
38. Number of urinals
39. Number of lavatories
40. Number of vacuum outlets
41. Number of compressed air outlets
42. Number of tv outlets
43. Number of tv receivers
44. Number of fume hoods
45. Master utility safety control code
46. Number of floor drains
47. Specialized environmental controls code
48. Linear feet of chalkboard
49. Linear feet of tackboard
50. Seating-work station code
51. P.A. system code
52. Visual aid equipment code
53. Linear feet of open shelving
54. Linear feet of closed shelving
55. Linear feet of lockable shelving
56. Linear feet of counter space
57. Spatial environmental quality code
58. Floor covering code
59. Ceiling covering code
60. Wall covering code
61. Availability of gas

III. Raw Profile Data Collected on Building

Identification Data

62. Number (I.D.)
63. Street address
64. Building type code (original, addition, etc.)
65. Date of construction
66. Date of acquisition
67. Building code
68. Ownership code
69. Number of relocatable units
70. Structural composition code
71. Stories

Service Data

72. Number of elevators
73. Number of floors the elevator services
74. Ramp availability (yes or no)
75. Food service code
76. Number of public pay phones
77. Number of office phones
78. Number of intercom phones
79. Length of loading dock (feet)
80. Width of loading dock (feet)
81. Height of loading dock (feet)
82. Number of tap-temperature drinking fountains
83. Number of chilled water drinking fountains
84. Electrical capacity rating
85. Water capacity (pipe diameter)
86. Source of water code
87. Sewage treatment
88. Police protection code
89. Fire protection code

Maintenance Data

90. Date of last roof replacement (total or partial)
91. Date of last exterior wall work
92. Date of last interior painting
93. Date of last interior wall washing
94. Annual custodial costs
95. Annual maintenance costs
96. Annual utilities costs
97. Number of custodians

Building Code Data

98. Fire rating or fireproof construction code
99. Built-in fire sprinklers code
100. Fire alarm systems code
101. Fire exits code
102. Number of fire extinguishers
103. Corridor width (feet)

104. Stairwell width (feet)
105. Emergency lighting code
106. Number of fire hose cabinets

Quantity Data

107. Cost of construction
108. Total square feet of building

Quality Data

109. Heating code
110. Heating quality code
111. Lighting code
112. Roof type code
113. Exterior wall surface code
114. Corridor floor covering code
115. Stairwell floor covering code
116. Corridor ceiling covering code
117. Stairwell ceiling covering code
118. Interior wall covering code

IV. Raw Profile Data Collected on School

Identification Data

119. Number (I.D.)
120. Date of acquisition
121. Street address
122. Ownership code

Function Data

123. Site size in acres
124. Number of parking spaces
125. Parking lot surface code
126. Stadium seating capacity
127. Athletic space code (type, number, and quality)
128. Site safety code
129. Site environment quality code
130. Quantity of mowing acres
131. Quantity of new seeding acres
132. Quantity of reseeding acres
133. Quantity of fertilizing acres
134. Quantity of weed control acres
135. Quantity of shrub and tree pruning acres
136. Quantity of blacktop in square yards
137. Quantity of concrete in square yards
138. Quantity of all-weather track and tennis court surfaces in square yards
139. Quantity of fence in linear yards
140. Landscaping code
141. Drainage code

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FOOD SERVICE UNIT TREE

I. Food Service Unit Keys

1. Agency: LEA, Joint vocational school district, Parochial school district, YMCA, Parks and recreation, etc.
2. Agency component: Decentralized unit or Planning area
3. School: Madison High School, Montgomery County Tech., Jefferson Elementary
4. Building: Academy, North building, East Annex, etc.
5. Program: Direct instruction, Indirect instructional support, Student support, Institutional support, Independent operations
6. Program Component: A la carte, Type A lunch, etc.

II. Data Collected on Food Service Units

1. Kitchen description (serving and/or preparation)
2. Total receipts from a la carte meals
3. Total expenditures for supplies for a la carte meals
4. Total number of free lunches served
5. Total number of reduced priced lunches served
6. Total number of regular priced lunches served
7. Total number of adult priced lunches served
8. Price charged for each category of lunch served
9. Total expenditure for commodities
10. Total expenditure for service charges for federal commodities
11. Cost of transportation of prepared meals
12. Estimated dollar value of federal commodities used
13. Total receipts from vending machines
14. Total expenditure for vending machine supplies
15. Milk price per carton
16. Quantity of milk served on special milk program
17. Total number of cartons of milk sold
18. Over-head charges for operation of kitchen
19. Total receipts from government subsidy
20. Item categories listed in inventory
21. Quantity of items in inventory at beginning of year
22. If serving kitchen only, indicate by code the central kitchen to which it is assigned
23. Menu planning done with aid of a computer (yes or no)

Attitudinal Data

24. Extent to which the following groups believe they are involved in food service planning (constantly, frequently, moderately, rarely, never)
    a. Students
    b. staff
    c. parents
    d. board of education
    e. others

25. Extent to which the following groups believe the objectives of the food service program are being achieved (superior achievement, above average, average, below average, hardly at all)
    a. students
    b. staff
    c. parents
    d. board of education
    e. others

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BUSINESS MANAGEMENT DATA TREE

I. Business Management Keys

1. Agency: LEA, Joint vocational school district, Parochial school district, YMCA, Parks and recreation, etc.
2. Agency Component: Decentralized unit or Planning area
3. School: Madison High School, Montgomery County Tech., Jefferson Elementary
4. Building: Academy, North building, East Annex, etc.
5. Program: Direct instruction, Indirect instructional support, Student support, Institutional support, Independent operations

II. Data Collected on Each Program

1. Number of active accounts
2. Listing of the line and/or sub-program accounts
3. Ordering dates established for
   materials
   equipment
   supplies
4. Materials stored
   by building
   by school
   by agency component
   by agency
5. Equipment stored
   by building
   by school
   by agency component
   by agency
6. Supplies stored
   by building
   by school
   by agency component
   by agency
7. Extent to which the following groups participate in ordering supplies, materials and equipment (constantly, frequently, moderately, rarely, or never)
   pupils
   teachers
   building administrators
   parents
   skill or craft committees
   central office administrators
   board of education members
   others

8. Extent to which the following groups participate in the determination of the allocation of funds to the different purchase categories (constantly, frequently, moderately, rarely, never)
   pupils
   teachers
   building administrators
   parents
   skill or craft committees
   central office administrators
   board of education members
   others
9. Extent to which the following groups participate in an evaluation of the budgetary processes (constantly, frequently, moderately, rarely, never)
   pupils
   teachers
   building administrators
   parents
   skill or craft committees
   central office administrators
   board of education members
   others
10. Check list available for ordering
    supplies
    materials
    equipment
11. Record available i[illegible]ing assignment location of each item
    supplies
    materials
    equipment
12. Frequency of inventory reporting for supplies (annually, semi-annually, quarterly, monthly, daily, instantly, never)
13. Frequency of inventory reporting for materials (annually, semi-annually, quarterly, monthly, daily, instantly, never)
14. Frequency of inventory reporting for equipment (annually, semi-annually, quarterly, monthly, daily, instantly, never)

Acquisition Costs Collected by Program

15. Program implementation
16. Equipment: program-related
17. Equipment: student-related
18. Materials: program-related
19. Materials: student-related
20. Pre-service training
21. Facilities
22. Installation

Operational Costs Collected by Program

23. Salaries: teachers
24. Salaries: paraprofessional
25. Salaries: specialists
26. Salaries: other

27. Materials and supplies: program-related
28. Materials and supplies: student-related
29. Equipment: replacement
30. Equipment: maintenance
31. In-service training
32. Facilities operation
33. Facilities maintenance
34. Media services
35. Transportation
36. Contracted services

III. Data Collected on Agency

37. Agency participate in "cooperative purchasing" with other agencies (yes or no)
38. If yes, list categories of items so purchased
39. Outside audits contracted for (yes or no)
40. Dates of scheduled audits
41. Auditing of school accounts done by internal auditors (never less often than annually, annually, semi-annually, quarterly, monthly, instantly)
42. Auditing of agency accounts performed by external auditors (never, less often than annually, annually, semi-annually, quarterly, monthly, instantly)

Payroll Procedures

43. Payroll process computerized (yes or no)
44. Payroll process performed by machine other than computer (yes or no)
45. Alternative pay dates (yes or no)

Attitudinal Data

46. Assessment of purchasing procedures by (good, fair, poor)
    pupils
    teachers
    building administrators
    parents
    skill or craft committees
    central office administrators
    board of education members
    others
47. Assessment of auditing procedures by (good, fair, poor)
    pupils
    teachers
    building administrators
    parents
    skill or craft committees
    central office administrators
    board of education members
    others
48. Assessment of the accounting procedures by (good, fair, poor)
    pupils
    teachers
    building administrators
    parents

skill or craft committees
central office administrators
board of education members
others

49. Assessment of the inventory procedures (good, fair, poor)
pupils
teachers
building administrators
parents
skill or craft committees
central office administrators
board of education members
others

50. Assessment of the payroll procedures by (good, fair, poor)
pupils
teachers
building administrators
parents
skill or craft committees
central office administrators
board of education members
others

51. Assessment of the budgetary procedures by (good, fair, poor)
pupils
teachers
building administrators
parents
skill or craft committees
central office administrators
board of education members
others

Simu-School - LEA Comprehensive Educational Planning Project

Data System - Raw Profile Data Level 1

ORGANIZATIONAL MANAGEMENT TREE

I. Organizational Management Keys

1. Agency: LEA, Joint vocational school district, Parochial school district, YMCA, Parks and recreation, etc.
2. Agency Component: Decentralized unit or Planning area
3. School: Madison High School, Montgomery County Tech., Jefferson Elementary
4. Program: Direct instruction, Indirect instructional support, Student support, Institutional support, Independent operations
5. Occupational Category: Teacher, Nurse, Bus Driver, Secretary, etc.

II. Data Collected on Individual Employee

Job Perceptions Codes

1. Job involvement (degree to which the job is perceived as having priority over all other things in life)
2. Personal security (degree to which individuals are happy with amount of job security)
3. Autonomy (degree to which group functions independently of other groups and occupies an independent position in society)
4. Control exercised on individuals (degree of regulation of individuals while functioning as group members)
5. Flexibility (degree of informality of group procedures, in contrast to adherence to established procedures)
6. Hedonic tone (degree to which membership is accompanied by pleasant effect)
7. Homogeneity (degree to which members are similar with respect to socially relevant characteristics)
8. Intimacy (degree to which members are mutually acquainted and familiar with personal details of one another's lives)
9. Participation (degree to which members apply time and effort to group activities)
10. Permeability (degree to which group permits ready access to membership)
11. Polarization (degree to which group is oriented and works toward a single goal which is clear and specific to all members)
12. Potency (degree to which group has primary significance to members)
13. Stability (degree of persistence over time with essentially unchanged characteristics)
14. Stratification (degree to which membership is ordered into status hierarchies)
15. Viscidity (degree to which members function as a unit)

Measures of Normative Environment Codes

16. Clarity of objectives toward which to work
17. Clarity of rules, policies and guidelines
18. Extent to which workers are given conflicting priorities
19. Extent to which central office changes policies without advance notice

Measures of Intertask Structure (coordination) Codes

20. Extent to which related jobs are meshed to achieve objectives
21. Extent to which independent assignments are well planned

Measures of Conditions for Negotiating Orders Codes

22. Ease of exchanging ideas and information with others doing related work
23. Extent to which people doing related work avoid creating problems for one another
24. Extent to which coordination problems with others doing related work are handled

Measures of Levels of Skills Codes

25. Proportion of personnel who are competent to do the work assigned to them
26. Perception of self as competent to do work assigned

Measures of Rational-trust Relationship Codes

27. Extent to which central office is perceived as following its own rules
28. Extent to which central office is perceived as understanding teachers' needs, problems and points of view
29. Extent to which central office is perceived as understanding non-certificated staff needs, problems, and points of view
30. Extent to which central office is perceived as understanding all other employee needs, problems and points of view
31. Extent to which top management is perceived as fair and reasonable

III. Data to be Collected on the Agency Component

Expectations Held for Employees by Code Regarding

32. Contributions to be made
33. Freedom to act
34. Goal (outcome) values
35. Freedom to interact
36. Discontinuity of membership
37. Mutual liking
38. Non-task performances
39. Task specialization
40. Returns from the organization
41. Task performance
42. Task urgency
43. Reference group support

Simu-School - LEA Comprehensive Educational Planning Project

Community Profile Data Level 1

POPULATION DATA TREE

I. Population Data Keys

1. Agency: LEA
2. Agency Component: Decentralized unit or Planning area
3. School: Madison High School attendance area, Jefferson Elementary attendance area, etc.
4. School Component Planning Area: Coded local district planning area, if different from federal census classification areas
5. Census Tract/Enumeration District (Defined by federal census)
6. Block Group/Enumeration District (Defined by federal census)
7. Block/Enumeration District (Defined by federal census)

II. Population Data Collected on Head of Household

1. Address
2. Birth date
3. Sex
4. Ethnic characteristic code
5. Educational attainment code
6. Occupational code (defined by federal census)
7. Employment status code
8. Attitudinal data (based on individual responses to community opinionnaire)

III. Population Data Collected on Spouse of Head of Household

9. Birth date
10. Ethnic characteristic code
11. Educational attainment code
12. Occupational code
13. Employment status code

IV. Population Data Collected on the Family and other Household Members

14. Family income range code
15. Birth dates of other members of household
16. Number of pre-school age children likely to attend non-public schools
17. Number of children attending non-public schools, kindergarten through grade 12
18. Principal language spoken in home code

Simu-School - LEA Comprehensive Educational Planning Project

Community Profile Data Level 1

PHYSICAL DATA TREE

I. Facility Data Keys

1. County
2. Agency: LEA, Joint vocational school district, Parochial school district
3. Agency Component: Decentralized unit or Planning area
4. Census Tract and/or Enumeration District (Defined by federal census)
5. Block Group and/or Enumeration District (Defined by federal census)
6. Block and/or Enumeration District (Defined by federal census)

II. Physical Data Collected on Dwelling Unit

1. Address
2. Type of unit code (single-family-detached, duplex, townhouse, garden apartment, mid-rise apartment, high-rise apartment, mobile home)
3. Year of construction
4. Owner occupied or rented
5. Estimated value of dwelling unit if owned
6. Monthly rent of unit if rented
7. Number of bedrooms
8. Year occupied by present head of household

III. Physical Data Collected on Non-dwelling Units

9. Address
10. General use code (light industry, heavy industry, commercial, retail, agriculture)
11. Occupant's name
12. Occupant category code (governmental, religious, private, etc.)
13. Acreage of site

Number of Quantitative Specification by Special Use Facilities

14. Outside pool(s)
15. Dimensions of pool(s)
16. Baseball diamond
17. Outside tennis court(s)
18. Football and/or soccer field(s)
19. Outside basketball court(s)
20. Parking spaces
21. Acreage of developed general playground area
22. Acreage of undeveloped wooded area
23. Acreage of undeveloped unwooded area
24. Acreage of nature exhibit area
25. Enclosed pool(s)

26. Dimensions of Pool(s)
27. Inside tennis court(s)
28. Inside basketball court(s)
29. Bowling alley(ies)
30. Equipped exercise room(s)
31. Square footage of exercise room(s)
32. Inside multi-use recreational area(s)
33. Square footage of multi-use recreational area(s)
34. Auditorium and/or theater
35. Seating capacity of auditorium and/or theater
36. Square footage of stage area
37. Inside exhibit area(s)
38. Square footage of exhibit area(s)
39. Enclosed general instructional use area(s)
40. Square footage of instructional area(s)
41. Eligibility for use code (membership only, owner selects from applicants, open for public use, restricted to residents of specific geographic area, etc.)
42. Availability code (weekday morning, weekday afternoon, weekday evening, weekend)

Simu-School - LEA Comprehensive Educational Planning Project

Community Profile Data Level 1

ACTIVITIES AND SERVICES DATA TREE

I. Activities and Services Data Keys

1. County
2. Agency: LEA, Joint vocational school district, Parochial school district, YMCA, Parks and recreation, etc.
3. Agency Component: Decentralized unit or Planning area
4. Census Tract and/or Enumeration District (Defined by federal census)
5. Block Group and/or Enumeration District (Defined by federal census)
6. Block and/or Enumeration District (Defined by federal census)
7. Sponsoring Agency: Local government, State government, Federal government, Religious institution, Industrial-business organization, Other private organization
8. Program Classification: General instructional, Job training, Employment placement, Counseling, General health, Mental health, Recreational, Cultural

II. Activities and Services Data Collected by Program

1. Sponsoring agency name
2. Name of activity or service
3. Name of contact
4. Address of contact
5. Address where program conducted
6. Participation eligibility code (membership only, sponsor selects from all applicants, all who apply are enrolled, restricted to residents of specific geographic areas, restricted to certain socio-economic levels)
7. Annual number of individuals seeking participation
8. Annual number of individuals participating by age and sex
9. Desired annual program participation capacity
10. Estimated number of participants from local educational agency
11. Number of persons involved in conducting program
12. Total annual cost of program

If this activity or service is an organized group program

13. Length of program in weeks per year
14. Number of meeting times per week
15. Length of meeting in hours
16. Number of program sections offered per year

If this activity or service is provided on an individualized basis

17. Number of weeks per year activity or service is available
18. Average number of meetings with individual
19. Average length of meetings

Simu-School - LEA Comprehensive Educational Planning Project

Community Profile Data Level 1

GOVERNANCE DATA TREE

I. Governance Data Keys

1. County
2. Agency: LEA, Joint vocational school district, Parochial school district, YMCA, Parks and recreation, etc.
3. Agency Component: Decentralized unit or Planning area
4. Type of Organization or Position: Governmental, Religious, Service, Business and/or Industrial, Private organization

II. Governance Data Collected by Organization or Position

1. Name of organization or position
2. Name of respondent
3. Title of respondent
4. Office address of organization or position
5. Name of executive head
6. Title of executive head
7. Date incumbent executive head took office
8. Percentage of time used for executive head position
9. Executive head (elected or appointed)
10. Length of term of executive head
11. Executive head (salaried or non-salaried)
12. Number of current total membership
13. Membership eligibility code (employed, appointed, elected, anyone applying, restricted by geographic area, restricted by socio-economic level, restricted by occupation, restricted by religious affiliation, restricted by political affiliation)
14. Average age of membership
15. Number of new members this year
16. Characteristics of membership by social or ethnic code and percentage (black, white, American-Indian, Spanish-American, Oriental, other)
17. Date of founding of organization
18. Geographical breadth of organization (local, state, regional, national, international)
19. Organization life span (temporary or long-term)

Use the following ranking system in response to item 20:
Single most important source 1
Among the most important source. 2
A minor source 3
Not at all important as a source 4

20. How would you rank your organization as a source of ideas and advice to the following groups or individuals: City Council, Mayor, City Commissioner, Board of Education, Superintendent of Schools, Zoning Board, Board of Health, Police Department, County Commissioners, Minority special interest groups, Council of Churches, Chamber of Commerce, Service clubs, PTA organizations, Largest local industries and/or businesses, Major labor unions, Voter leagues, Realtors Association

Use the following rating system in response to questions 21, 22, and 23:

Always 1
Usually 2
Sometimes 3
Rarely 4
Never 5

21. When your organization considers financial resource allocations, with what frequency do you seek information from the following groups or individuals: City Council, Mayor, City Commissioner, Board of Education, Superintendent of Schools, Zoning Board, Board of Health, Police Department, County Commissioners, Minority special interest groups, Council of Churches, Chamber of Commerce, Service clubs, PTA organizations, Largest local industries and/or businesses, Major labor unions, Voter leagues, Realtors Association

22. With what frequency do the following groups or individuals contact you to gain information when they are making decisions on allocation of financial resources: City Council, Mayor, City Commissioner, Board of Education, Superintendent of Schools, Zoning Board, Board of Health, Police Department, County Commissioners, Minority special interest groups, Council of Churches, Chamber of Commerce, Service clubs, PTA organizations, Largest local industries and/or businesses, Major labor unions, Voter leagues, Realtors Association

23. Number of times in the past year your organization coordinated financial and/or personnel resources in a combined effort to reach a commonly held objective with each of the following groups or individuals: City Council, Mayor, City Commissioner, Board of Education, Superintendent of Schools, Zoning Board, Board of Health, Police Department, County Commissioners, Minority special interest groups, Council of Churches, Chamber of Commerce, Service clubs, PTA organizations, Largest local industries and/or business, Major labor unions, Voter leagures, Realtors Association

APPENDIX B

Examples of Levels 2, 3, 4 Data

(These partial data bases were used to generate the examples in Section III of this report.)

The data recorded in the partial data bases (for Level 2, Level 3, and Level 4) are presented in a rather compact notation in order to save space; however, the meaning of the entries may not be clear at first inspection. Accordingly, this example is presented. Consider the last page of Level 4 data under the caption, "HIRED TEACHERS -- CERTIFICATION AREA (RG)": under this caption will be listed the six values starting with "PROJECTED YEAR" and ending with "COST OF TEACHERS". The "RG" in the title is simply that the six data elements listed below the caption "HIRED TEACHERS" repeat for every possible value (and combination thereof) of the six values. The previous statement is not strictly true since there are two types of data elements listed within the repeating group: the first four items (PROJECTED YEAR, RACE/SEX CODE, PAY GRADE-PAY STEP, and CERTIFICATION AREA) are descriptors and the last two data elements (NUMBER OF TEACHERS, COST OF TEACHERS) are the values that are described by the previous four descriptors. This statement simply means that there will be a number and cost of teachers for each possible combination of the four descriptors which precede it. If five years of projected data are needed, then the number of possible combinations of descriptors will be shown in the following table:

Descriptor	Maximum Number of Unique Values
PROJECTED YEAR	5
RACE/SEX CODE	8
PAY GRADE - PAY STEP	38
CERTIFICATION AREA	38
Number of Combinations	57,760

Hence, there are 57,760 values for "NUMBER OF TEACHERS" and 57,760 values for "COST OF TEACHERS". An example of these values might be that for the second PROJECTED YEAR for black, female (RACE/SEX CODE) teachers with a Master's Degree and six years experience (PAY GRADE - PAY STEP) who teach Biology (CERTIFICATION AREA) there are ten such teachers (NUMBER OF TEACHERS) who, when hired, will cost the District $92,500 (COST OF TEACHERS). Hence, the value of "10" is one of 57,760 values for the data element "NUMBER OF TEACHERS" within the repeating group (RG) "HIRED TEACHERS -- CERTIFICATION AREA".

LEVEL 2:

RUN ID
RUN DATE
PERIODIC DATA (RG)
    YEAR OF RECORD
    NUMBER OF SECONDARY PUPILS IN SYSTEM
    NUMBER OF SECONDARY TEACHERS IN SYSTEM
    SECONDARY LEVEL PUPIL/TEACHER RATIO
    NUMBER OF ELEMENTARY PUPILS
    NUMBER OF ELEMENTARY TEACHERS
    ELEMENTARY PUPIL/TEACHER RATIO
    AVERAGE NUMBER OF CLASSES PER SECONDARY PUPIL
    AVERAGE NUMBER OF CLASSES PER ELEMENTARY PUPIL
    NUMBER OF INDICATORS
    NUMBER OF PROJECTS
    CERTIFICATION AREA DISTRIBUTIONS (RG)
        RACE/SEX
        PAY GRADE-PAY STEP
        CERTIFICATION AREA
        NUMBER OF PUPILS IN CLASSES
        FRACTION OF SECONDARY PUPILS IN A CERTIFICATION AREA
        NUMBER OF CLASSES HELD IN A CERTIFICATION AREA
        SIZE OF AVERAGE CLASS IN A CERTIFICATION AREA
        AVERAGE NUMBER OF CLASSES TAUGHT PER TEACHER IN A CERTIFICATION AREA
    SUBJECT AREA DISTRIBUTIONS (RG)
        RACE/SEX
        PAY GRADE-PAY STEP
        SUBJECT AREA
        NUMBER OF PUPILS IN CLASSES IN A SUBJECT AREA
        FRACTION OF SECONDARY PUPILS IN A SUBJECT AREA
        NUMBER OF CLASSES HELD IN A SUBJECT AREA
        SIZE OF AVERAGE CLASS IN A SUBJECT AREA
        AVERAGE NUMBER OF CLASSES TAUGHT PER TEACHER IN A SUBJECT AREA
    STRATEGIC PLANNING PROJECTS (RG)
        PROJECT NUMBER
        PROJECT NAME
        FIXED COST
        VARIABLE COST
        PERCENT PROJECT STUDENTS ELEMENTARY
        PERCENT PROJECT STUDENTS SECONDARY
        NUMBER OF RELATED INDICATORS
        RELATED INDICATORS (RG)
            RELATED INDICATOR NUMBER
            RELATED ELEMENTARY/SECONDARY CODE
            RELATIONSHIP COEFFICIENT

LEVEL 3:

RUN ID
RUN DATE
PERIODIC PARAMETER SPECIFICATIONS (RG)
    YEAR OF RECORD
    NUMBER OF SECONDARY PUPILS IN SYSTEM
    NUMBER OF SECONDARY TEACHERS IN SYSTEM
    SECONDARY LEVEL PUPIL/TEACHER RATIO
    NUMBER OF ELEMENTARY PUPILS
    NUMBER OF ELEMENTARY TEACHERS
    ELEMENTARY PUPIL/TEACHER RATIO
    AVERAGE NUMBER OF CLASSES PER SECONDARY PUPIL
    AVERAGE NUMBER OF CLASSES PER ELEMENTARY PUPIL
    NUMBER OF INDICATORS
    NUMBER OF PROJECTS
    TOTAL BUDGET FOR PROJECTS
    STRATEGIC PLANNING INDICATORS (RG)
        INDICATOR NUMBER
        ELEMENTARY/SECONDARY CODE
        INDICATOR NAME
        MINIMUM ALLOWABLE INDICATOR CHANGE
        INDICATOR WEIGHT
    CERTIFICATION AREA DISTRIBUTIONS (RG)
        RACE/SEX
        PAY GRADE-PAY STEP
        CERTIFICATION AREA
        NUMBER OF PUPILS IN CLASSES
        FRACTION OF SECONDARY PUPILS IN A CERTIFICATION AREA
        NUMBER OF CLASSES HELD IN A CERTIFICATION AREA
        SIZE OF AVERAGE CLASS IN A CERTIFICATION AREA
        AVERAGE NUMBER OF CLASSES TAUGHT PER TEACHER IN A CERTIFICATION AREA
    SUBJECT AREA DISTRIBUTIONS (RG)
        RACE/SEX
        PAY GRADE-PAY STEP
        SUBJECT AREA
        NUMBER OF PUPILS IN CLASSES IN A SUBJECT AREA
        FRACTION OF SECONDARY PUPILS IN A SUBJECT AREA
        NUMBER OF CLASSES HELD IN A SUBJECT AREA
        SIZE OF AVERAGE CLASS IN A SUBJECT AREA
        AVERAGE NUMBER OF CLASSES TAUGHT PER TEACHER IN A SUBJECT AREA
DATA BASE WEIGHTINGS (RG)
    YEAR
    WEIGHTING FOR YEAR
TEACHER BASE SALARY CONTROL (RG)
    YEAR
    PERCENTAGE INCREASE FOR YEAR
    AMOUNT INCREASE FOR YEAR
    BASE SALARY FOR YEAR
TEACHER SALARY INDEX CONTROL (RG)
    YEAR
    PAY GRADE
    PAY STEP
    SALARY INDEX

LEVEL 3 (continued):

TEACHER RACIAL MIX CONTROL (RG)
- YEAR
- RACE
- RACIAL PERCENTAGE

STUDENT ENROLLMENT DISTRIBUTION (RG)
- YEAR
- CERTIFICATION AREA
- PERCENTAGE OF ENROLLMENT IN CERTIFICATION AREA

STUDENT ENROLLMENT DISTRIBUTION -- SUBJECT AREA (RG)
- YEAR
- SUBJECT AREA
- ENROLLMENT PERCENTAGE IN SUBJECT AREA

TEACHER HIRING EXPERIENCE CONTROL (RG)
- YEAR
- PAY GRADE
- PAY STEP
- PERCENT OF NEW HIRES FOR PAY GRADE-PAY STEP

STRATEGIC PLANNING PROJECTS (RG)
- PROJECT NUMBER
- PROJECT NAME
- FIXED COST
- VARIABLE COST
- MINIMUM STUDENTS
- MAXIMUM STUDENTS
- MAXIMUM BUDGET
- PERCENT STUDENTS ELEMENTARY
- PERCENT STUDENTS SECONDARY

LEVEL 4:

RUN ID
RUN DATE
YEAR
SELECTED PROJECTS (RG)
    SELECTED PROJECT NUMBER
    SELECTED PROJECT NAME
    OPTIMUM NUMBER OF STUDENTS
    OPTIMUM COST
    PROJECT CONTRIBUTION TO INDICATORS (RG)
        PROJECT INDICATOR NUMBER
        PROJECT INDICATOR ELEMENTARY/SECONDARY CODE
        CONTRIBUTION AMOUNT
        CONTRIBUTION PERCENT
TOTAL INDICATOR CHANGES (RG)
    TOTAL INDICATOR NUMBER
    TOTAL ELEMENTARY/SECONDARY CODE
    TOTAL CHANGE
    WEIGHTED CHANGE
WEIGHT SENSITIVITY (RG)
    WEIGHT INDICATOR NUMBER
    INDICATOR WEIGHT ELEMENTARY/SECONDARY CODE
    WEIGHT INDICATOR NAME
    WEIGHT USED
    LOWER CRITICAL WEIGHT
    UPPER CRITICAL WEIGHT
CONSTRAINT SENSITIVITY (RG)
    CONSTRAINT NAME
    CONSTRAINT TYPE
    CONSTRAINT VALUE
    LOWER CRITICAL CONSTRAINT
    UPPER CRITICAL CONSTRAINT
STARTING TEACHERS -- CERTIFICATION AREA (RG)
    PROJECTED YEAR
    RACE/SEX CODE
    PAY GRADE-PAY STEP
    CERTIFICATION AREA
    NUMBER OF TEACHERS
    COST OF TEACHERS
STARTING TEACHERS -- SUBJECT AREA (RG)
    PROJECTED YEAR
    RACE/SEX CODE
    PAY GRADE-PAY STEP
    SUBJECT AREA
REMAINING TEACHERS -- CERTIFICATION AREA (RG)
    PROJECTED YEAR
    RACE/SEX CODE
    PAY GRADE-PAY STEP
    SUBJECT AREA

LEVEL 4: (continued)

REMAINING TEACHERS -- CERTIFICATION AREA (RG)
    PROJECTED YEAR
    RACE/SEX CODE
    PAY GRADE-PAY STEP
    CERTIFICATION AREA
    NUMBER OF TEACHERS
    COST OF TEACHERS
REMAINING TEACHERS -- SUBJECT AREA (RG)
    PROJECTED YEAR
    RACE/SEX CODE
    PAY GRADE-PAY STEP
    CERTIFICATION AREA
    NUMBER OF TEACHERS
    COST OF TEACHERS
REMAINING TEACHERS -- SUBJECT AREA (RG)
    PROJECTED AREA
    RACE/SEX CODE
    PAY GRADE-PAY STEP
    SUBJECT AREA
    NUMBER OF TEACHERS
    COST OF TEACHERS
HIRED TEACHERS -- CERTIFICATION AREA (RG)
    PROJECTED YEAR
    RACE/SEX CODE
    PAY GRADE-PAY STEP
    CERTIFICATION AREA
    NUMBER OF TEACHERS
    COST OF TEACHERS
HIRED TEACHERS -- SUBJECT AREA (RG)
    PROJECT YEAR
    RACE/SEX CODE
    PAY GRADE-PAY STEP
    SUBJECT AREA
    NUMBER OF TEACHERS
    COST OF TEACHERS
TERMINATED TEACHERS -- CERTIFICATION AREA (RG)
    PROJECTED YEAR
    RACE/SEX CODE
    TERMINATION CODE
    CERTIFICATION AREA
    NUMBER OF TEACHERS
TERMINATED TEACHERS -- SUBJECT AREA (RG)
    PROJECTED YEAR
    RACE/SEX CODE
    TERMINATION REASON
    SUBJECT AREA
    NUMBER OF TEACHERS

APPENDIX C

An Example of Comprehensive Educational Planning
in a Large Urban LEA

The major reason for creating a Planning Information System (PIS) is to provide evaluated input information to the decision makers of an LEA. Consequently, the PIS must be carefully and closely related to the decision-making framework of an LEA. In the discussion which follows, certain key assumptions are made, such as: (1) the management of an LEA may be systematically analyzed and evaluated; (2) improved decision making will be achieved most efficiently through the continued implementation of rationalized decision making, i.e., input/output analysis, accountability, etc.; (3) educational costs and products may be evaluated and PPBS techniques adapted to all LEA: (4) operations research techniques developed in business and government may be tailored to educational needs and efficiently used. From these assumptions, it is now clear that the major initial tasks of providing information for planning are the gathering of data on resources, processes, operations, and constraints which are then used to form an organized data base. Accordingly, PIS assumes that an LEA may be represented as shown in Exhibit I. This exhibit indicates that there are three essential functions of an LEA: (1) Operations, which is basically curriculum and instruction; (2) Support, which includes finance, personnel, facilities, etc.; (3) Control, which is the decision-making apparatus of the LEA. It will be noted later that this breakdown is adhered to in the program budgeting structure (PPBS) to be presented later.

Exhibit II is an expansion of the "LEA Control" section shown in Exhibit I which is made more explicit by using an actual LEA as the example; for concreteness, an actual LEA is used as an example to illus-

MANAGEMENT FLOW DIAGRAM OF LOCAL EDUCATIONAL AGENCY (LEA)

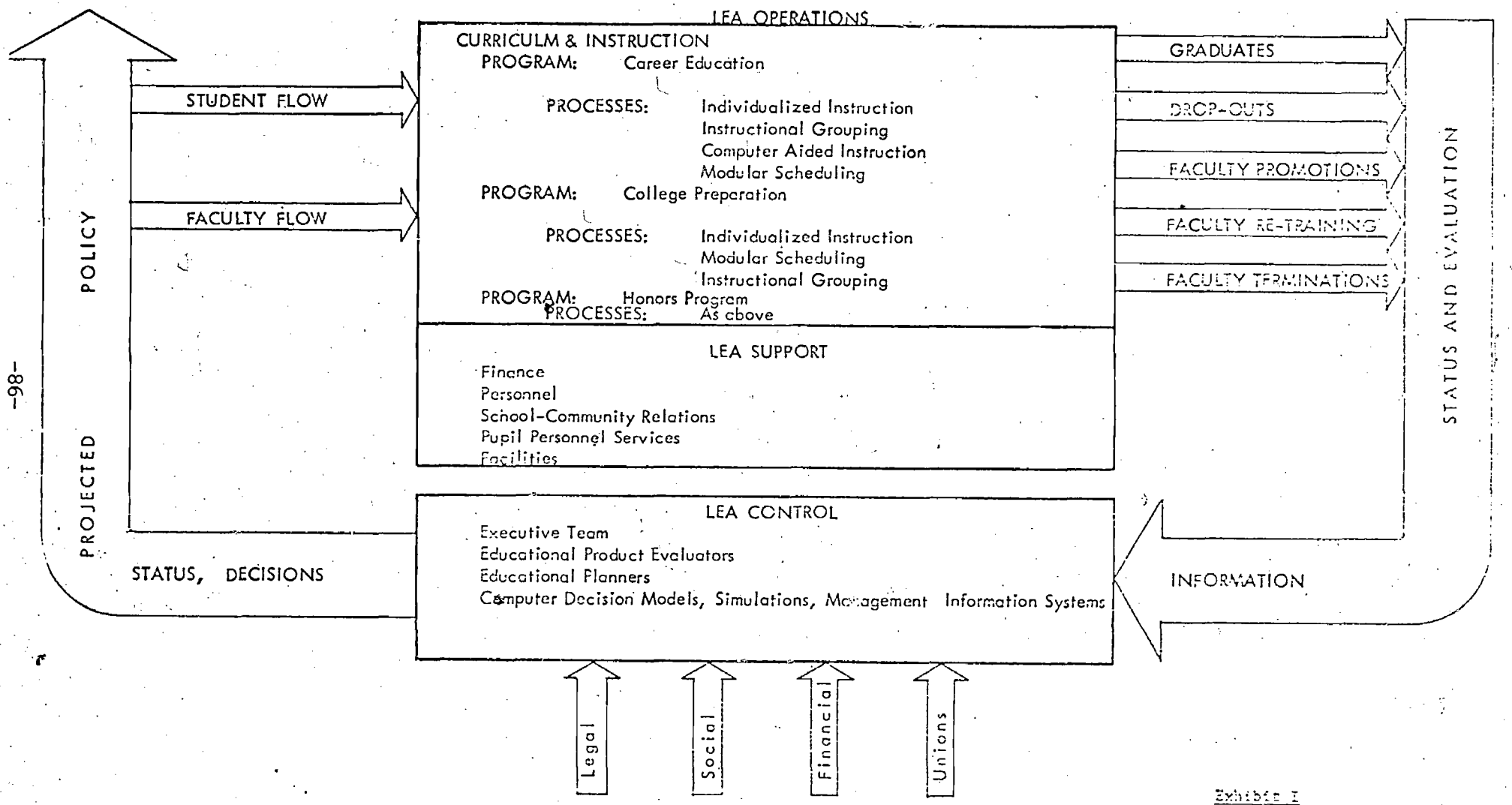


Exhibit I

trate the present and anticipated future decision-making apparatus. The Dallas Independent School District (DISD) was chosen because it is a large city school district in actual transition from intuitive to rationalized decision making. A detailed description of the DISD efforts may be found in Chapter 18 of Rethinking Urban Education by Frances Chase. Exhibit II indicates the relationship among Control Module (numbered for easy reference) either in place, partially completed, or contemplated. A brief discussion of these modules and their interrelationships follows:

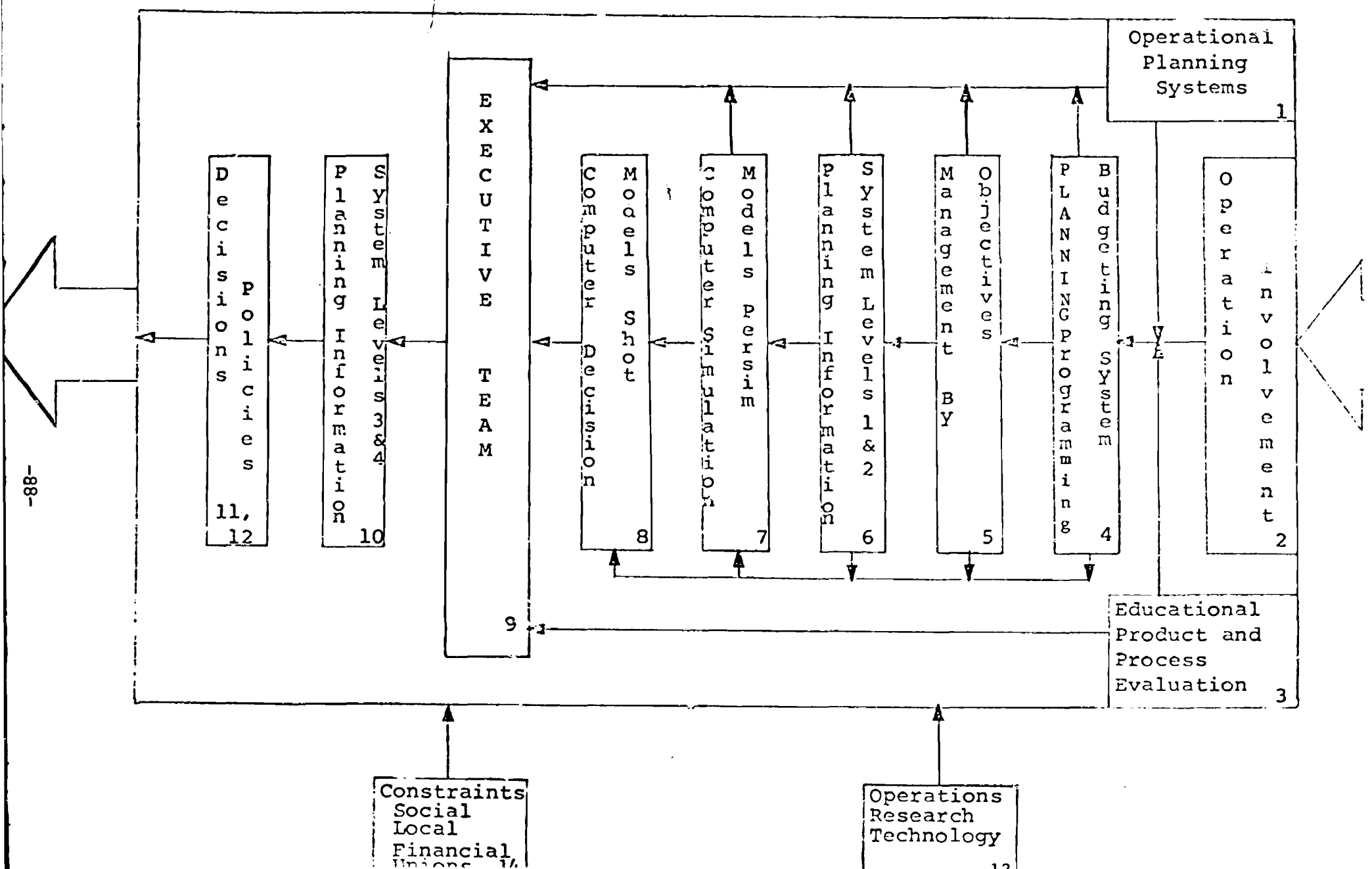
Module 1: "Operational Planning Systems" are the present managerial artifacts by which the various subsystems within the school district are presently governed by the applicable managers. Most of these systems are manual, some of them have been partially automated. One critical weakness of the present system is that the impact of the decision and information inherent in these Operational Planning Systems upon the rest of the decision making framework is not explicitly known and planned for.

Module 2: The DISD has for some yars been building a model for shared decision-making stressing community involvement.

> "But the most exciting and promising component of the Dallas model for shared decision making is known as Operation Involvement -- a systematic effort to assist the Board of Education in assessing needs, assigning priorities, and allocating resources as a part of the annual budgeting process. For nearly two years now, some 600 Operational Involvement participants have played a major role in determining goals and objectives for the Dallas Public School System.
>
> Participants meet in small groups on a monthly basis and as a whole several times during the year. Operational Involvement participants also are invited to attend Board of Education budget retreats, and make tours of the schools to help assess the effectiveness of programs under way in the district. Last year, input from Operations Involvement participants resulted in some 100 revisions or additions to proposed district goals for 1972-73. An evaluation of last year's Operation Involvement showed that, almost without exception, participants were enthusiastic and enjoyed "having a piece of the action". The school district

EXHIBIT II

LEA CONTROL



benefited immeasurably from the advice and suggestions of participants and the end result was greater support for the budget proposals".

Currently, the output from Operation Involvement feeds directly into the Management by Objectives System (Module 5) of the district; when it is completed and operational it is anticipated that the output from Operation Involvement will first be factored into Module 4, the Planning, Programming, Budgeting System structure to be established in DISD.

Module 3: Recognizing the need for a greater cost effectiveness in education and the consequent necessity to measure and evaluate the educational product obtained as a result of the functioning of an LEA, DISD is in the fourth year of a comprehensive program of educational product evaluation. The basic research, evaluation, and development model utilized in the DISD is presented. The approach involves the application of Stufflebeam's CIPP Evaluation Model in conjunction with a strong quantitative research emphasis to provide basic information used in the development process. The District's longitudinal research and evaluation is explicated as well as the resource commitments required to implement the model. Explication is aided by the use of numerous examples drawn from the reports generated by the District's Department of Research and Evaluation. Finally, the method of communicating information to decision makers is outlined. The process is relatively unique among public school systems.

Product evaluation information is currently fed into the Management by Objectives System (Module 5) and Modules 7 and 8, the Computer Simulation Models and Computer Decision models, respectively. Once Module 4 (PPBS) is actualized, it is anticipated that educational product evaluation information will be fed into that module and flow from there to all modules downstream from it.

Module 4: The need for educational accountability can no longer be gainsayed and most educators will agree that some form of planning, programming, budgeting system will probably be utilized to affect greater cost effectiveness considerations and decision making. For over three years, DISD has had employees of Price Waterhouse, resident and full time, working in efforts to assist the District in converting the accounting system to Bulletin 679, a system which will permit PPBS. One of the results of this project is the identification of the fact that the data base structure must be integrated with the program budgeting structure. Module 4 is meant to indicate the Planning Portion of PPBS. Modules 7, 8 and 10 can be considered the Programming portion of PPBS. The Budgeting System of PPBS is not represented in Exhibit II except as it provides data for planning as an Operational Planning System (Module 1).

Module 5: The information from Operation Involvement (Module 2) currently feeds as input to the Management by Objectives System utilized by DISD. Starting with the goals obtained from Module 2, a systematic procedure is used to explode these goals into objectives, sub-objectives, activities, tasks, and finally, actual budget amounts; this mechanism is the goal reationalization/budgeting process within DISD. It serves as a useful management tool and as a precursor for training management in the PPBS system to be installed subsequently. It is anticipated that the management by objectives techniques will be absorbed by the PPBS system.

Module 6: The Planning Information System, Levels 1 and 2, receives inputs from Modules 1 through 5. The Planning Information System (PIS)

is conceived as a multi-dimensional data management structure to support educational decision making. Level 1 of the PIS contains "raw" or unprocessed data at the transaction level about all significant aspects of the School District and its surrounding community relevant to planning. Level 2 contains algorithmic profile data extracted and summarized from Level 1 which is useful in management decision making directly. Information from the PIS is fed directly to the Executive Team and also to Module 7 and 8.

Module 7: Computer simulation models are intended as a means to improve educational decision making by enabling the prediction of alternative user states of the school district given as input policy or environmental trial decisions. Through the use of a simulation model and the computer, the results of policy and environmental trial decisions may be ascertained in a few moments rather than a few years. Thus, the search for and evaluation of alternatives is facilitated. To this end, a goal of the DISD is to construct a complex, comprehensive model encompassing all significant aspects of school district operation. This model would include "building blocks" in such areas as policy, revenue, operations, costs, organizational structure, facilities, enrollment, personnel, etc. Implicit in the construction of these building blocks is the establishment of the data systems necessary to drive these models; these data systems would be incorporated within the structure of PIS, Level 1, Level 2.

Module 8: The computer simulation models, when constructed, seek to answer the question, "What can be done?" The computer decision models, operating in conjunction with the simulation models, will answer, "What should be done?" Their goal will be to analyze the myriad possible

combinations of decisions relative to a particular segment of the school district or the entire school district and to pick that combination of decisions which maximizes educational improvement while minimizing cost. These models will depend heavily upon input from the PIS and the simulation models of Module 7; the optimal decisions will be fed directly to the Executive Team for their analysis and approval.

Module 9: The Executive Team is that corpus of individuals charged with the decision-making for an LEA. The thrust of this project is to create the planning tools necessary to enable this group to improve its decision-making capabilities. Currently the Executive Team gets inputs from virtually every module in Exhibit II. Although this project does not attempt to insulate the Executive Team from needed inputs, implementation of the PIS and the mechanisms which will quantify district goals and performance should inevitably reduce the number of unprocessed inputs to the Executive Team and strengthen the chain of input that flows from Modules 2 to 4 to 5 to 6 to 7 to 8 to 9 (rationalized decision making). Such a transformation would be consonant with the military example of the command of a ship. A Combat Information Center (CIC) is established to receive all inputs from within and without the ship, process these, and provide the rationalized information to the decision makers on the Bridge (i.e., the conn of the ship). Thus, the decision making team charged with directing the course of the ship is relieved of the necessity to process each piece of input information into meaningful correlations with the total informational picture. For example, the CIC feeds the Bridge information about the speed, course and estimated closest point of approach of any ship or plane in the vicinity, rather than providing

the Bridge the information of each sighting and its bearing and range and making the Bridge perform these analyses and calculations.

Module 10: The Planning Information System, Levels 3 and 4, contain a complete data base of projected future states of the LEA as a result of policy/environmental alternatives. Thus, the Executive Team will have a complete repertoire or catalogue of alternatives to browse and correlate as they see fit in answering the questions that must be asked in order to make rationalized decisions. Most of the data in the PIS Levels 3 and 4 will come from Module 7 and 8. Therefore, the Executive Team will have the ability to simulate all or part of the operations of the school district and to observe the impact of decisions in one area upon other operating departments within the school district and the total school district, a capability that is lacking at the present time. Hence, PIS Levels 3 and 4 can be thought of as a catalogue of alternatives, decisions, and their results.

Modules 11 and 12: From this repertoire of analyzed alternatives represented by Module 10, the Executive Team may then select the decisions (Module 11) and policy (Module 12) appropriate to the particular fact situation (present or anticipated) with which they may be faced. These policies and decisions will have had the advantage of careful analysis and an assessment of their sensitivity in terms of the results they will produce and the factors which influence these results.

Module 13: LEA Control is also impacted by various constraints as shown in Exhibit I and II. The chief constraints are legal, social, and financial.

Module 14: Operations research technology from sources other than education may be adapted and utilized by an LEA in order to speed the attainment of rationalized decision making. Thus, considerable development expense will be saved.

APPENDIX D

Input/Output Analysis and the PIS

From the discussion in Appendix C, it is clear that the PIS must be created to support a rationalized decision making procedure which includes the following concepts:

1. To plan programs around major objectives rather than functions.
2. To relate resources, manpower, material, equipment and the like, to the output of the appropriate management level or department.
3. To coordinate long range planning with budgeting.
4. To appraise programs on a continuous basis.
5. To control approved programs through timely progress reports.
6. To provide a capability for making cost benefit and effectiveness studies on alternative programs.

Since these concepts are indigenous to Planning, Programming, Budgeting System (PPBS), it is apparent that the PIS must integrate closely with the program budgeting structure of an LEA. Imbedding the program budgeting structure within PIS is an important step toward permitting analysis and evaluation of alternative trial decisions/policies and environmental changes such as:

1. Changes in enrollment patterns.
2. Alternative instruction modes.
3. Curriculum changes.
4. Alternative staffing patterns and salary schedules.
5. Changes in faculty work loads.
6. Variations in levels of support activities.
7. Long range implications of current decisions.
8. Trend analyses.

Accordingly, a suggested program budgeting structure is shown in Exhibit I. It may be seen that this structure consists of one primary program and four support programs; the primary program of "Direct Instruction" corresponds exactly with the "LEA Operations" segment of Exhibit I, Appendix C. The "Support Programs" of Exhibit I correspond with the "LEA Support" of Exhibit I, Appendix C. Exhibits II and III detail some of the major breakdowns within each of the five programs in order to facilitate a grasp of their meaning. In considering the program structure for an LEA, it is important to remember certain fundamental assumptions and concepts:

1. A primary "program" identifies a series of activities and resources contributing to the education of a group of students pursuing a common path. This suggests that students logically may be viewed as a homogeneous group for analytical purposes. A program, then, consists of all the activities and resources contributing to the educational experience of a particular group of students.

2. The fundamental quantitative unit of output of faculty is the number of contact minutes per course section per duration of course section. Qualitative input comes from a Product and Process Evaluation Group such as is indicated in Module 3, Exhibit II, Appendix C.

3. Dollar resources will flow from organizational units (e.g., department with a school) to programs in proportion to the flow of basic units of output from specific organizational units to program breakdowns (e.g., General College Prep, Honors, Adult Ed., etc.

4. Cost-per-student-information presumes a definition of student; this consideration is especially important in the secondary level.

FTE (full time equivalent) student is the basis recommended and is obtained by dividing the number of contact units associated with a full time equivalent student into the total number of output units taken by all head count students in a specific program, subject area, certification area, department, or whatever.

One of the objections usually raised to applying program budgeting to education is the mingling of resources which occurs in producing the educational product (an educated student). Thus, a woodworking course in high school may contain students pursuing either a General, College Prep, Honors, or Career Ed program. How then, to allocate the resources required to conduct any of these programs given the mingling of resources to produce the program product? Items 2 and 3 of the fundamental assumption/concepts previously presented address this point; perhaps an example will best serve to illustrate it.

Exhibit IV represents the resource allocation method inherent in the programming budgeting structure just presented for a hypothetical high school containing 400 students, all of whom must take one required course, physical education (P.E.). There are only two periods per day in this high school, one of which is devoted to P.E. For the other period, there are three options: Math, Music, and History. As shown in the "Total Enrollment" column, 200 of the 400 students take Math for their elective and 100 of the students take History and Music respectively. Also shown in the exhibit are the Number of Course Sections and the Actual Contact Minutes for each of the Course Sections. The numbers in parentheses indicate what the resource allocation to the department would have been if the resource allocation had been made on the basis of the particular column; for

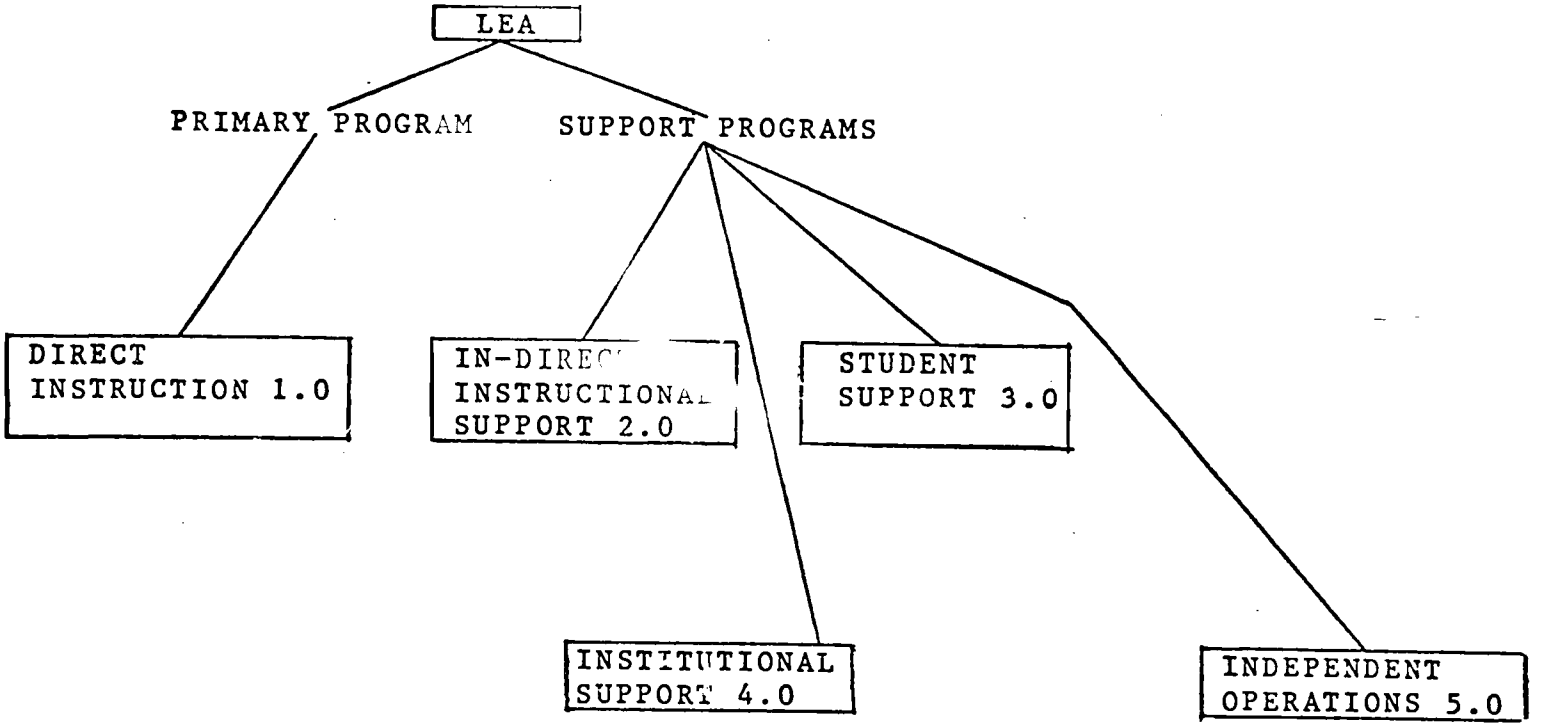


EXHIBIT I.
SUGGESTED PROGRAM STRUCTURE FOR A LEA

EXHIBIT II

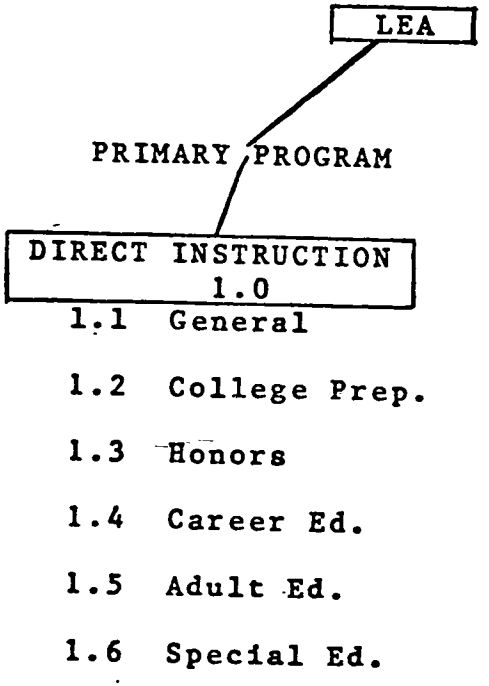
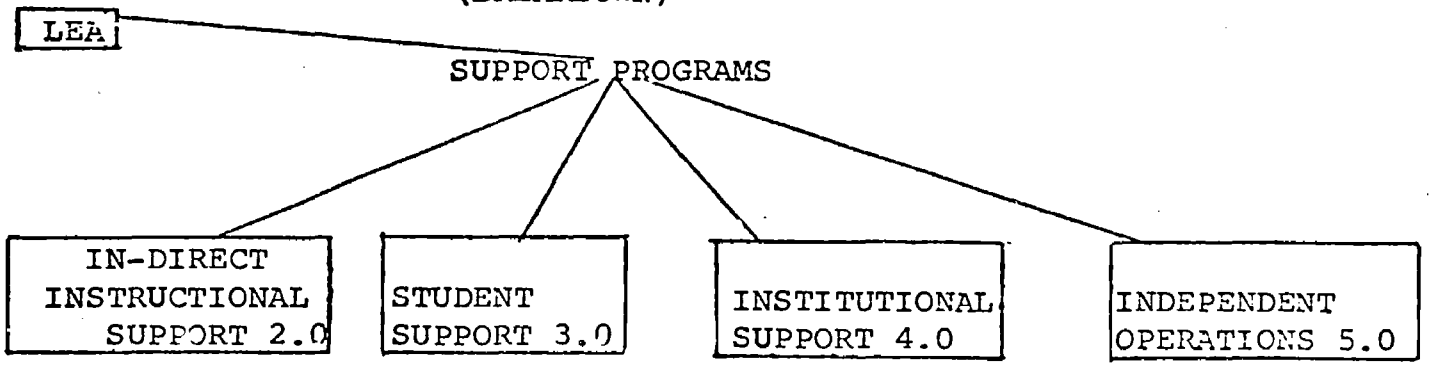

LEA
PRIMARY PROGRAM
DIRECT INSTRUCTION
1.0
1.1 General
1.2 College Prep.
1.3 Honors
1.4 Career Ed.
1.5 Adult Ed.
1.6 Special Ed.

EXHIBIT III
SUGGESTED PROGRAM STRUCTURE FOR A LEA
(BREAKDOWN)



2.0 IN-DIRECT INSTRUCTIONAL SUPPORT

- 2.1 Libraries
- 2.2 Audio/Visual Services
- 2.3 Computing Support
- 2.4 Academic Admin. and Personnel Development
- 2.5 Course & Curriculum Development
- 2.6 Educational Product Evaluation

3.0 STUDENT SUPPORT

- 3.1 Academic Counseling and Career Guidance
- 3.2 Home and Family Life Counseling
- 3.3 Supplantive
  - a. Meals
  - b. Eyeglasses
- 3.4 Health Services

4.0 INSTITUTIONAL SUPPORT

- 4.1 Executive Management
- 4.2 Fiscal Operations
- 4.3 General Administrative Services
- 4.4 Physical Plant Operations
- 4.5 Faculty & Staff Services
- 4.6 Community Relations
- 4.7 Logistical Services

5.0 INDEPENDENT OPERATIONS

- 5.1 Outside Agencies

example, if the number of teachers, supplies, etc., had been allocated on the basis of the Number of Course Sections, then 34,5% of the resources would have been devoted to the Mathematics Department, 20.7% to the History Department, 27.6% to the Physical Education Department, and 17.1% to the Music Department. If the resource allocation had been on the basis of actual contact minutes, then the percent of total funds which would flow to each department would be the numbers shown in parentheses under the column "Actual Contact Minutes". A weighting factor is included in the calculation to account for disparities in class size among departments, differentiated staffing, etc. Application of the weighting factor to the actual contact minutes results in the "Adjusted Contacted Minutes" as shown in the appropriate column. The values in the collumn captioned "Earned Resource Percentage" present the resource allocation to each of the departments on the basis of the Adjusted Contact Minutes. Hence, it may be seen that the Mathematics Department could have received as little as 24.6% of the resources available (based on actual contact minutes) or as much as 34.5% of the available resources (based on number of course sections). Similarly, if resource allocation had been based on total enrollment, the P. E. Department would have received half the available resources; application of the weighting factor reduced this percentage to 31.6%.

Thus far, it has been shown how basic units of output (from whatever program) may be used to allocate resources to particular organizational units (in this case, departments within a school). Now it remains to indicate how basic units of output as previously defined (contact minutes per course section) may be related to educational program breakdowns in order that the cost and output of such breakdown (e.g., General, College Prep, Honors, etc.) may be calculated. The ability to make this last

EXHIBIT IV

EXAMPLE OF
RESOURCE ALLOCATION

DEP'T	NUMBER OF COURSE-SECTIONS	TOTAL ENROLLMENT	ACTUAL CONTACT MINUTES	WEIGHT	ADJUSTED CONTACT MINUTES	EARNED RESOURCE PERCENTAGE
MATH	10 (34.5%)	200 (25%)	540,000 (24.6)	1.0	540,000	31.6%
HISTORY	6 (20.7%)	100 (12.5%)	300,000 (13.7)	1.2	360,000	21.0%
P. E.	8 (27.6%)	400 (50%)	1,080,000 (49.5)	0.5	540,000	31.6%
MUSIC	5 (17.1%)	100 (12.5%)	270,000 (12.2)	1.0	270,000	15.8%
TOTAL			2,190,000		1,710,000	100.0%

association turns upon the integration of the program budgeting structure with the PIS data base structure.

In answering this last question, consider Exhibits V and VI; we will use the Primary Program "Direct Instruction" as an example. Exhibit V shows how this program may be broken down according to a program budgeting structure to Section 4 of Algebra 1-2 taught on an interactive basis of a course in the Mathematics Department in the Honors Program at the secondary level. Exhibit V also indicates that the program would be evaluated ("program measures") at the lowest level, i.e., the Program Element "Section 4". Comparison of the program budgeting structure in Exhibit V with the Curriculum and Instruction Keys from the PIS data base items 5-11 shows them to be virtually identical. This coincidence is by design, not accident. Examination of the data in Exhibit VI also indicate that this data structure will facilitate identifying costs and program output at any level of disaggregation that may be desired. A more detailed examination of Exhibits V and VI is necessary in order to demonstrate this last point.

Careful examination of Exhibits V and VI will indicate one point of difference between them, namely that Program Component (Honors) in Exhibit V is missing in Exhibit VI. The breakdown into Honors, General, College Prep, etc. is missing in Exhibit VI because (as previously discussed) an individual course section is not always dedicated to a particular Program Component (e.g., Honors). Rather, the student may be said to pursue a particular Program Component (e.g., Honors, College Prep, etc.). Hence, the curriculum and instruction keys in Exhibit VI permit the identification of a particular course section to all the breakdowns within the Program Budgeting structure of an LEA except

Program Component. The Program Component breakdown within the PPBS structure must come from another source within the PIS, namely, the Student Personnel tree. This situation gives rise to the need for linking data in the Curriculum and Instruction tree with data in the Student Personnel tree. If such a linkage can be made, then a student in a particular Program Component can be associated with the appropriate information about a particular course and resource allocation can be accomplished.

Exhibit VII shows the function of the "Keys" for data linkage among trees. Four trees are presented in this exhibit, namely Curriculum and Instruction, Student Personnel, Staff Personnel, and Facilities. Under each tree are shown significant keys and some of the other data within the tree (e.g., demographic and test score data in the Student Personnel Tree). Examination of the dotted lines will indicate that the Curriculum and Instruction Tree can be linked to the Staff Tree by use of the teacher's social security number (SSN) so that each course section can be identified to a particular teacher. It may also be seen that the Curriculum and Instruction Tree may be linked to both the Staff Personnel Tree and the Student Personnel Tree by means of the grade/age level, course, instructional mode, and section. Thus, it may be seen that a student in a particular Program Component (e.g., Honors, General, College Prep) may be identified to every course section in which he is enrolled. Hence, for a given course section, the number of contact minutes for the students in any Program Component may be calculated and therefore, resource allocation and output measurements be made as indicated in Exhibit IV.

EXHIBIT V

EXAMPLES OF PROGRAM BUDGETING STRUCTURE

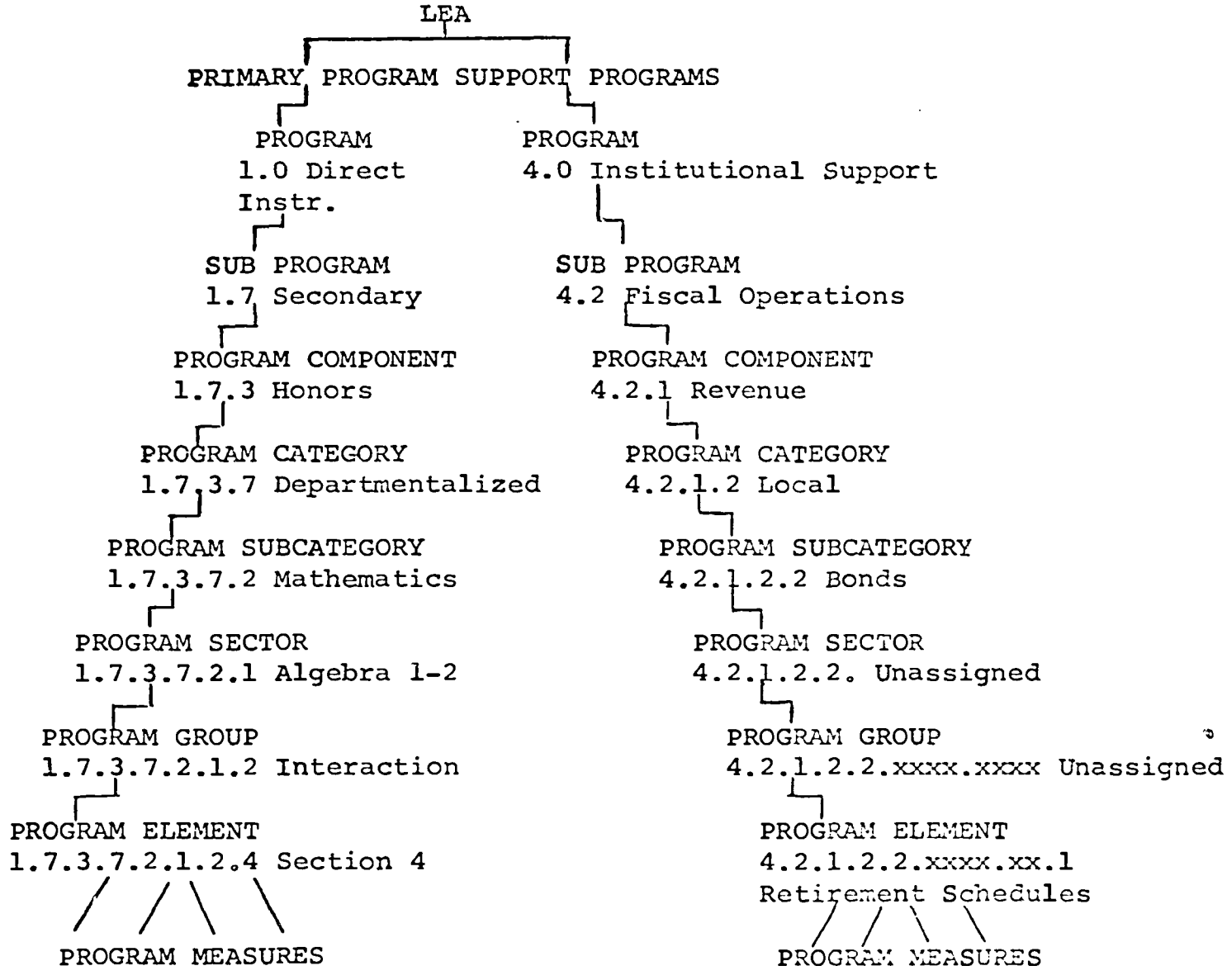


EXHIBIT VI

REVISED CURRICULUM AND INSTRUCTION KEYS

1. Agency: LEA, Joint Vocational School District, Parochial School District, YMCA, Parks and Recreation, etc.

2. Agency Component:

3. School or Site: Madison High School, Montgomery County Tech, etc.

4. Building: Academy, North Building, East Annex, Park View, Overlook, etc.

5. Program: Direct Instruction, Indirect Instructional Support, Student Support, Institutional Support, Independent Operations.

6. Age or Grade Level: Nursery School, Kindergarten, Grades 1-14, Adult, etc.

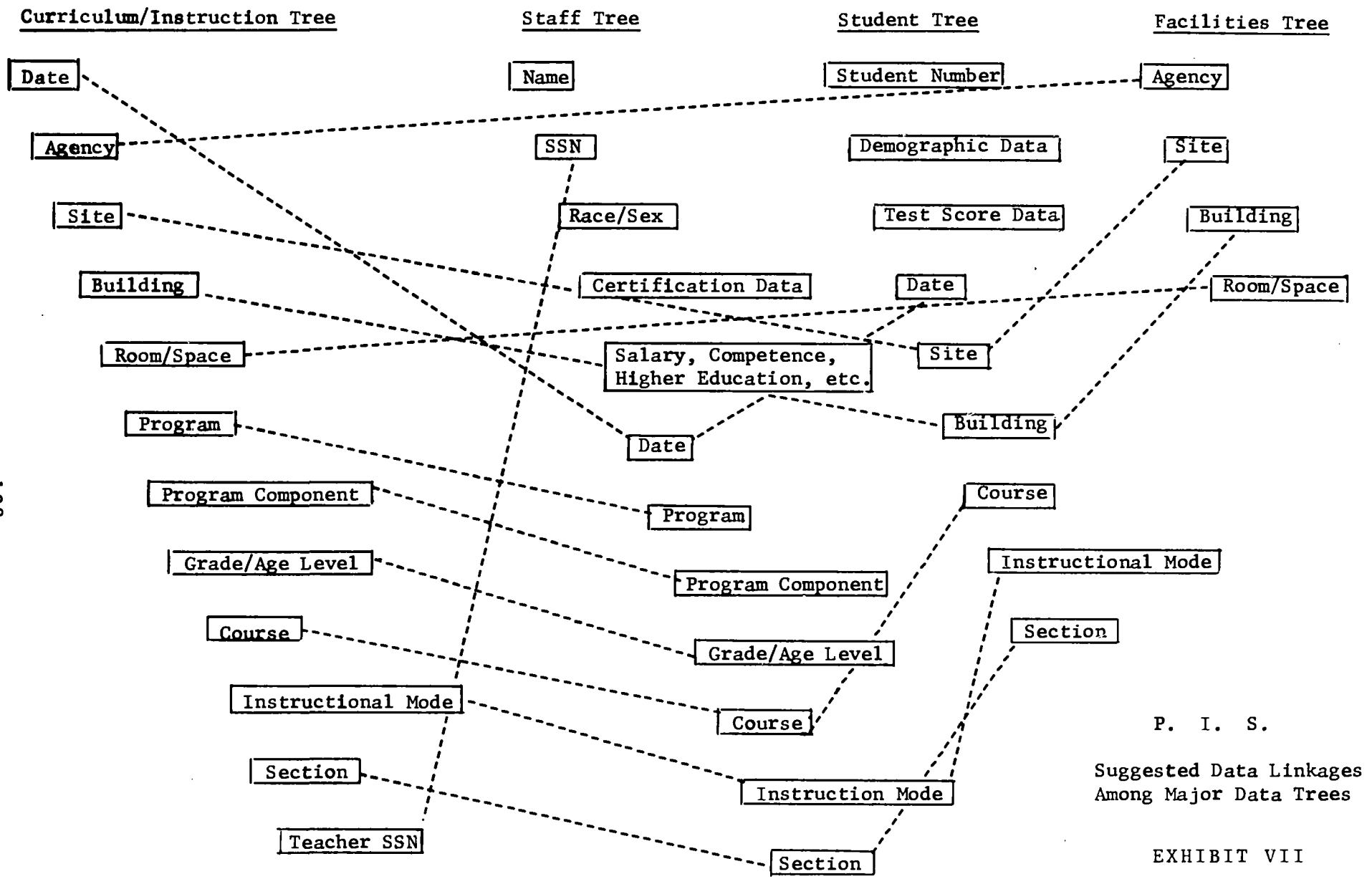
7. Instructional Organization: Departmentalized, Team Teaching, Non-graded Multi-age, etc.

8. Program Component: Mathematics, Science, Automotives, Nursing, Orthopedics, etc.

9. Course or Activity Title: Art 1, Geometry, French Club, Debate, Stock Market, Flower Arrangements, etc.

10. Instructional Mode: Action (laboratory), Interaction (seminar), Reaction (lecture-demonstration), Multimodel, etc.

11. Section: 1, 2, 3, etc.



P. I. S.

Suggested Data Linkages
Among Major Data Trees

EXHIBIT VII