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ABSTRACT

A description of the Oregon Total Information System (OTIS) project is presented. The purpose of the three year project was to improve education and its administration by implementing and demonstrating a total information system which could provide data processing services to school districts of varying sizes over a large geographic region. The report describes: 1) the context and scope of the program; 2) the administrative and student data processing services provided; 3) the organizational structure and flow of responsibility within OTIS; 4) the system's hardware and software; and 5) an evaluation of the project and a summary of benefits flowing from it. Nine appendixes present details on users, teleprocessing statistics, costs, user evaluations, evaluations by two outside consultants and recommendations submitted by three state agencies. (PB)

# OTIS
# TITLE III EVALUATION



MAY 1971

## CONTEXT

Locale Project OTIS, as its name implies, is a regional activity encompassing all of Oregon as its territory. Since the original goal of the project was to act as a demonstration study of how data processing could be provided to school districts in a large geographic setting no matter their size or location, a variety of types of communities were selected. Included in the original group were districts representing urban, suburban, and rural areas.*

| AREA | URBAN | RURAL | TOTAL |
|---|---|---|---|
| Lane County Population | 122,810 | 78,190 | 201,000 |
| Umatilla County Population | 22,490 | 21,010 | 43,500 |
| City of Bend Population | 13,200 | - | 13,200 |
| City of Coos Bay Population | 14,200 | - | 14,200 |
| Parkrose District Population | 20,500 | - | 20,500 |
| Total Project Area Population | 193,200 | 99,200 | 292,400 |
| Oregon State Population Distribution | 1,243,863 | 755,917 | 1,999,780 |
| Percent of Total Oregon Population Included in Project Area | 15.5 | 13.1 | 14.6 |

The five initial participating areas present a widely divergent

*Demographic figures taken from: (1) 1967-68 Oregon Blue Book; (2) A Demographic Analysis of the State of Oregon, 1965.

educational and cultural picture; yet, together their divergences closely resemble the larger state-wide situation.

Lane County, located in the mid-Willamette Valley, is Oregon's second largest metropolitan area and the fifth largest in the Pacific Northwest. It is a railway center, a rich agricultural area, the country's leading plywood producer, and the home of the University of Oregon. The urban population is located in the Eugene-Springfield area.

Umatilla County, located in the northeastern section of the state, is a region of authentic western character. The economy of the area depends largely on cattle ranching and wheat farming. The population is almost equally divided between rural and urban. The major community is Pendleton, the county seat. Blue Mountain Community College is located in Pendleton. About four per cent of the county's population is Indian with the Nez Perce the major tribe.

Bend is a picturesque community located on the central Oregon plateau at the base of the Cascade Mountains. It is the Deschutes county seat and site of Central Oregon Community College. Principal products of the area are lumber and cattle. It is a major recreation center for hunting, fishing, and skiing.

Coos Bay is located on one of the finest natural harbors on the Pacific coast. It is Oregon's major lumber shipping port as well

as a commercial fishing center. Southwestern Oregon Community College is located in Coos Bay.

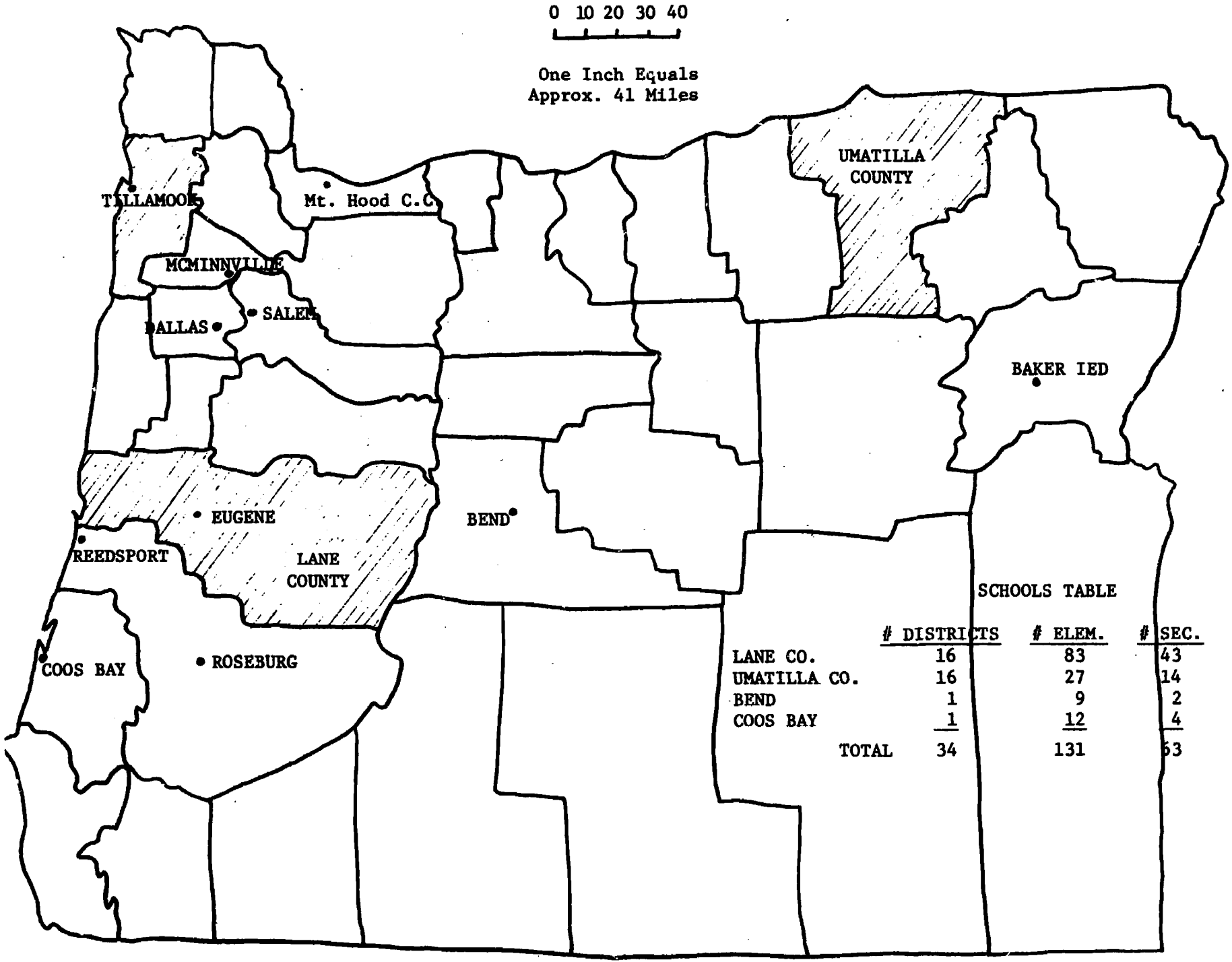
Parkrose District (Suburban Portland) is a suburban community located on the eastern edge of the city of Portland. It is a middle income residential district comprised of homes and shopping centers.

School Systems Served Initially OTIS served 28 school districts in six counties. Of those districts only one, Parkrose, dropped out of the project. Parkrose was faced with the problem (as other districts in the state face) of having to pay for two data processing systems and using only one since Multonomah County IED voted to provide data processing services to its schools by resolution.

Subsequently, during the three years of operation, other districts have been added to the OTIS network. The following is a list of present OTIS users with original district members indicated by an asterisk.

*Applegate District
*Athena District
Baker IED
Beaver District
*Bend District
*Bethel District
*Blachly District
Cloverdale District
*Coos Bay District
*Creswell District
Dallas District
*Echo District
*Eugene District
*Fern Ridge District
Hebo District
*Hermiston District
*Junction City District
*Lowell District
*Mapleton District
*Marcola District
*McKenzie District
McMinnville District
*Milton-Freewater District
*Milton-Freewater Union High
Mt. Hood Community College
Neah-Kan-Nie District
Nestucca District
Northwest Regional Laboratory
*Oakridge District
Oregon State Dept. of Education
*Pendleton District
*Pleasant Hill District
Reedsport District
Roseburg District
*Siuslaw District
*South Lane District
*Springfield District
Tillamook District
Tillamook IED
*Tum-A-Lum District
*Umapine District
*Weston District

# OREGON




SCHOOLS TABLE

| | # DISTRICTS | # ELEM. | # SEC. |
|---|---|---|---|
| LANE CO. | 16 | 83 | 43 |
| UMATILLA CO. | 16 | 27 | 14 |
| BEND | 1 | 9 | 2 |
| COOS BAY | 1 | 12 | 4 |
| TOTAL | 34 | 131 | 63 |

Needs Assessment Education is, in large measure, an information gathering and processing system. The interaction between teachers, students, parents, administrators, and classified school employees consumes enormous quantities of data and produces a great volume of information. The participants in this education process spend a large portion of their time collecting, storing, and retrieving information. Manual systems are no longer adequate to meet the needs of today's schools.

In order to effectively individualize instruction and guidance, complete and detailed information regarding each student's aptitudes, interests, goals, and progress is needed by teachers, counselors, and the student himself.

Administrators at the building and district levels need a broader base of information coupled with a system having summary and exception reporting capabilities to aid in decision making and to assist in communication with parents, community, and state and federal agencies.

Research and evaluation efforts to improve educational programs must be supported by large quantities of accurate and consistent data covering all aspects of school operation. Powerful statistical and analytical tools are required to make comprehensive evaluation. Simulation techniques need to be applied to educational models to provide greater predictability for education experimentation.

The needs described above were determined as a result of three activities. The Bureau of Education Research at the University of Oregon was contracted to conduct a state-wide survey of current school district information handling practices. This summary involved the collection of over 500 school data forms for 20 representative district.

In order to further determine the needs of individual districts and to keep them informed about progress of the project, OTIS staff members made more than 100 visitations in school throughout the state.

Selected members of the project staff visited leading educational data processing installations throughout the United States in order to verify the general educational and information processing needs.

In all contacts with local, state, and federal school officials, there was general agreement of the urgent and manifold need for a system to improve methods of handling and utilizing school information.

History The Oregon Total Information System, billed as the largest educational data processing system in the nation, officially became operational on May 1, 1968, after a 21-month planning phase. From the ideas of some far-sighted educators and an initial planning proposal, the system has developed into a working reality that is regarded by the U.S. Office of Education as a prototype of all total information systems. OTIS is funded through and administered by the Lane County Intermediate Education District. During its first year of operation, Project OTIS served 28 school districts in 6 counties throughout Oregon. Over 95,000 student records were entered in the Project's data banks along with school fiscal records and equipment inventories. For the year 1970-1971 the OTIS program serviced 62 participants including both school districts and IED offices.

A project of such scope and size does not spring to life overnight. Intensive planning, research, and development went into making OTIS an exemplary project that has received national interest.

Project OTIS was conceived by a number of local school administrators, working closely with the Lane Intermediate Education District and the Oregon State Department of Education. These educators recognized the increasing pressure on local and state education agencies for complete and current information. They saw that the then current methods of collecting, recording, and processing information on students, scheduling, and fiscal matters were simply not adequate. They realized that the cost of developing complete,

automated information systems for each of the school districts in Oregon would be prohibitive. And, they recognized that while the needs of a metropolitan district such as Eugene's differed greatly from those of a small rural district in Eastern Oregon, that each could benefit by utilizing the facilities of a central computer system. The answer seemed to lie in developing a new system -- statewide in scope, with resources jointly shared and activities coordinated. It was with these concerns in mind that the idea for OTIS was born.

The planning phase of the project began on August 1, 1966, with receipt of $257,437 in grant funds. In developing their proposal for a Title III E.S.E.A. planning grant, the OTIS planning force determined two broad goals:

1. to build and maintain a service organization that could provide Oregon schools with the hardware and technical staff necessary to meet their computer requirements, and
2. to develop with each user a plan that would assure individual district satisfaction as well as efficient and economical utilization of the OTIS hardware and staff.

The OTIS planning force felt that Oregon possessed attributes that would make it an ideal ground for a statewide informational system as did the U.S. Office of Education (Title III ESEA). 1) While it is the tenth largest state in the Union, Oregon has a relatively small population of just over two million. The 365 school districts vary greatly in both physical size and population. 2) Educators in

Oregon have long enjoyed a spirit of cooperation; and in an effort to equalize the educational opportunity for all children in the state, the various districts have interacted and cooperated through Intermediate Education Districts and other agencies. Oregon educators have also shown a willingness to innovate. 3) Another factor that made Oregon "ripe" for a system such as OTIS was the fact that there had been no previous proliferation of data processing systems. While there was great interest in computers and their applications, no large system has been developed.

It was determined that OTIS should offer to Oregon elementary and secondary schools services in all aspects of the educational system -- students, staff, curriculum, property, and finance. It was also decided that the system would be responsive to the needs and desires of the local school districts and would be controlled and supported by them.

## SCOPE OF THE PROGRAM

At present OTIS participants number 58 Oregon school districts as well as services for community colleges, IED offices, and state and federally funded agencies. The initial and continuing overall objective of the OTIS project is to improve education and its administration by implementing and demonstrating a data processing system utilizing a teleprocessing network to allow the use of one large computer to process files for a large number of school districts.

TELEPROCESSING NETWORK A teleprocessing system offers three major advantages over delivery type systems: increased speed, accuracy, and flexibility.

Speed

Any ground delivery type system presents a system lag. For example, if a school in Umatilla County is to have data delivered to a computer center in Eugene, it would take approximately two travel days. Assuming that the data could be logged in, scheduled for the computer, processed, and logged out all in one day, two more days would still be required to return the data to the sending school. The job would require at least five and possibly eight working days--one and one-half weeks--to determine if the data was processed correctly. If the data from Umatilla dealt with the enrollment of a student into class, waiting one week for the student's new schedule would be much too long to have the operation be much more than an extra record-keeping chore. For inquiry to information contained in the files, a response would be at best accurate up to the day

before the request was made. An answer would not be received until about a week after it was requested. Also the system would be relatively unresponsive to the individual school's request for special status reports since each request would require special manual attention at the computer center.

If system users are to have on file the kinds and volumes of information that they will need, the information system will have to provide more than an historic record-keeping system which offers data too late to be of any real value. Schools' information must be as accessible with OTIS as it currently is with the schools' manual method.

An additional advantage of a teleprocessing system over a delivery system is the ability to correct erroneous information. With a teleprocessing system, the user need only enter the correcting information and an immediate verification is printed as the change is made. The user knows immediately if a change must be re-entered. In a delivery system, however, at least five days transpire before confirmation is received. After five or more days have passed, it is doubtful that the user will remember to check to see if the error was corrected.

Accuracy

A teleprocessing system proves to be of significant value in maintaining accurate records in the system. As mentioned earlier, data errors on the OTIS files can be corrected over the terminal immediately upon discovery. The system is also able to coach the user,

that is, inform him what data should be entered and the type of format to be used.

Flexibility

The OTIS teleprocessing system is much more flexible than a standard computer system. Short reports and summaries can be requested over the terminal and will be handled completely by machine. This provides a major breakthrough in the use of online data. Few computer installations today are willing to handle a large volume of small reports. The time required for a computer center's staff to log in a request, set up the job, get the job on the computer, the results back from the computer, and log the results out makes this a completely uneconomical application because of the manual work required. In OTIS, however, the user need only communicate to the system over the terminal the report or summary desired. The computer then handles the preparation of the report and subsequently transmits the report back over the lines to the user's terminal.

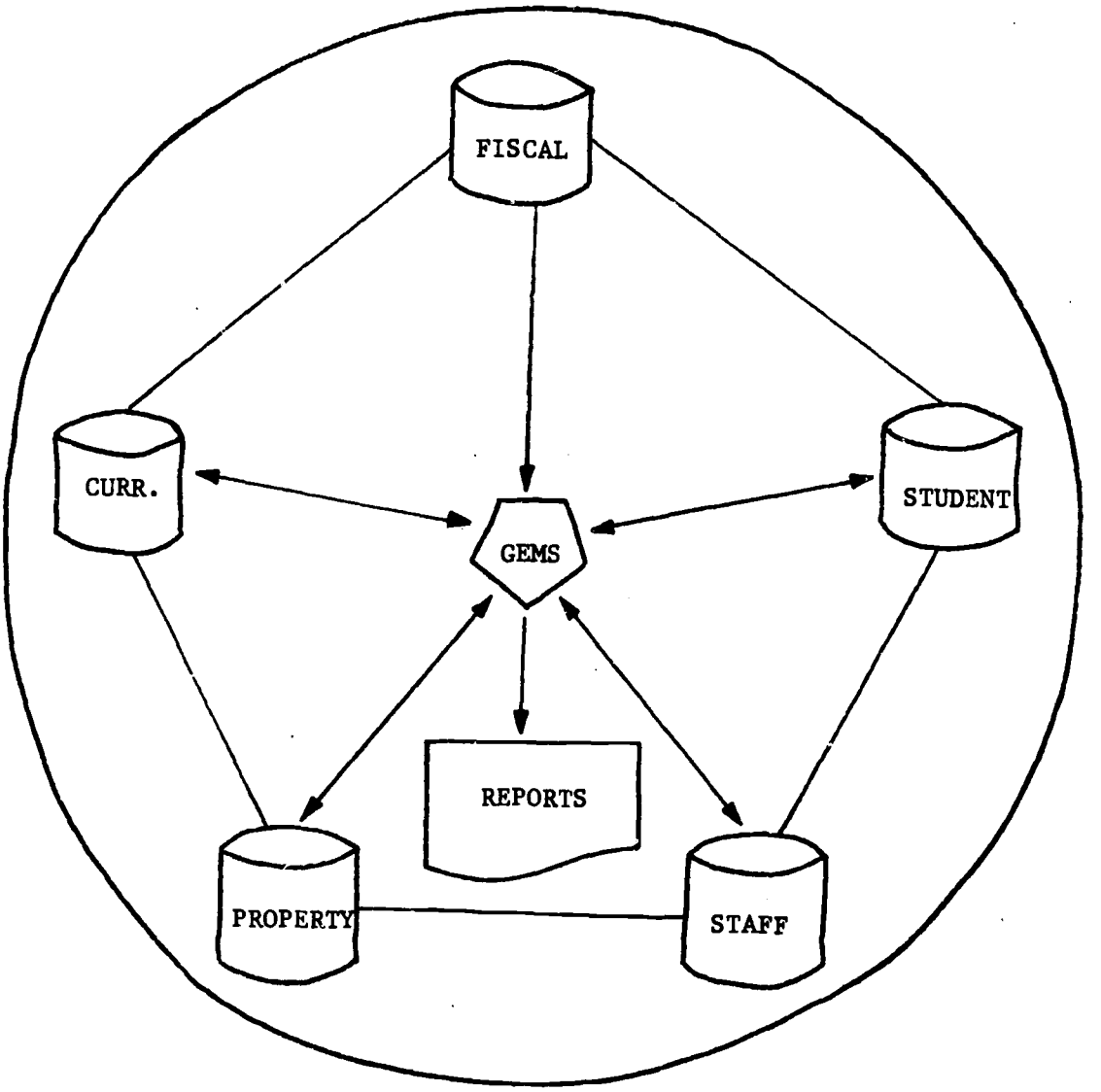
In general, the OTIS teleprocessing system will give the user the speed, accuracy, and flexibility of a computer system in his own building without the problems involved in creating, maintaining, or operating the system.

GEMS The Generalized Education Management System (GEMS) is the software heart of the OTIS project. Developed during the first year of funding it allows the collection of data independent files that are then combined to produce required reports. The design of

GEMS is oriented toward change and expansion. It is a generalized information management system that is controlled by variable parameters established by the user districts. By manipulating the parameters, input, output, files, segments, and fields can be added, deleted, or altered without reprogramming.

DATA BANK The data bank created for each participating school consists of five files of information. Detailed data concerning students, staff, curriculum, facilities, and finances is stored on random access devices in such a way as to permit information from any one of the files to be related to that from any other. Each file is subdivided into records, segments, and fields. For example, each record in the student file will pertain to one student. Each segment in one student's record will contain common data relating to specific applications (such as class schedule). Each field in this segment will contain one piece of the schedule (such as his first period class). This method of storing data allows for unlimited expansion and maximum flexibility because the number of fields, segments, and records will not be fixed, but will be individually specified according to each user district's needs. With this method, an item of information is easily accessible and needs to be stored in only one location in the data bank.

INTEGRATED DATA BANK



## ADMINISTRATIVE AND INSTRUCTIONAL SERVICES

A primary objective of the system was to provide business and student services in support of the administration and instruction involved in daily school operations. The following sections describe the services presently being provided. Due to the flexibility of the system (GEMS, the teleprocessing network, the integrated data bank), providing these services is merely the utilization of a set of multipurpose tools; services can be added, altered, and implemented easily and rapidly as changes to the design develop as a result of continual evaluation by OTIS analysts and user coordinators.

## BUSINESS SERVICES

General Ledger The fiscal accounting system for Oregon school districts is maintained in a manner consistent with generally accepted school accounting procedures and in conformity with the requirements of the State of Oregon.

The basis of the fiscal system is the general ledger. A general ledger is maintained for each fund within each district. The accounts within each ledger are classified as required in the State of Oregon's School Business Management No. 2, which was drawn from the U.S. Office of Education's Financial Accounting for Local and State School Systems.

Input is by terminal with processing at night. Each account is current as of the previous day's changes. Output reports consist of:

Vendor Checks
Financial Statements
General Ledger Transactions

Check Register
Paid Invoice List
Unpaid Invoice List
Outstanding Purchase Order List
Outstanding Purchase Order List by Account
Invoice List by Account Number
Daily Error List
Summation Report (quarterly reports)

Payroll The payroll system has been developed as an adjunct of the general ledger system. It may stand alone or operates as part of the total fiscal system.

Input is via terminal and consists of a master employee record, monthly changes to existing records, terminations, and time and adjustments. From this information the current payroll is computed and payroll checks, payroll register, and deduction registers are produced at OTIS central and delivered to user districts. Also produced from the payroll system are managerial reports such as:

1. Year-to-date reports
2. Post to general ledger
3. Payroll distribution reports
4. Tax reports for federal and local agencies
5. Special deduction reports such as investment and retirement witholdings.

Inventory Using whatever data the school district initially has, the school's inventory of equipment is built into an inventory file. Additions and deletions to the inventory are made via terminal. Users can inquire via terminal for the status and location of items of equipment, extract reports specific to their needs, or have total inventory reports printed by OTIS on a routine or request basis.

Personnel The personnel file contains information on both classified and certified district employees. From this file are extracted the necessary data to provide the state and county with district personnel information. Inquiries may be made via terminal as to status of any personnel and additional reports are available for district use such as:

Termination statistics
Personnel salary projections (for district budget board)
Annual leave report
Health card report
Retirement report
Appointment list

OTIS Automated Library System The OTIS Automated Library System is an automated total system for libraries. It has batch-processed and on-line acquisitions, processing, and cataloging ability with inquiry and report capabilities. The system provides:

1. Purchase Orders
2. Title-on-Order Report by district and by library
3. Processing Kit including catalog and shelf cards, book pocket, borrower's card, and spine label.
4. Updated Financial Reports
5. Invoice scan sheet preprinted with complete order information
6. Check and voucher for each vendor, monthly
7. Titles Received Report
8. Outstanding Purchase Orders Report and Claim Notices
9. Titles Cancelled Report
10. An annual Vendor Performance Report

If the district's inventory information is currently held in the library data bank, inventory records will be updated automatically; also, if the district is using the OTIS Fiscal program the proper account records will be updated automatically.

## STUDENT SERVICES

The Student Services System has been designed with the thought in mind of serving the daily administrative, accounting, and reporting needs of the individual school. The data bank content has been determined in order to provide the information necessary to insure individualized attention and support to people involved in the administration, instruction, counseling, and guidance of the individual student.

### Enrollment Reports

Locator Cards This report consists of 4 copies of 4 X 5 cards containing some 35 items of information for elementary plus a schedule for secondary students. A complete set of locators for each school is run twice a year. A new set of locators is also generated for a student when a change occurs in the data or schedule information.

Rosters This list is produced once a month for both elementary and secondary schools. The students are listed alphabetically within grade in each school. It contains the student name, grade, sex, enrollment status, and enrollment date. Only the students that are actively enrolled in the school are printed.

### Class Rosters

1. Temporary:

   This list is produced for secondary schools only. Each student is listed alphabetically within each course that the school is teaching. It is produced at the beginning of school on the temporary

class list form which allows for 4 weeks use.

2. Permanent:

   This list is the same as above except that the form is different and allows for the teacher's use the rest of the semester. It is produced twice a year -- at the beginning of school after the temporary class lists are printed and after the schools have had time to update their records but before the 4 weeks is over that the temporary rosters can handle. It is also generated at the beginning of 2nd semester.

Student Data Verification This is printed on a single copy continuous form data sheet. All the information on file is printed in the correct location on the data sheet and sent to the schools for verification. These data sheets are produced during the second semester and just prior to the beginning of school in the fall.

Mailing Labels These are gummed address labels, 2 labels side by side. The same name and address is printed on both labels. The student's Parent or Guardian name is used. These labels are produced on a request basis except at the beginning of the school year when 1 set of labels is produced for each school.

Directories There are 3 different directories involved. One list is alphabetic within school and is sent to the school. The second list is alphabetic within district and is sent to the district office and the district coordinator. These 2 lists are run twice a year, once during the 1st quarter and once during the 3rd quarter. The

third list is the same except it is sequenced on the Parent/Guardian name and phone number within district to group all children in one family together. This list is used for census purposes and is run on request. A maximum of two census reports may be produced per year.

Master Schedule Listing This list is produced once a month for all schools that have a master schedule entered in the data bank. The sequence is course, section, phase within school and lists all of the information entered for each course, section, and phase.

Locker Lists There are two lists involved; one is the list of locker numbers sequentially arranged showing the name, sex and grade of the student assigned to that locker. The other is a list showing the same information but arranged alphabetically (student name). These lists are run twice a year, once in the 1st quarter and once in the 3rd quarter.

Counselor List This list is run at the same time as the locker lists. The list contains the name, grade, and sex of each student. The sequence is alphabetic (student name) within counselor name.

Mark Reporting

Prior to the Grade Marking Cycle, each school is furnished verification rosters showing the students on the OTIS files that are enrolled in each course. A sufficient period of time is allotted for each school to update the files, dropping students who are no longer in

that course and adding students who are enrolled but do not appear on the verification roster. The updates may be accomplished either via the terminal or supplied forms.

The Grade Marking Cycle is initiated by preparing scanable Grade Marking sheets for each course to be graded. Each student enrolled in that course is listed on the scan sheet.

Output Reports consist of:

1. The Report Card. Two similar types of card format are available. The essential difference is that type one shows class period absence and the previous grading period mark as well as the current period. Both type cards show the courses taken, the marks recorded, the GPA, days absent and teacher name. The Report Card is a snap-out mailable form, addressed "To the parents of..."
2. A one-copy duplicate of the report card is produced for school use.

Other reports produced from the Mark Reporting program are:

1. A grade listing which is a year to date listing of the courses and grades for each student.
2. A listing of all special grades recorded, i.e., no grade given, failures, incomplete, conditional grades, etc. is printed in alphabetical sequence for the school.
3. Honor Roll - A numeric ranking of GPA for each grade level in the school from 4.00 to 0.00. The report is sequenced by GPA

from high to low for each school.

4. Grade analysis by teacher - a list of each teacher's courses showing the percentage of each type grade given.
5. Grade analysis by course - a list of each course showing the percentage of each grade given.
6. Permanent grade label - a gummed label prepared each semester showing courses and grades received for each student.

Standardized Test Scoring

A. Complete Test Scoring is offered for the following standardized tests:
   1. California Test of Mental Maturity-1963 Short Form, Levels 2, 3 and 4.
   2. Iowa Tests of Educational Development, 1964, Forms X-4 and Y-4, Class Period Version* and 1970, Forms X-5 and Y-5, Assessment Survey*.
   3. Stanford Achievement Batteries, 1964, Forms W and X. Intermediate I, Intermediate II and Advanced for Fall, Spring, or late Spring (past May 1st) testing.
   4. Gates - MacGinitie Reading Test, Survey D, E, and F (all forms). Covers grades 4-12.

B. The user receives:
   1. Pre-identified test answer sheets for each student on OTIS files in the grade to be tested.
   2. A sufficient supply of extra sheets to test new enrollees not yet on OTIS files.

*for Fall or Spring testing.

Teacher-Made Tests

OTIS provides standardized answer sheets for teacher use with teacher-made tests. These teacher-prepared tests are then scored by OTIS and the teacher is provided with the following information:

1. Response Record. This section lists the students by name, and gives their raw score, rank in the group, percentile rank, T-Score, and Stanine Score for the test given. It also gives a listing of the questions missed or omitted by each student. In addition the mean, median, and number of students taking the test is given.
2. Frequency Distribution. This section lists the raw scores for the test along with the number of students receiving that score. In addition, the corresponding T-Score, Percentile Rank, and Stanine Score is given for each raw score.
3. Item Analysis. This section lists each item showing the distribution of responses among the five options for each question and how many students omitted each question. This section also gives the number of correct responses, the number of incorrect responses, an Index of Discrimination, an Index of Difficulty, and a Point-Biseral Coefficient of Validity for each question.
4. Histogram of Raw Score Frequency. This section gives a graphic representation of the Raw Score Distribution for this test.
5. Raw Score Summary Statistics and Definitions. This section contains a summary of statistics used in other sections. The statistics given are: Number of Students, First Quartile,

Third Quartile, Median, Mean, Variance, Standard Deviation, Kuder-Richardson, Formula 20 Estimate of Reliability, and the Standard Error of Measurement. Also included in this is a descriptive definition of some of the terms used in the report.

Attendance

I. Data collection, verification and summary reports.

A. Weekly printing of Attendance Data Gathering and Collection Form.

1. Available alphabetically by school, by class, by home room teacher and by class period.

B. Output Reports.

1. Weekly Attendance Report.
2. Monthly Attendance Report.
3. Verification of Attendance (file dump).
4. State Quarterly Report.
   a. Pupil Personnel Accounting Report.
   b. Verification Report to support item (a).
   c. Error list of inconsistent data.

II. Attendance by Mark Reporting Periods.

A. Days absent and days present by each Report Card interval --primarily for elementary schools.

Student Scheduling

A. Loader Type - The loader scheduling program offered is designed to load students into class sections of a master schedule developed by the school administrator. Thus, the master

schedule can be appreciably expanded and the computer used as a tool for checking validity of information and for student tallies and conflict matrices. Three types of material are produced in this system.

A. Tally Reports (these reports are also produced for student forecasting).

   1. Course request tally.

      A list of each course offered, itemizing the count by grade level and sex for each course.

   2. A list of each student and his course requests.

   3. A list of each course and the names of each student requesting the course.

B. Conflict analysis reports.

   1. Singleton conflict matrix.

      A conflict matrix of the singleton courses, plus a list of each student's name and singleton requests.

   2. A singleton and doubleton conflict matrix.

C. Master schedule lists.

   1. A listing of the master schedule by course and selection number.

   2. A listing of the master schedule by each period in the school's day.

   3. A listing of the master schedule by teacher.

   4. A listing of the master schedule by room.

Simulation runs and schedule loading involve the following steps:

1. Schedule simulation runs.

A simulation run is a scheduling run in which sections are allowed to become out of balance so that the principal can tell where to move course sections to improve the master schedule. The updated master schedule and student conflicts are printed.

2. Normal schedule run.

   The loading of students into course sections, honoring course section balance. The updated master schedule, student conflicts and student schedules are printed.

3. The student schedules are formated in machine readable form which becomes input to the student data bank.

Generator Type Scheduling

Flexible modular schedules are created by these programs which are designed to allow the creation of the most complex master schedules desired by the school principal. The principal provides information about students, teachers, and rooms to approach the optimum master schedule for the school. Modular Schedule Generation is contracted for through Educational Coordinates of Palo Alto.

Reports are produced to assist the principal in evaluating the progress made by the program and the principal at each step in the master schedules development. The final output consists of a Master Schedule, class lists, student, teacher and room schedules.

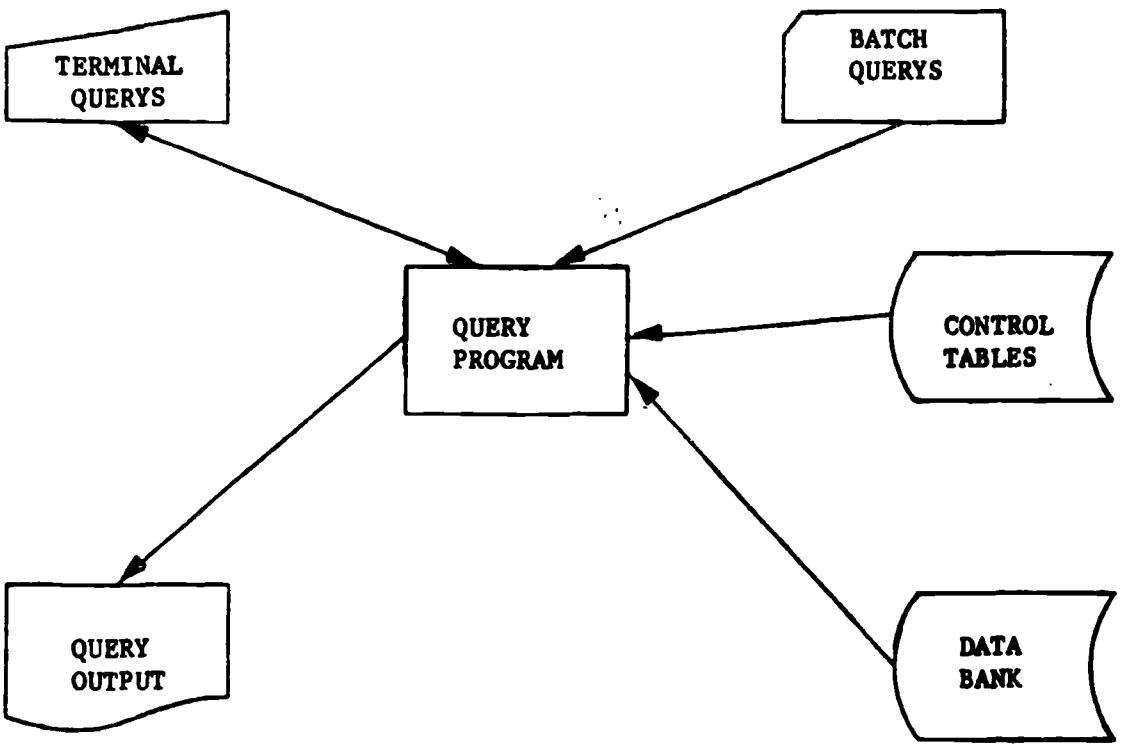
Problem Solving IBM's Interactive Terminal Facility (ITF) is a time sharing system that operates concurrently with the OTIS GEMS system via teleprocessing during the school day. The language available is Basic and IBM's PL/1. This system allows students, using a terminal, to interact with a computer, write, stop, and recall their own computer programs. Districts can also write or obtain programs to be available for students through ITF problem solving.

OIAS Bruce McKinlay, Project Director Occupational Information Access System (OIAS), University of Oregon, has developed a program which provides a terminal interaction with students interested in gathering information on occupations based on their own individual strengths and interests. OTIS is capable of providing this service to user schools via teleprocessing concurrently with other programs operating during the school day.

Health Report Preprinted forms are provided the school nurse to gather student health information. A letter to parents is generated as a reminder if there is a need for innoculations or attention to a particular health problem. Summary statistics are also provided.

QUERY One of the primary objectives of the OTIS Project was the application of the power of a large computer to the problems of education management. It was envisioned that through the development of separate files of information and the GEMS software system, new reports and statistical analyses could be produced by entering

QUERY


TERMINAL QUERYS
BATCH QUERYS
QUERY PROGRAM
CONTROL TABLES
QUERY OUTPUT
DATA BANK

the requested report content and format as well as the report parameters via terminal and having an immediate, one-time report produced. The QUERY program provides such a tool.

The QUERY system provides a user-generated report without interaction with an analyst or programmer.

Using a simplified language an administrator keys in the format and the qualifications to the parameters of the report. The computer then searches the indicated file, assembles the information sorts and prints the report over the user's manual. (See example)

## OTIS ADMINISTRATION

While OTIS is funded through and is a part of the Lane County IED, it has an advisory board made up of representatives primarily from user districts (see page 36). The director of OTIS, an Oregon school administrator with some twenty-nine years experience in school district administration, is responsible to the Lane County IED but is advised along general objective lines by the advisory board.

### OTIS Coordination

The need for good communication between human beings in any endeavor is always present regardless of the scope of that endeavor. In a project the size and complexity of the Oregon Total Information System, good communication is absolutely essential. The large numbers of people involved make it necessary to plan very carefully. Plans must be designed to insure good communications between the individual district personnel and the OTIS center.

Unique training needs arise from terminal usage and the technical knowledge required for their proper use. Controlling the accuracy of data input, understanding and utilization of the system output, and knowledge concerning computer capabilities are just some of the areas requiring special attention.

### Coordination Structure

In order to satisfy communication needs, OTIS has established a

central organizational branch devoted to coordination, evaluation, and dissemination. Field coordinators are added to the staff as the number of participating districts increase. Their primary function is to instruct system users, to receive suggestions which will facilitate system improvements, to recommend modifications, to publish manuals, and to engage in any and all activities intended to keep the communication lines open and flowing freely.

A coordination network involving many school district personnel has been formed. Each district coordinator works with building coordinators who in turn work with teachers and administrators for each school building. The philosphy behind the extensive involvement of district personnel rests with the fact that the system being developed belongs to and serves its participants. It cannot function independently from school personnel but requires that they fully appreciate their role. Since all data originates in the districts, the responsibility for its accuracy falls there. Since system output is designed primarily for district use, constant vigilance must be maintained to assure quality and provide feedback to the computer center when difficulties arise. It is also imperative that school personnel be thoroughly instructed on the use and interpretation of printed reports.

The coordination structure shown on page 37 is designed to provide open lines of communication. It is important to recognize that the flow of communication is both to and from the districts and the OTIS center.

Responsibilities of the District Coordinator

The key to the success of a district's participation in OTIS is its coordinator. In order to participate, a district must employ a full- or part-time coordinator. His qualifications include: Administrative experience (administrative and teaching credentials preferred). Orderly and logical mind, a problem solver. Works well with people. An interest in educational data processing. A person the district would select for promotion.

His responsibilities include: The Data Processing Coordinator will be the contact man in his district for all data processing activities. In this capacity he will:

1. Derive his authority directly from the superintendent of his district.
2. Serve as the interface with OTIS staff.
3. Attend all required coordinator meetings.
4. Establish the communication network for DP in his district.
5. Assume personal responsibility for the DP activities in his district.
6. Be responsible for establishing and maintaining schedules and quality in his district.
7. Be responsible for identifying, planning, and presenting all required data processing in-service training in his district.

Monthly meetings are held between district coordinators and OTIS staff members. These meetings act not only to convey information to school districts but as training sessions on technical aspects

of importance to the district, feed-back on problems or potential-problem areas, and as a sounding board for potential new applications.

Coordinators, working with OTIS Field Service representatives, or alone, promote inservice training for district staff members involved in data collection and dissemination.

## OTIS STAFF

OTIS is primarily a data processing organization serving educational organizations. Through training, hiring of employees with educational backgrounds, and interaction between OTIS staff members and users, the organization has become highly sophisticated not only in data processing applications but in the understanding of unique school problems and the application of computer technology to educational problems where such applications are appropriate.

Early programming and analytical work involved considerable interaction between school administrators and OTIS staff in shaping the format and context of reports. Presently OTIS has reached a level of program development where its primary programming emphasis is one of maintenance and refinement of existing programs.

Contained within the OTIS staff are Field Representatives, whose primary responsibility is dealing directly with the field (whether district coordinator, staff, or administrators) to improve communications, solve problems, and train new users.

# OTIS ADVISORY BOARD

Walt Commons, Superintendent
Jackson County I.E.D.
1133 S. Riverside
Medford, Oregon 97501
Phone 779-5510

Tom Calkins, Superintendent
Josephine County Unit
706 N. W. A Street
Grants Pass, Oregon 97526
Phone 476-7721

John Crowley, Superintendent
Coos Bay School District #9
P. O. Box 509
Coos Bay, Oregon 97420
Phone 267-3104

Bill Dahlien, Superintendent
Tillamook School District #9
P. O. Box 469
Tillamook, Oregon 97141
Phone 842-4415

R. E. Jewell, Superintendent
Bend School District #1
Foot of Broadway
Bend, Oregon 97701
Phone 382-8221

Dr. William C. Jones, Superintendent
Lane County I.E.D.
748 Pearl Street
Eugene, Oregon 97401
Phone 342-5576

Claude C. Martin, Superintendent
Neah-Kan-Nie School District #56
P. O. Box 15
Rockaway, Oregon 97136
Phone 355-2222

Raymond A. Mullen, Superintendent
South Lane School District #45J
103 S. 5th Street
Cottage Grove, Oregon 97424
Phone 942-3381

Donald Murray, Superintendent
Pilot Rock School District #2
P. O. Box BB
Pilot Rock, Oregon 97868

Vernon Osborn, Deputy Superintendent
State Board of Education
942 Lancaster Drive N. E.
North Building
Salem, Oregon 97310
Phone 364-2171 X2758

Ellis H. Neal, Superintendent
Pendleton School District #16
1207 S. W. Frazer Avenue
Pendleton, Oregon 97801
Phone 2766711

Dr. Millard Pond, Superintendent
Eugene School District #4
200 North Monroe
Eugene, Oregon 97402
Phone 342-5611

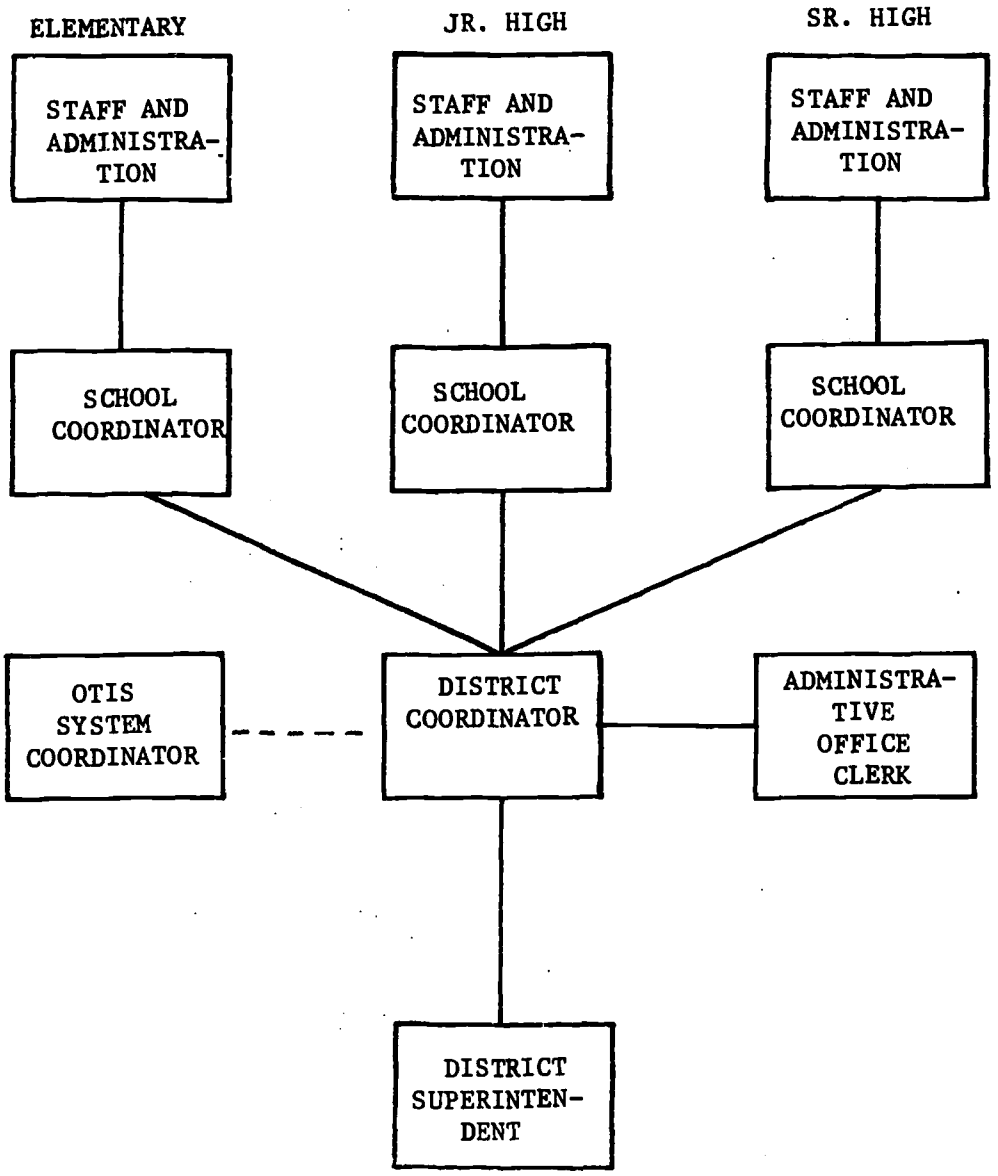
Tom Rigby, Executive Secretary of
School Boards
Room 216
Education Building
University of Oregon
Eugene, Oregon 97403
Phone 342-1411 X1288

R. J. Schwalenberg, Superintendent
McMinnville School District #40
1500 N. Baker Street
McMinnville, Oregon 97128
Phone 472-4101

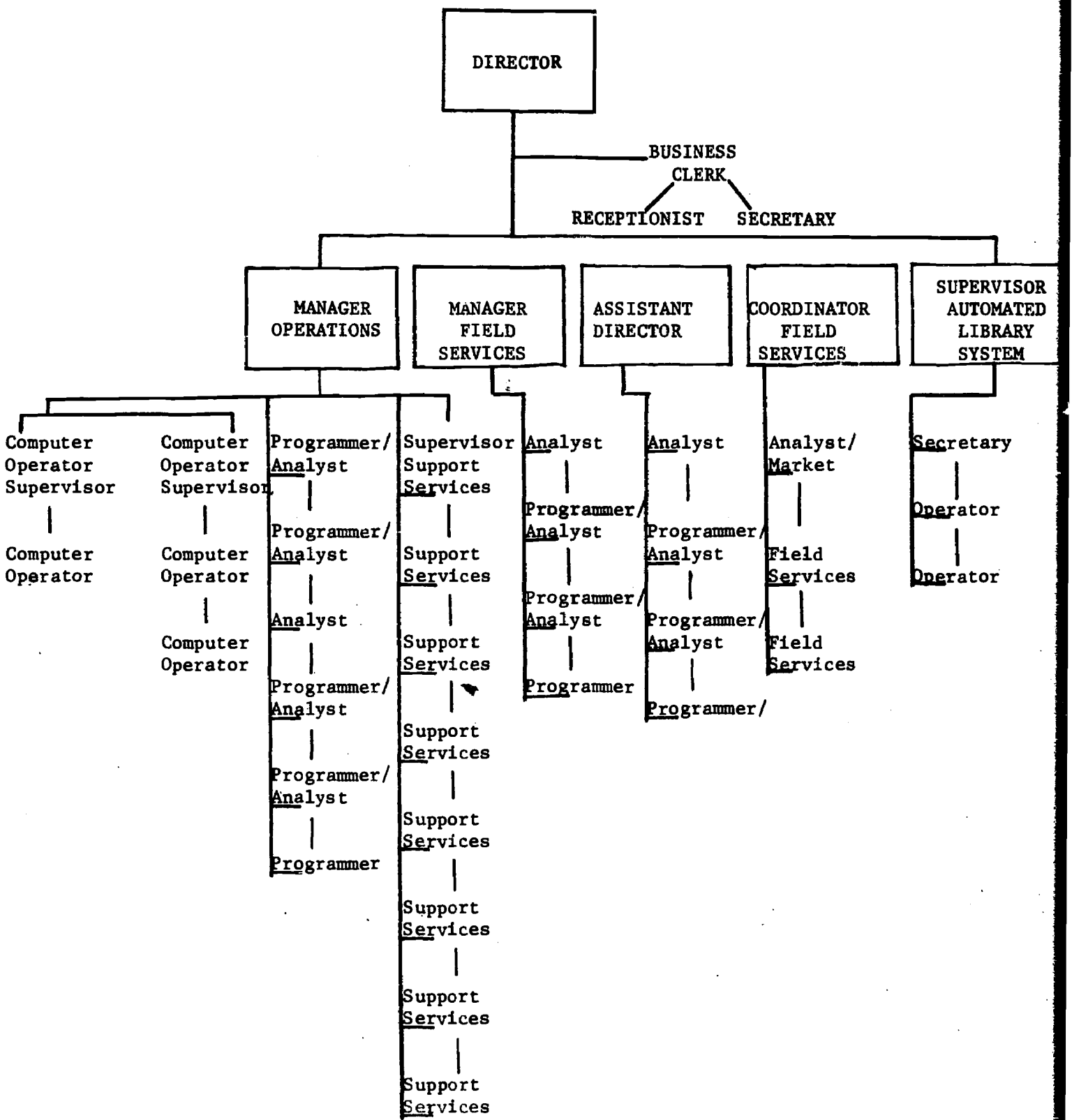
Richard Scott, Superintendent
Fern Ridge School District #28J
Elmira, Oregon 97437
Phone 935-2253

Ken Stanhope, Superintendent
Umatilla County I.E.D.
404 S. E. Dorion Street
Box 38
Pendleton, Oregon 97801
Phone 276-6616

## DISTRICT COORDINATION STRUCTURE



O T I S


DIRECTOR
BUSINESS CLERK
RECEPTIONIST
SECRETARY
MANAGER OPERATIONS
MANAGER FIELD SERVICES
ASSISTANT DIRECTOR
COORDINATOR FIELD SERVICES
SUPERVISOR AUTOMATED LIBRARY SYSTEM
Computer Operator Supervisor
Computer Operator
Computer Operator Supervisor
Computer Operator
Computer Operator
Programmer/ Analyst
Programmer/ Analyst
Analyst
Programmer/ Analyst
Programmer/ Analyst
Programmer
Supervisor Support Services
Support Services
Support Services
Support Services
Support Services
Support Services
Support Services
Analyst
Programmer/ Analyst
Programmer/ Analyst
Programmer
Analyst
Programmer/ Analyst
Programmer/ Analyst
Programmer/
Analyst/ Market
Field Services
Field Services
Secretary
Operator
Operator

## OTIS SYSTEM SOFTWARE & HARDWARE CONFIGURATION

Operating System: OTIS operates under the full OS/360-MVT Control Program which provides for the concurrent scheduling of a variable number of jobs in a dynamic environment. Jobs in an OS/360 multiprogramming environment are protected from alteration by other user programs, systems programs, or input/output operations through OS/360 support of the storage protection feature. Our full multiprogramming support is designed to increase system through-put and decrease job turn-around time while optimizing the use of the system resources.

Language Processors: A wide range of language compilers and assemblers that contain powerful diagnostic capabilities is available on the OTIS system. These include PL/1, COBOL, FORTRAN, RPG, ALGOL, and Assembler Language.

Teleprocessing: Remote terminal controls and data transmission requirements can be handled simultaneously with other processing through the multiprogramming facilities of OS/360. Our use of the Queued Telecommunications Access Method (QTAM) to construct telecommunications service provides the bonus facilities to perform error recovery, error logging, on-line terminal tests, and other functions that increase system availability.

Hardware Configuration: An IBM S/360 Model 50 with attached 2361 Core Storage, Model 1, provides 1,179,648 bytes of directly addressable core memory. This is one of the largest in the North-

west and allows us to run jobs requiring extremely large amounts of core storage. Input/output devices include:

4 - 2400 Series Magnetic Tape Units - (9 track R/W heads, 800 BPI recording density.)

2 - 2314 Direct Access Storage Facilities - (Each stores 233,400,000 bytes or 466,800,000 packed digits on 8 removable disk packs.)

1 - 2321 Data Cell Drive, Model 1 - (Capacity of 400 million bytes or 800 million packed digits on-line.)

1 - 2540 Card Read Punch - (Reads 1000 cards per minute, punches 300 cards per minute.)

1 - 1403 Printer, Model N1 - (Line width 132 print positions, print rate 1,100 lines per minute.)

For telecommunications, users can choose either IBM 2740 Communications Terminals or TTY-33 Teletype Terminals as their needs dictate.

## OBJECTIVES

The educational goal of Project OTIS is described in the first sentence of the original title proposed. "The purpose of the three year operational phase described herein is to improve education and its administration by implementing and demonstrating the Oregon Total Information System". A demonstration project is primarily concerned with process rather than product evaluation. Several methods have been utilized to describe OTIS activities and some attempts have been made to consider the product as judged by users of the system.

### Performance Objectives

Performance objectives grew out of needs assessment and reflect

activities aimed at satisfying ascertained needs.

A. To improve educational opportunities by building a total information service which will provide data and services for better administration and will aid in the individualization of instruction.

B. To develop a generalized computer system which will:

   1. Create data banks in the five areas of source information (student, staff, curriculum, property, finance).

   2. Process a variety of applications under a single programmed control system (GEMS) having analytical capabilities for comparing, correlating, manipulating and summarizing the information stored in the data bank.

   3. Provide for system expansion and revision without reprogramming.

   4. Produce printed reports according to district specifications on a summary or detailed level or by exception.

C. Development of a tele-communication network linking participating schools to one large computer.

D. Development of a coordination system linking schools and OTIS for mutual communication and instruction.

## SUMMARY

If OTIS can be judged only on the attainment of the original goals set forth in the Title III proposal then it must be pronounced a success for in fact all the programs and systems originally proposed are presently in operation. In looking beyond the simple fact of operation it is important to also consider the quality of the work being done as well as future activities of OTIS.

OTIS questionnaires have generally returned an average to above average response to questions concerning the quality of service. While in many instances the only basis for user comparison of OTIS data processing services have been with manual operations or partially contracted services, the users seem to indicate that the OTIS services are more efficient and wider ranging than those services that have been available to them in the past and that OTIS services are continuing to improve in their estimation.

As an educational data processing center the success of OTIS rests on several concepts that have proven viable.

1. Shared resources by many school districts can provide the computer services normally available only to very large organizations.
2. Total educational data processing needs can be provided from one centeralized production point.
3. The teleprocessing concept is acceptable to school personnel and proves to be more accurate, faster, and more flexible than batch operations.

4. The GEMS concept entailing separate files of information which are manipulated by the computer through a generalized software system has proven capable of handling large numbers of daily transactions. Both business and student service activities are capable of being handled simultaneously, allowing the user to add, delete, alter or inquire to any of his online files with a terminal response time of less than 10 seconds.
5. The development of Query is a unique service to Oregon schools and perhaps to the rest of the nation. For the first time the educator can query his files for information tailored to his own particular needs. The Query program avoids the problem of a one-time report in a batch mode which proves almost prohibitive since it normally must include login, logout time, programmer time, debugging time, and travel time to and from the computer center.

Further activities of OTIS that should increase its efficiency or service to users are presently underway and in some instances nearing production status.

1. GEMS is being rewritten to increase its efficiency which in turn means faster terminal response time.
2. Using the IBM problem solving package, OTIS will offer problem solving to its user schools as an additional service during the 1971-72 school year. By utilizing the existing terminal network, problem solving will be available to schools that could normally not afford dedicated problem solving terminals and lines. Instead a terminal command will switch their terminal

from business or student services to a problem solving mode.

3. OIAS, piloted this year with three user schools, will also be available using the same terminal arrangement as problem solving, that is by a terminal command the existing terminal in the building can also be made available for the Occupational Information Access program.

Certain additional benefits have accrued to Oregon education from the OTIS project that were not contemplated in most instances by the original proposal.

1. Under a purchase agreement the Lane County IED is acquiring data processing equipment worth $968,881. In the present fiscal year it will have an equity of $177,628 in equipment.
2. The Lane County IED as well as the other OTIS users has a highly trained staff of data processors available to them for their unique projects.
3. OTIS users have received training in data processing for both employees and students and have become much more sophisticated in their understanding and use of data processing and its applications.
4. OTIS has tended to increase cooperation among school personnel both at the county level and on a state-wide basis as well. It encourages a cooperative approach to county-wide activities such as testing, for example, as well as a sharing of knowledge about programs entailing data processing support.

5. It has tended toward more standardization of the kinds of information stored, types of reports, and report format.
6. It has increased the application of better, more uniform methods of fiscal accounting and reporting procedures.

The following reports are included to denote the amount of usage of either various programs specified by school districts as necessary data processing activities, usage of the teleprocessing network, or development of the generalized computer system.

1. Survey of users - programs.
2. Teleprocessing statistics for 1970-71.
3. Comparison of OTIS operating costs and service performed 1968-69 to 1971-72.
4. User evaluation.
5. Touche, Ross, Bailey and Smart evaluation.
6. State Department Recommendation.
7. Advisory Board Recommendations.
8. Peat, Marwick, Mitchell & Co. evaluation.
9. Report by the State Department Advisory Committee on Data Processing.

## USER ACTIVITIES

| Program | Number |
|---|---|
| Fiscal | 20 Districts |
| Payroll | 33 Districts |
| Inventory | 6 Districts |
| Enrollment | 214 Schools |
| Attendance | 193 Schools |
| Mark Reporting | 64 Schools |
| Testing | 59,002 Students scored 1970-71 school year |
| Census | 36 Districts |
| 3S Scheduling | 75 Schools |
| EC Scheduling | 9 Schools |
| Problem Solving | 2 Schools |
| Automated Library System | 4 Districts |
| OIAS | 3 Schools |
| Personnel | 2 Districts |

## OTIS TERMINAL TRANSACTIONS 1970-71

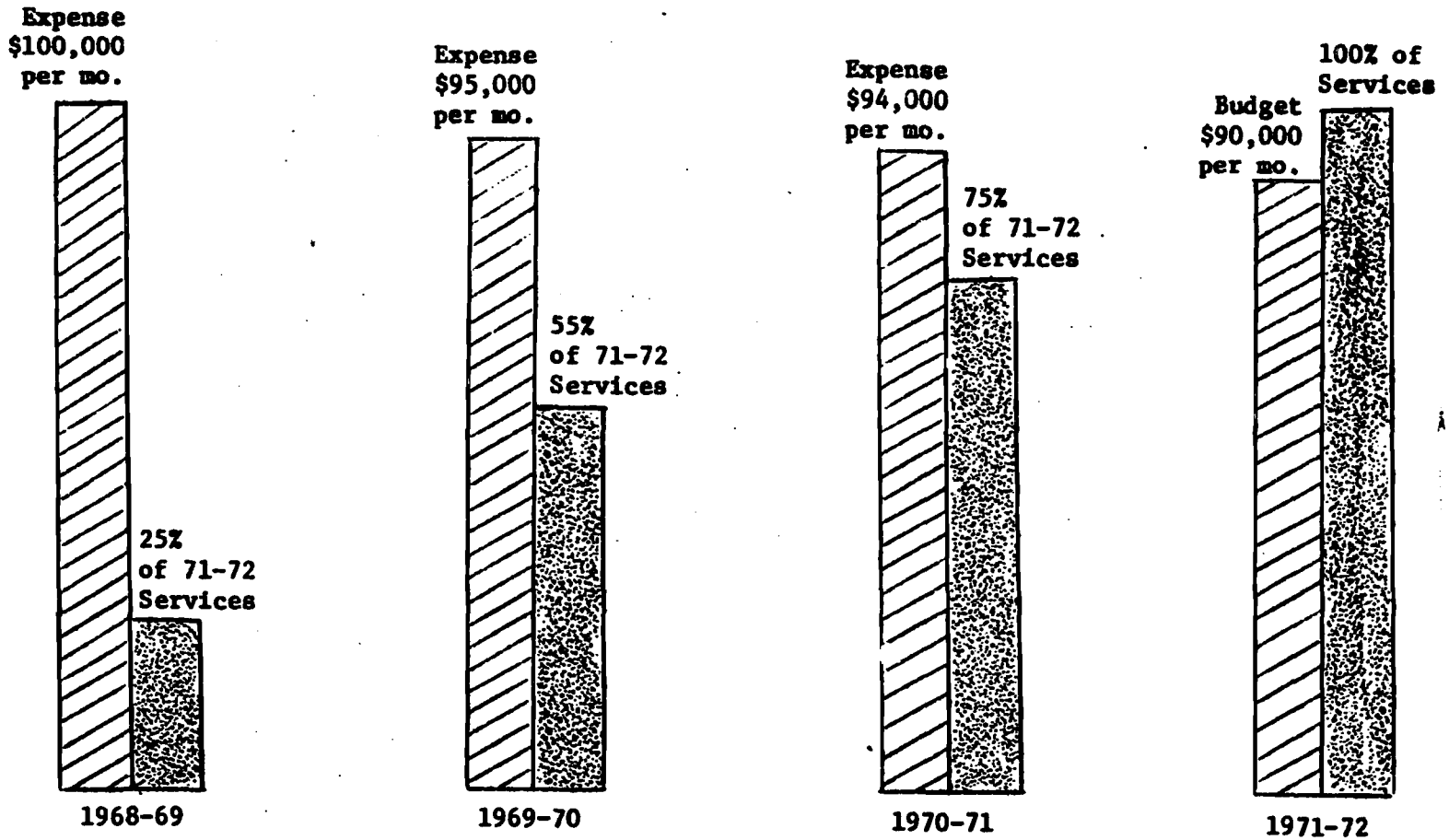
| Terminal Location | Sept 1970 | Oct 1970 | Nov 1970 | Dec 1970 | Jan 1971 | Feb 1971 | Mar 1971 |
|---|---|---|---|---|---|---|---|
| Baker IED | 1476 | 889 | 638 | 493 | 274 | 464 | 253 |
| Bend DA | 4298 | 3186 | 2569 | 1604 | 2123 | 1708 | 1741 |
| Bend DO | 2091 | 1187 | 1627 | 1911 | 1438 | 2473 | 1332 |
| Bend Hi | 2511 | 5381 | 2497 | 1912 | 1280 | 3729 | 2467 |
| Bend Jr | 4233 | 3309 | 1550 | 1749 | 1137 | 1862 | 1656 |
| Bethel DO | 2338 | 2840 | 3097 | 2621 | 1573 | 2547 | 2346 |
| Bethel IM | 2504 | 2046 | 2866 | 3772 | 1657 | 2187 | 2192 |
| Blossom Gulch El | 4635 | 4107 | 5023 | 3110 | 1749 | 3444 | 2434 |
| Briggs Jr | 924 | 1336 | 758 | 744 | 894 | 1090 | 921 |
| Cal Young Jr | 628 | 618 | 477 | 383 | 296 | 361 | 286 |
| Cascade Jr | 1012 | 1241 | 1134 | 631 | 563 | 880 | 869 |
| Churchhill Hi | 2495 | 1602 | 1398 | 646 | 1396 | 11300 | 6554 |
| Colin Kelly Jr | 1320 | 1155 | 737 | 781 | 666 | 1086 | 775 |
| Coos DO | 2265 | 2660 | 2673 | 1917 | 1057 | 2219 | 2831 |
| Creole Jr | 237 | 486 | 499 | 707 | 756 | 464 | 475 |
| Crow DO | 1117 | 858 | 415 | 753 | 154 | 431 | 310 |
| Crow Hi | 385 | 172 | 40 | 80 | 60 | 223 | 90 |
| Creswell DO | 1513 | 574 | 1309 | 847 | 313 | 716 | 995 |
| Creswell Hi | 1340 | 1029 | 1198 | 700 | 403 | 956 | 702 |
| Cottage Grove DO | 4029 | 3699 | 4146 | 2599 | 1862 | 2843 | 1980 |
| Cottage Grove Hi | 1171 | 1913 | 1583 | 932 | 1442 | 1288 | 647 |
| Dallas Hi | 2229 | 1221 | 1102 | 976 | 1498 | 1101 | 809 |
| Elmira Hi | 2116 | 2081 | 1306 | 1967 | 452 | 645 | 481 |
| Eugene DO1 | 5423 | 5421 | 5020 | 5574 | 2556 | 4346 | 4311 |
| Eugene DO2 | 3843 | 5692 | 4893 | 5507 | 3223 | 4192 | 5742 |
| Eugene DO3 | 2768 | 3909 | 4174 | 4947 | 3982 | 3983 | 6598 |

| Terminal Location | Sept 1970 | Oct 1970 | Nov 1970 | Dec 1970 | Jan 1971 | Feb 1971 | Mar 1971 |
|---|---|---|---|---|---|---|---|
| Eugene DO4 | 4587 | 4442 | 4571 | 8462 | 4762 | 3321 | 8589 |
| Eugene IED | 1751 | 1564 | 1420 | 1775 | 1595 | 2879 | 2255 |
| Fern Ridge DO | 1936 | 1642 | 1173 | 1147 | 900 | 1196 | 1133 |
| Fern Ridge Jr | 1191 | 1189 | 659 | 558 | 543 | 1033 | 994 |
| Florence DO | 687 | 1579 | 1706 | 1182 | 1249 | 1427 | 985 |
| Hermiston DO | 1565 | 2350 | 2601 | 1877 | 1135 | 1306 | 892 |
| Hermiston Hi | 1380 | 794 | 514 | 582 | 522 | 530 | 823 |
| Hermiston Jr | 857 | 1750 | 1024 | 461 | 596 | 826 | 908 |
| Hamlin Jr | 1481 | 1213 | 733 | 1162 | 1665 | 2084 | 787 |
| Junction City DO | 925 | 293 | 169 | 497 | 45 | 492 | 395 |
| Junction City Hi | 1648 | 1347 | 1218 | 819 | 694 | 1170 | 707 |
| Junction City Jr | 1959 | 1878 | 2129 | 829 | 531 | 810 | 954 |
| Jefferson Jr | 1392 | 2604 | 1523 | 1793 | 899 | 2055 | 1504 |
| Kennedy Jr | 899 | 663 | 718 | 808 | 906 | 763 | 577 |
| Leads 1 | 3575 | 5903 | 6131 | 8649 | 5656 | 6830 | 6615 |
| Leads 2 | 607 | 2246 | 811 | 3032 | 2790 | 316 | 2075 |
| Leads 4 | 3034 | 2523 | 51 | 3358 | 3936 | 5869 | 5913 |
| Leads 5 | 3006 | 1584 | 3374 | 2 | -- | -- | -- |
| Leads 6 | 1008 | 518 | 3151 | 2918 | 3226 | 6114 | 6442 |
| Leads 7 | 2469 | 1163 | 1904 | 8 | 2437 | -- | -- |
| Leads 8 | 2043 | 3037 | 1092 | 28 | 3167 | -- | -- |
| Leads 9 | 3380 | 2355 | 1027 | -- | -- | -- | -- |
| Lincoln Jr | 1032 | 697 | 550 | 593 | 572 | 718 | 612 |
| Lowell DO | 737 | 1383 | 868 | 685 | 324 | 497 | 496 |
| McEwen | 1497 | 890 | 1170 | 969 | 429 | 388 | 717 |
| McMinnville Hi | 2792 | 2805 | 1977 | 2001 | 1468 | 3572 | 1796 |
| McMinnville Jr | 1516 | 1781 | 1242 | 1305 | 780 | 1557 | 1278 |
| McCune | 974 | 2133 | 1953 | 1360 | 474 | 533 | 592 |
| Madison Jr | 1397 | 122 | 814 | 863 | 1036 | 1497 | 1373 |

| Terminal Location | Sept 1970 | Oct 1970 | Nov 1970 | Dec 1970 | Jan 1971 | Feb 1971 | Mar 1971 |
|---|---|---|---|---|---|---|---|
| Michigan Jr | 982 | 630 | 927 | 329 | 360 | 656 | 350 |
| Millicoma Jr | 808 | 382 | 303 | 194 | 348 | 523 | 278 |
| Milton-Freewater DO | 3758 | 2456 | 1365 | 1223 | 2010 | 2187 | 1300 |
| Monroe Jr | 1418 | 1063 | 910 | 769 | 1144 | 1020 | 633 |
| Mapleton DO | 872 | 1281 | 442 | 568 | 179 | 497 | 471 |
| Marshfield Hi | 3259 | 5970 | 3508 | 2781 | 2992 | 3695 | 2720 |
| Marshfield Jr | 633 | 816 | 290 | 285 | 317 | 883 | 351 |
| Mt Hood | 2190 | 4395 | 3933 | 2693 | 2464 | 3629 | 3116 |
| Neah-Kah-Nie DO | 2453 | 1849 | 1171 | 1870 | 854 | 1285 | 1462 |
| Neah-Kah-Nie Hi | 981 | 928 | 276 | 228 | 190 | 724 | 442 |
| Nestucca Hi | 2551 | 2100 | 1769 | 1643 | 1216 | 1013 | 1044 |
| North Eugene Hi | 2840 | 3096 | 3068 | 1379 | 2938 | 2976 | 2156 |
| Oakridge DO | 2724 | 778 | 1647 | 646 | 634 | 1174 | 803 |
| Oakridge Hi | 1069 | 768 | 680 | 745 | 592 | 727 | 596 |
| OTIS CL | 955 | 688 | 429 | 441 | 332 | 504 | 313 |
| OTIS 03 | 3511 | 5039 | 3019 | 3804 | 657 | 6818 | 5963 |
| OTIS 04 | 3812 | 4777 | 3805 | 4104 | 627 | 4067 | 4171 |
| Pendleton DO | 3298 | 2594 | 2011 | 1639 | 1807 | 1616 | 1630 |
| Pendleton Hi | 1905 | 2101 | 2465 | 2451 | 1782 | 1470 | 1138 |
| Pleasant Hill DO | 695 | 478 | 2497 | 329 | 333 | 350 | 331 |
| Pleasant Hill Hi | 1829 | 2127 | 687 | 752 | 631 | 592 | 524 |
| Pleasant Hill Jr | 612 | 337 | 258 | 220 | 241 | 281 | 214 |
| Roosevelt Jr | 905 | 835 | 583 | 679 | 641 | 612 | 892 |
| South Eugene Hi | 3190 | 1626 | 808 | 426 | 824 | 863 | 1752 |
| Shasta Jr | 962 | 1140 | 320 | 1965 | 1298 | 822 | 1139 |
| Sheldon Hi | 1895 | 1012 | 691 | 395 | 1292 | 999 | 500 |
| Siuslaw Hi | 548 | — | — | — | — | — | — |
| uslaw Jr | 2480 | 621 | 1788 | 1273 | 302 | 451 | 547 |

| Terminal Location | Sept 1970 | Oct 1970 | Nov 1970 | Dec 1970 | Jan 1971 | Feb 1971 | Mar 1971 |
|---|---|---|---|---|---|---|---|
| Springfield DO | 5413 | 5949 | 4783 | 5087 | 2793 | 5195 | 5270 |
| Springfield Hi | 2317 | 4195 | 3145 | 3031 | 2565 | 4630 | 3113 |
| Springfield Jr | 1256 | 839 | 638 | 736 | 667 | 641 | 277 |
| Spencer Butte Jr | 1894 | 1712 | 1686 | 1627 | 2100 | 1628 | 1463 |
| State 01 | 788 | 1722 | 1441 | 360 | 2616 | 4720 | 7208 |
| Thurston Hi | 1954 | 1522 | 1591 | 2116 | 815 | 2158 | 1525 |
| Thurston Jr | 815 | 2087 | 1612 | 695 | 944 | 1234 | 1126 |
| Tillamook IED | 94 | 96 | 214 | 42 | -- | 3 | 222 |
| Tillamook DO | 2958 | 2231 | 2557 | 3198 | 2432 | 1668 | 2033 |
| Tillamook Hi | 2304 | 2160 | 874 | 757 | 557 | 1528 | 897 |
| Triangle Lake Hi | 505 | 487 | 202 | 417 | 54 | 501 | 149 |
| TTY33A (OTIS) | 509 | 300 | 196 | 1638 | 5365 | 7254 | 4789 |
| TTY33B (OTIS) | -- | -- | -- | 56 | 72 | -- | -- |
| Umatilla IED | 5714 | 5878 | 4151 | 3673 | 2903 | 3199 | 2849 |
| Willamette Hi | 3748 | 1168 | 1723 | 1047 | 1151 | 833 | 884 |
| Wint Hi (LCC) | 547 | 2743 | 909 | 846 | 1337 | 2438 | 3684 |
| Weston DO | 1023 | 417 | 444 | 385 | 459 | 335 | 282 |
| Westridge Jr | 204 | 332 | 130 | 61 | 105 | 110 | 124 |
| TOTAL | 195406 | 196855 | 164938 | 155189 | 129901 | 182830 | 169940 |

## COMPARISON OF OTIS OPERATING COSTS AND SERVICE PERFORMED
## 1968-69 1971-72




The graph is based on the monthly expenditure for the four years compared to the estimated total of all actual services performed for all users. The 1971-72 year is an estimate with the anticipated total services as 100%.

RLD/wm
4/27/71

OREGON TOTAL INFORMATION SYSTEM
354 EAST 40TH
EUGENE, OREGON 97405

# OTIS USER EVALUATION FOR THE SCHOOL YEAR 1969-70

OTIS is an educational co-operative supplying a service to many schools in the state of Oregon. We would like you to evaluate our service to you and would sincerely appreciate your cooperation in filling in the attached optical scan sheet. The OTIS test answer sheet is being used to facilitate an analysis of your evaluation.

Answer only those areas that pertain to your area of involvement of the OTIS system; do not answer areas you do not use.

The response sheet has been precoded into district response; fill in the space below the number you wish to record. The back side of the answer sheet may be used for added comments.

## INSTRUCTIONS:

1. There is a list of 100 areas attached to your response sheet. Each response area has five (5) choices. Mark only one (1) of the five blocks with the choice that most accurately describes our present service to you.

2. It is important that each block be filled in correctly to insure an accurate analysis. Use this enlarged example and a #2 pencil to fill in each block. [ ] [■]

3. If more than one person is responsible for certain areas of application, please ask them to answer those questions pertaining to their involvement.

4. A stamped, self-addressed envelope is enclosed for your convenience. Please return your answer sheet to us by May 22. Thank you.

SR/os
5/6/70

## OTIS USERS

Evaluate each of the following items in terms of the five-point scale.

Opening of school reports for the year 1969-70:

1. Accuracy
2. Timely
3. Usable in the form in which it was received

Enrollment process:

4. Students enrolled prior to the beginning of the school year
5. Student verification
6. Student body rosters
7. Mailing labels
8. Directories
9. Locator cards

Attendance process:

10. Weekly attendance report
11. Monthly attendance report
12. Attendance file dump
13. Error listing
14. Student verification list
15. State Quarterly report

Scheduling process received to date:

If scheduling is traditional:

16. Tally reports
17. Conflict analysis
18. Master Schedule
19. OTIS Manual
20. OTIS consultant
21. Turn-around time

If scheduling modularly:

22. Input forms
23. Verital
24. OTIS consultant
25. EC consultant
26. Turn-around time

Mark Reporting process:

27. Grade marking sheet
28. Report cards
29. Failure, incompletes, no grades, conditionals report
30. Exception report
31. Grade analysis
32. Transcript labels
33. Grade list
34. Turn-around time

Testing process:
35. Standardized tests
36. Iowa
37. CTMM
38. SAT
39. Test scoring only (no computer output)
40. Teacher prepared tests
41. Turn-around time

Teleprocessing system:
42. Degree of reliability
43. On-line Master Schedule file
44. On-line student schedule file
45. Enrollment input
46. Attendance
47. Mark Reporting input
48. Inquiry capability

Optical scan system:
49. Attendance
50. Scheduling
51. Testing
52. Mark Reporting

Report accuracy:
53. Enrollment
54. Scheduling
55. Attendance
56. Test scoring
57. Mark Reporting

Timeliness of reports:
58. Enrollment
59. Scheduling
60. Attendance
61. Test scoring
62. Mark Reporting

Useability of reports in delivered form:
63. Enrollment
64. Scheduling
65. Attendance
66. Test scoring
67. Mark Reporting

OTIS-District structure:
68. Coordination in your district
69. Field service support
70. OTIS in-house staff support
71. OTIS publications (memo, manuals)
72. Coordinators' meetings

Future development: (please rank order your priorities)

73. Student Problem Solving (1)
74. QUERY (2)
75. Computer assisted instruction (3)
76. Inventory (4)
77. Personnel files (5)

PAYROLL and CLERKS ONLY

Fiscal:

81. District Coordinator
82. Monthly Clerk's meeting at OTIS
83. Structure of Chart of Accounts
84. Audit Trail by Fiscal reports
85. Completeness of information available
86. Field interface
87. Timeliness of reports
88. Daily edit on terminal
89. Choice of automatic control totals
90. Ability to locate errors
91. Ease in understanding and use of Fiscal System

Payroll:

92. District Coordinator
93. Monthly Clerk's meeting at OTIS
94. Accuracy of payroll
95. On-line time and adjustment entry
96. Timeliness of reports
97. Completeness of information available
98. Field interface
99. Ability to locate errors
100. Ease in understanding and use of Payroll System

5/6/70
/os

OREGON TOTAL INFORMATION SYSTEM
354 East 40th
Eugene, Oregon 97405

# ANALYSIS OF OTIS USER EVALUATION

During May of this year, OTIS sent approximately 500 response-type forms to principals, secretaries and OTIS coordinators. The areas of response were:

1. excellent
2. above average
3. satisfactory
4. below average
5. unsatisfactory

They are grouped together by percentages, 1-2 represents above average, 3 average, and 4-5 below average. Of the 500 forms, 262 are represented here.

| | GROUPED ITEMS | % ABOVE AVERAGE | % AVERAGE | % BELOW AVERAGE |
|---|---|---|---|---|
| 1- 3 | OPENING OF SCHOOL REPORTS | 23.8 | 40.8 | 35.2 |
| 4- 9 | ENROLLMENT PROCESS | 36.5 | 41.9 | 21.4 |
| 10- 15 | ATTENDANCE PROCESS | 45.4 | 39.6 | 14.9 |
| 16- 21 | SCHEDULING PROCESS RECEIVED TO DATE | 55.6 | 35.4 | 8.9 |
| 22- 26 | IF SCHEDULING MODULARLY | 35.5 | 57.6 | 6.7 |
| 27- 34 | MARK REPORTING PROCESS | 61.1 | 30.2 | 8.6 |
| 35- 41 | TESTING PROCESS | 61.7 | 29.0 | 9.2 |
| 42- 45 | TELEPROCESSING SYSTEM | 51.4 | 37.3 | 11.2 |
| 46- 48 | ATTENDANCE | 61.4 | 32.2 | 6.3 |
| 49- 52 | OPTICAL SCAN SYSTEM | 50.8 | 37.2 | 11.9 |
| 53- 57 | REPORT ACCURACY | 55.5 | 34.9 | 9.4 |
| 58- 62 | TIMELINESS OF REPORTS | 39.9 | 43.9 | 16.1 |
| 63- 67 | USEABILITY OF REPORTS | 51.7 | 38.0 | 10.1 |
| 68- 72 | OTIS-DISTRICT STRUCTURE | 48.6 | 38.5 | 12.7 |
| * | | | | |
| 81- 91 | FISCAL | 37.1 | 46.1 | 16.7 |
| 92-100 | PAYROLL | 56.7 | 36.4 | 6.7 |

*73-77 FUTURE DEVELOPMENTS (ranked in order of priority):

| All | Coordinators |
|---|---|
| 1. Query | 1. Query |
| 2. Inventory | 2. Student Problem Solving |
| 3. Student Problem Solving | 3. Inventory |
| 4. Personnel Files | 4. Computer Assisted Instruction |
| 5. Computer Assisted Instruction | 5. Personnel |

*73-77 FUTURE DEVELOPMENTS (continued)

Principals-Secondary

1. Computer Assisted Instruction
2. Student Problem Solving
3. Inventory
4. Personnel
5. Query

Principals-Elementary

1. Inventory
2. Query
3. Personnel
4. Student Problem Solving
5. Computer Assisted Instruction

Secretaries-Secondary

1. Query
2. Computer Assisted Instruction
3. Student Problem Solving
4.) Tie-Inventory & Personnel
5.)

Secretaries-Elementary

1. Inventory
2. Personnel
3. Student Problem Solving
4. Query
5. Computer Assisted Instruction

SR/os
6/23/70

OREGON TOTAL INFORMATION SYSTEM
354 EAST 40TH AVENUE
EUGENE, OREGON 97405
February 15, 1971

## OTIS QUESTIONNAIRE

In order to evaluate the results of the OTIS Title Project the following questionnaire has been developed to survey user opinions of how well OTIS has achieved its stated objectives. The results of this and other data gathering procedures will go to make up a final evaluation of the OTIS project to be available not only to Federal and State agencies but to the public as well. Obviously we are most desirous of having a high percentage of returned questionnaires accurately portraying user opinions.

An OTIS test sheet is attached for use as your answer sheet. Note that you question numbers begin with 1 and end with 44. Please mark only those questions indicated on the questionnaire, however, you may use the back of the answer sheet for comments. We would welcome such comments especially concerning questions 40 through 44. Individual schools and districts will not be cited. Our results will be consolidated into percentages of total respondents only.

Instructions:

1. Each numbered response has five selections available to it numbered one (1) through (5). Mark only one of the five choices with your opinion reflecting the choice you consider closest to representing the service of your school. Be sure to fill in the selected block completely with a No. 2 pencil.

2. Please consult with fellow employees in areas with which they may be better acquainted than yourself. We hope to achieve responses that most accurately reflect school personnel opinions.

3. Please disregard those statements which apply to services not utilized by your school.

4. A stamped, self-addressed envelope is enclosed for your convenience.

NDR/wm

OREGON TOTAL INFORMATION SYSTEM
354 EAST 40TH AVENUE
EUGENE, OREGON 97405

# OTIS QUESTIONNAIRE

Selections available represent the following:

1 = excellent
2 = good or above average
3 = average or satisfactory
4 = poor or below average
5 = unsatisfactory or unacceptable

---

## Enrollment Process

1 Ease of enrollment of new students and updating of enrollment records
2 Accuracy of enrollment of new students and updating of enrollment records
3 Usefulness of output reports (student verification, student body rosters, mailing labels, directories, locator cards)
4 OTIS manual

## Attendance Process

5 Ease of attendance data gathering system
6 Accuracy of attendance files
7 Usefulness of output reports (weekly and monthly attendance reports, error listings, state quarterly report)
8 OTIS manual

## Scheduling Process

### If scheduling traditionally:

9 Usefulness of prescheduling reports (edit and tally reports, conflict analysis)
10 OTIS consultants and field service
11 Turn around time
12 OTIS manual

### If Scheduling modularly:

13 Input forms
14 OTIS consultants
15 OTIS manual
16 Turn around time

## Mark Reporting Process

17 Grade marking sheet
18 Turn around time
19 Output reports (report cards, FINC list, grade analysis, labels)
20 OTIS manual

## Test Scoring

21 Standardized test preprinted answer sheets
22 Turn around time
23 Usefulness of output reports (labels, test analysis)
24 Teacher made tests
25 OTIS manual

Teleprocessing System

26 Reliability
27 Speed
28 Accuracy
29 OTIS manual

OTIS Reports

30 Delivery
31 Accuracy
32 Usefulness

QUERY

33 Online mode
34 Over night mode

Coordination Structure

35 District Coordinator
36 OTIS Field Service
37 OTIS Coordinator Meetings
38 OTIS publications
39 OTIS in-house staff support

The following are those services to schools presently considered online (input by teleprocessing) by OTIS. We would like your opinion of their worth as online systems rather than as batch systems. Mark each from one (1) to five (5) according to how you see their worth to your school not as a separate system but as an online system rather than as a batch system. In other words the further you move toward unsatisfactory (5) the closer you move toward batch system.

40 Enrollment
41 Attendance
42 Scheduling

The following are those services to schools presently considered batch (input by forms to OTIS) by OTIS. We would like your opinion of their worth as batch systems rather than online. Mark each from one (1) to five (5) according to how you see their worth to your school not as a separate system but as a batch system. In other words the closer you move to unsatisfactory (5) the closer you move toward an online system.

43 Grade reporting
44 Testing

NDR/wm
2/15/71

OREGON TOTAL INFORMATION SYSTEM
354 EAST 40TH AVENUE
EUGENE, OREGON 97405
February 15, 1971

# CLERK QUESTIONNAIRE

In order to evaluate the results of the OTIS Title Project the following questionnaire has been developed to survey user opinions of how well OTIS has achieved its stated objectives. The results of this and other data gathering procedures will go to make up a final evaluation of the OTIS project to be available not only to Federal and State agencies but to the public as well. Obviously we are most desirous of having a high percentage of returned questionnaires accurately portraying user opinions.

An OTIS test sheet is attached for use as your answer sheet. Note that your question numbers begin with 50 and end with 66. Individual district responses will not be cited. Our results will be consolidated into percentage of total respondents only.

Instructions:

1. Each numbered response has five choices available to it. Mark only one (1) of the five choices available with the choice that you consider most closely reflects the service to your district. Be sure to fill in the selected block completely using a No. 2 pencil.

2. Please consult with fellow employees in areas with which they may be more familiar than yourself. We hope to achieve responses that most accurately reflect district personnel opinion.

3. Please disregard questions concerning services not presently utilized by your district.

4. A stamped, self-addressed envelope is enclosed for your convenience.

NDR/wm

OREGON TOTAL INFORMATION SYSTEM
354 EAST 40TH AVENUE
EUGENE, OREGON 97405

# CLERK QUESTIONNAIRE

Selections available represent the following:

1 = excellent

2 = good or above average

3 = average or satisfactory

4 = poor or below average

5 = unsatisfactory or unacceptable

---

Reports

50 Accuracy
51 Timeliness
52 Audit trails
53 Structure of chart of accounts
54 Payroll checks

Teleprocessing

55 Payroll time and adjustment entries
56 On-line fiscal batch transactions
57 Daily edit reports
58 Online Query

Coordination Structure

59 District Coordinator
60 Monthly Clerk's meeting
61 OTIS field service
62 OTIS in-house staff support
63 OTIS manual
64 OTIS publications

Both the Fiscal and Payroll services are considered on-line systems (information is entered by teleprocessing methods). We would like your opinion of them as on-line systems in comparison to batch systems (in a batch system information is gathered and forwarded to OTIS on forms). Mark each from one (1) to five (5) according to how you see their worth to your district not as a separate system but as an on-line system. In other words the closer you move toward unsatisfactory (5) the closer you move toward a batch system. Feel free to make any comments you wish to on the back of the questionnaire on any aspect of the project but especially on your opinion of the on-line status of fiscal and payroll.

65 On-line Fiscal system
66 On-line Payroll system

NDR/wm
2/15/71

# ANALYSIS OF OTIS USER EVALUATION

213 Responses to 243 Questionnaires (87%)

## OTIS Questionnaire

| | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| | **Enrollment Process** | | | | | |
| 1. | Ease of enrollment | .32 | .39 | .27 | .02 | --- |
| 2. | Accuracy of enrollment | .31 | .42 | .24 | .03 | --- |
| 3. | Usefulness of output reports | .27 | .37 | .29 | .07 | --- |
| 4. | OTIS manual | .13 | .41 | .37 | .07 | .02 |
| | **Attendance Process** | | | | | |
| 5. | Ease of attendance data gathering system | .28 | .40 | .31 | .01 | --- |
| 6. | Accuracy of attendance files | .4[illegible] | .35 | .24 | --- | --- |
| 7. | Usefulness of output reports | .31 | .39 | .22 | .07 | --- |
| 8. | OTIS manual | .15 | .36 | .38 | .10 | .01 |
| | **Scheduling Process** | | | | | |
| | **If scheduling traditionally:** | | | | | |
| 9. | Usefulness of prescheduling reports | .33 | .39 | .20 | .06 | .01 |
| 10. | OTIS consultants and field service | .23 | .40 | .31 | .03 | .03 |
| 11. | Turn around time | .13 | .42 | .39 | .06 | --- |
| 12. | OTIS manual | .17 | .36 | .41 | .07 | --- |
| | **If scheduling modularly:** | | | | | |
| 13. | Input forms | .29 | .41 | .24 | .05 | --- |
| 14. | OTIS consultants | .29 | .47 | .24 | --- | --- |
| 15. | OTIS manual | .19 | .38 | .44 | --- | --- |
| 16. | Turn around time | .22 | .28 | .39 | .11 | --- |
| | **Mark Reporting Process** | | | | | |
| 17. | Grade marking sheet | .27 | .51 | .21 | .01 | --- |
| 18. | Turn around time | .31 | .42 | .22 | .05 | --- |
| 19. | Output reports | .31 | .34 | .27 | .06 | .01 |
| 20. | OTIS manual | .22 | .38 | .33 | .07 | --- |
| | **Test Scoring** | | | | | |
| 21. | Standardized test answer sheets | .36 | .39 | .18 | .05 | --- |
| 22. | Turn around time | .11 | .41 | .37 | .08 | --- |
| 23. | Usefulness of output reports | .22 | .47 | .21 | .08 | .01 |
| 24. | Teacher made tests | .28 | .33 | .30 | .08 | --- |
| 25. | OTIS manual | .13 | .46 | .31 | .07 | .03 |
| | **Teleprocessing System** | | | | | |
| 26. | Reliability | .20 | .41 | .35 | .03 | --- |
| 27. | Speed | .24 | .39 | .29 | .08 | --- |
| 28. | Accuracy | .28 | .47 | .24 | --- | --- |
| 29. | OTIS manual | .21 | .36 | .40 | .03 | --- |

| | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| | OTIS Reports | | | | | |
| 30. | Delivery | .16 | .43 | .34 | .05 | .02 |
| 31. | Accuracy | .30 | .48 | .19 | .03 | --- |
| 32. | Usefulness | .22 | .49 | .22 | .06 | .01 |
| | QUERY | | | | | |
| 33. | Online mode | .19 | .36 | .40 | .06 | --- |
| 34. | Over night mode | .18 | .33 | .43 | .05 | .02 |
| | Coordination Structure | | | | | |
| 35. | District Coordinator | .50 | .28 | .20 | .02 | --- |
| 36. | OTIS Field Service | .17 | .36 | .38 | .07 | .02 |
| 37. | OTIS Coordinator Meetings | .10 | .32 | .45 | .10 | .03 |
| 38. | OTIS publications | .13 | .28 | .46 | .11 | .02 |
| 39. | OTIS in-house staff support | .17 | .49 | .25 | .07 | .01 |
| 40. | Enrollment online | .48 | .32 | .16 | .01 | --- |
| 41. | Attendance online | .51 | .32 | .12 | .02 | --- |
| 42. | Scheduling online | .36 | .36 | .21 | .06 | --- |
| 43. | Grade reporting batch | .32 | .37 | .19 | .08 | .05 |
| 44. | Testing batch | .24 | .38 | .26 | .04 | .08 |

GROUPED ITEMS

| | | | | | | |
|---|---|---|---|---|---|---|
| 1- 4 | Enrollment | .26 | .40 | .29 | .05 | --- |
| 5- 8 | Attendance | .29 | .38 | .28 | .04 | --- |
| 9-12 | Scheduling (3S) | .21 | .39 | .32 | .06 | .01 |
| 13-16 | Scheduling (Mod) | .25 | .38 | .32 | .04 | --- |
| 17-20 | Mark Reporting | .28 | .41 | .26 | .05 | --- |
| 21-25 | Test Scoring | .22 | .42 | .27 | .07 | .02 |
| 26-29 | Teleprocessing | .24 | .41 | .32 | .04 | --- |
| 30-32 | OTIS Reports | .22 | .47 | .25 | .05 | .01 |
| 33-34 | QUERY | .18 | .34 | .41 | .05 | .01 |
| 35-39 | Coordination | .24 | .34 | .34 | .07 | .02 |
| 1-39 | Student Services | .25 | .40 | .29 | .05 | .01 |

## Clerk's Questionnaire

| | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| | Reports | | | | | |
| 50. | Accuracy | .40 | .52 | .04 | .04 | --- |
| 51. | Timeliness | .30 | .50 | .15 | .04 | --- |
| 52. | Audit trails | .26 | .33 | .40 | --- | --- |
| 53. | Structure of chart of accounts | .47 | .41 | .12 | --- | --- |
| 54. | Payroll checks | .54 | .31 | .15 | --- | --- |
| | Teleprocessing | | | | | |
| 55. | Payroll time and adjustment entries | .48 | .40 | .12 | --- | --- |
| 56. | Online fiscal batch transactions | .53 | .40 | .07 | --- | --- |
| 57. | Daily edit reports | .36 | .45 | .09 | .09 | --- |
| 58. | Online Query | .29 | .36 | .36 | --- | --- |
| | Coordination Structure | | | | | |
| 59. | District Coordinator | .35 | .45 | .15 | .05 | --- |
| 60. | Monthly Clerk's meeting | .25 | .50 | .19 | --- | .06 |
| 61. | OTIS field service | .21 | .58 | .13 | .08 | --- |
| 62. | OTIS in-house staff support | .48 | .35 | .09 | .09 | --- |
| 63. | OTIS manual | .16 | .48 | .28 | .08 | --- |
| 64. | OTIS publications | .09 | .65 | .22 | .04 | --- |
| 65. | Online Fiscal system | .40 | .50 | .10 | --- | --- |
| 66. | Online Payroll system | .56 | .38 | .06 | --- | --- |

### GROUPED ITEMS

| | | | | | | |
|---|---|---|---|---|---|---|
| 50-54 | Reports | .40 | .42 | .16 | .02 | --- |
| 55-58 | Teleprocessing | .43 | .40 | .15 | .01 | --- |
| 59-64 | Coordination | .25 | .50 | .18 | .06 | --- |
| 50-64 | Business Services | .34 | .45 | .16 | .04 | --- |

| | | | | | | |
|---|---|---|---|---|---|---|
| | OTIS Manual | | | | | |
| 4. | Enrollment | .13 | .41 | .37 | .07 | .02 |
| 8. | Attendance | .15 | .36 | .38 | .10 | .01 |
| 12. | Scheduling - Traditional | .17 | .36 | .41 | .07 | --- |
| 15. | Scheduling - Modular | .19 | .38 | .44 | --- | --- |
| 20. | Mark Reporting | .22 | .38 | .33 | .07 | --- |
| 25. | Test Scoring | .13 | .46 | .31 | .07 | .03 |
| 29. | Teleprocessing System | .21 | .36 | .40 | .03 | --- |
| 63. | Coordination Structure | .16 | .48 | .28 | .08 | --- |
| | Total | .19 | .39 | .37 | .06 | --- |

## SUMMARY OF EVALUATION

Based on the summarization of the OTIS questionnaire some general conclusions seem evident.

1. For the 1971 questionnaire no user reported more than 03% as unsatisfactory and in most instances there were no unsatisfactory responses.
2. Grouping the responses into the areas of student services and business services, the users rate these services as:

   Student Services

   25% excellent, 40% good or above average, and 29% average.

   Business Services

   34% excellent, 45% good or above average, and 16% average.
3. Those activities rated lowest were the area of communication between OTIS and the user; specifically coordination meetings and manuals. The users seem to have great confidence in the programs as well as the teleprocessing system.
4. Comparison of the latest evaluation with the previous evaluation (June 1970) shows a considerable shift toward a more successful operation. The following is a percent comparison of user responses on some common areas.

Above Average = 1 and 2, Average = 3, Below Average 4 and 5.

| GROUPED ITEMS | 1970 % Above Average | 1970 % Average | 1970 % Below Average | 1971 % Above Average | 1971 % Average | 1971 % Below Average |
|---|---|---|---|---|---|---|
| Enrollment | 36.5 | 41.9 | 21.4 | 66 | 29 | 05 |
| Attendance | 45.4 | 39.6 | 14.9 | 67 | 28 | 04 |
| Mark Reporting | 61.1 | 30.2 | 8.6 | 69 | 26 | 05 |
| Testing | 61.7 | 29.0 | 9.2 | 64 | 27 | 09 |
| Teleprocessing | 51.4 | 37.3 | 11.2 | 65 | 32 | 04 |
| Fiscal | 37.1 | 46.1 | 16.7 | | | |
| Payroll | 56.7 | 36.4 | 6.7 | | | |
| Business Services | | | | 79 | 16 | 04 |

TOUCHE, ROSS, BAILEY & SMART

910 STANDARD PLAZA
PORTLAND, OREGON 97204

June 4, 1969

Dr. Dale Parnell
Superintendent of Public Instruction
Salem, Oregon

Dear Dr. Parnell:

This letter documents the review of Project OTIS (Oregon Total Information System) conducted by Touche, Ross, Bailey & Smart. The review was performed at the request of the Oregon State Department of Education, and was conducted between May 5 and June 3, 1969.

The Oregon State Department of Education required this evaluation to assist it in the review of OTIS's 1969-70 budget. Touche-Ross was provided twelve questions around which to structure its review. In the process of answering these questions, we developed certain recommendations for your consideration. We wish to emphasize, however, that specific answers to these questions and our recommendations should not be read out of the context of this report. Extremely significant background material is contained in the early part of this report and must be considered by the reader as he interprets our conclusions.

The report is structured into the following sections:

I. Approach
II. Definition of OTIS
III. Response to Questions
IV Conclusions and Recommendations

## I. APPROACH

Our evaluation was conducted in two phases:

A. A review of the computer facility with specific emphasis on the technical integrity of the systems design and applications. We also examined the degree of computer hardware utilization and the technical competence of the OTIS staff.

B. A separate study was made of OTIS's objectives and performance.

The second phase began with a review of the OTIS proposals and literature, coupled with interviews of key OTIS and Lane County IED personnel. The result

was an accurate definition of what OTIS is and what its current objectives are. Measuring the level of achievement toward these objectives became the major task of this phase.

An interviewers' discussion guide was prepared to assist in evaluating the impact of OTIS on the educational community. Personal interviews were conducted with current users and non-users. The interviews tried to identify the impressions and experiences of all levels of users. Similar interviews were conducted with non-users to identify their understanding of OTIS and their reasons for not being in the system. Additional interviews were held with Parkrose and Corvallis to see why they are leaving the OTIS system. These activities resulted in more than forty interviews throughout the Willamette Valley.

## II. DEFINITION OF OTIS

It is inappropriate to comment on OTIS before first establishing what it is. We are confident that both a lack of understanding and misinformation exist to the extent that few can properly describe it. The sources of this condition are considered in the following pages of this report.

OTIS is a computer resources center. While it is a component of the Lane County Intermediate Education District, it can perform computer processing for non-Lane County locations. Its worth as a computer center rests on three factors:

A. As a part of an educational organization, it can be more understanding of and responsive to the Oregon educational community's requirements.

B. By developing a Generalized Educational Management System (GEMS), it can respond to the various changing requirements of present users and those of the future on an individual basis.

C. By using a teleprocessing environment (a network of telephone lines and terminals connected to the computer), OTIS can assure the accuracy and timeliness of data entered for processing and the timeliness of response for processed data returned to the user.

Of the three factors, the second is the one least understood.

The traditional approach to using a computer for information processing is to develop specific systems for specific requirements. For example, within a payroll system there would be designed the capability of producing paychecks, cost distribution reports, etc. The programming and information to be processed would be tailored to what this particular system needed. There could be, and commonly are, many elements of a specific system that would be of interest to other applications. For example, the personnel data associated with payroll preparation may also be that associated with district certification and staffing requirements. The result of this overlapping requirement is manifest in several ways, the most important of which is the repreparation and recapturing of data for each application. The first level of reaction to this problem is the establishment of another specific system that can perform the required functions of the first two.

In the instance of our example, a district personnel records system would be developed from which the payroll and staff scheduling systems could draw upon the basic personnel data for their unique or common requirements. Because we can't see the future, we continue to resystematize and reprogram past good work to accommodate efficient processing.

Recall that the point of contention is around the data being entered for processing. When it is specifically tailored for a system, the chance of having to re-enter it when it is needed by another system is very high. Similarly, data processed in one system may not be readily available to a second system and will have to be manually captured and re-entered for processing requirements. Planning can and does mitigate this problem considerably. However, two factors relating to system development seriously qualify the benefits of planning. They are:

A. A multiplicity of users, each with a basic informational requirement, exercising their need for variations within that basic requirement.

B. A dynamic educational environment in which change is the expected constant.

When these variables are present, a second level of reaction to our problems is appropriate. This calls for the development of a more generalized rather than specific system capability. In effect, the tailoring of data is eliminated at entry time. The computer is told all we know without qualifying that knowledge by how it is to be used. Similarly, processed data can be retained in this generalized form for further informational requirements. Data items are extracted from this base of knowledge through specific application programs. Given the variables earlier referenced, this system level has a favorable impact on the economies of computing by eliminating much of the duplication and rework problems in a specific system environment. To this point, the facility is catering to the data entry aspect of data processing. What of the output of processed data?

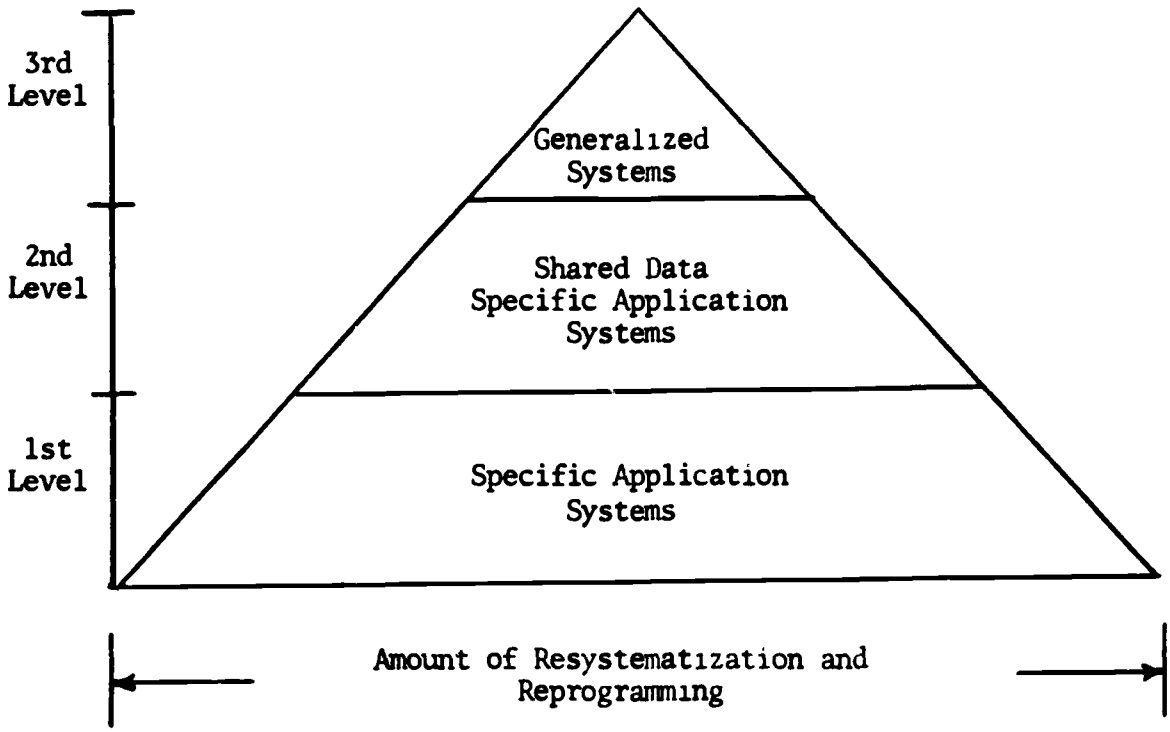
The largest class of information requirements are specific questions and answers. Who are the students absent with the greatest frequency? Who are the teachers with a specific academic background? Answering these questions has classically depended on two factors:

A. We expect a specific question to be asked and program a report which could answer it.

B. We develop a report containing all possible answers to our questions which must be manually reviewed to compile a specific question and answer.

Because these concepts can be so ably handled by the computer, the third level of system design came into being. This level accepts specific questions and provides specific answers. The user has the fastest optimum response because the information he is receiving is that which is most current and no manual review or compilation has to be conducted. Again, the economics of computing are facilitated as much programming is eliminated in favor of the users being able to tell the computer what he specifically wants to know.

Three Levels of Systems Approaches




The above figure summarizes the relationship of the three system approaches. There are few who cannot see the desirability in advancing to the third level of system status. Among those who could were the authors of the OTIS proposal. This is exactly the goal they have established for themselves. The data processing environment they wish for and are working for in the State of Oregon educational community is one in which the "utility" concept of a processing center achieves its highest meaning. Like the switching network of a telephone company's central offices, whose general capability is to transmit messages, the general capability of OTIS will be to store and present data as required by individual users across the state.

If this is not the OTIS you know, we are not surprised. Some historical notes may explain why this is so. We judge a thing by its action. OTIS found it necessary to develop and offer certain specific systems at the earlier defined second level of system status in order to provide some early benefits to its users. Remember the characteristics of that level were largely balanced in favor of the data entry side of the system rather than the direct question and answer emphasis. This created an image similar to other existing educational systems in the state, in spite of OTIS's unique third level systems approach. Early specific applications systems were the necessary catalyst in gaining initial support for the OTIS operation. The OTIS concept, fully developed and exercised at the third systems level, would eliminate much of the now existent reporting in favor of specific inquiries and answers.

It is not our purpose to pass judgment on this earlier period. Like many projects in which there is a strong research and development requirement, miscalculation of potential start-up problems and beginning workloads is expected. This approach to obtaining early support in the face of critical implementation problems is not uncommon.

We sketch this picture of OTIS because it is this OTIS we are evaluating, not the OTIS image that is in so many Oregon educators' minds. We reference the direction OTIS has taken not as an endorsement of it, but an acknowledgement of their action.

## III. RESPONSE TO QUESTIONS

An observation is appropriate and meaningful. OTIS's objectives are exemplary and innovative, but subjective. It became evident early in the user interviews that measurement of how OTIS was fulfilling its stated objectives (as listed in Volume I of the Title III grant application documents) could not be quantitative. Users could only respond with personal value judgments when we asked them about the extent of OTIS's objective fulfillment.

Thus, in viewing OTIS's achievement of these objectives we are only able to record:

A. Whether or not effective effort has been exerted toward an objective.

B. The users' subjective judgments as to how near OTIS has come to an objective's achievement.

How well is OTIS doing in meeting these objectives? (Question 5) To answer this question, we have listed each of the specific objectives and our findings.

Objective No. 1 - *To improve educational opportunities for students by building a total information system which will aid in the individualization of instruction as well as providing improved administrative information.*

The following comments on the other objectives best indicate how well this objective is being met.

Objective No. 2 - *To create a data bank consisting of five areas of information (student, staff, curriculum, property, finance) which will:*

*a. support the informational needs of all persons engaged in the educational process.*

*b. serve as a basis for research, evaluation, and planning.*

*c. provide a foundation for future applications of computers to education.*

Progress has been made toward establishing a data bank in all of the five designated areas of information: student, staff, curriculum,

property, finance. The most undeveloped area is the property data base. The systems design work is completed, and programming has begun. Nevertheless, the beginning of a data base to support the informational needs of OTIS's users has been established. The full ability to utilize this data base for planning, evaluation and research functions is not yet implemented. OTIS is committed to providing this capability through the development of "Query". These software routines are targeted for implementation before September, or the beginning of the 1969-70 school year. OTIS at that time should be well on its way to providing a foundation for future computer applications in education.

Objective No. 3 - *To demonstrate a generalized computer system which will:*

a. *process a great variety of applications under a single programmed control system.*

b. *have analytical capabilities for comparing, correlating, manipulating, and summarizing the information stored in the data bank.*

c. *provide for system expansion and revision without reprogramming.*

d. *produce printed reports according to district specifications on a summary or detailed level or by exception.*

In developing the Generalized Education Management System (GEMS) software package, OTIS will have a generalized computer system that processes a variety of applications. However, they have yet to implement a program control system that will provide analytical capabilities for comparing, correlating, maniuplating, and summarizing information stored in the data bank. GEMS will have the capability for system expansion and modification with very little reprogramming. With the implementation of "Query" in September, users should be able to produce printed reports according to district specifications on a summary, detailed or exception level.

Objective No. 4 - *To build a telecommunications network linking participating schools to one large computer in order to:*

a. *maintain data in a current status.*

b. *make possible rapid access to selected data.*

c. *provide computing power to schools of all sizes.*

d. *assure reasonable individual district costs.*

e. *provide students with the opportunity to learn computer techniques and programming in their local environment.*

OTIS has begun to build a telecommunications network that maintains data in current status. Access to the data bank information is more rapid than conventional batch systems, but slower than other teleprocessing information retrieval systems. Current terminal response was poor due to a combination of implementation problems and the lack of user familiarity

with teleprocessing terminal procedures. OTIS has the potential to provide computing power to schools of all sizes, but is limited by economic feasibility in adding low volume terminals in the smaller, rural districts. Reasonable individual district costs are not assured. Most users felt the per student costs were high. Our conclusions with regard to costs are outlined on page 9 of this report.

The opportunities for students to learn programming and computer techniques are present in OTIS's operation, but have not been emphasized to the degree that is possible and beneficial to the student users. Some instructional activity has gone on, but our user interviews indicated a great need for more effort in the student problem solving and computer instruction areas.

Objective No. 5 - *To establish a coordination system consisting of OTIS field representatives and school district coordinators which will:*

a. *facilitate communication between educators and data processors.*

b. *provide for smooth operation through continuing system evaluation.*

c. *provide for in-service training for school personnel in general data processing concepts as well as specific system procedures.*

OTIS's coordination system (consisting of field or school representatives and district coordinators) provides the means to facilitate communication between educators and data processing personnel. However, this essential system often fails due to the lack of well planned, consistent leadership at OTIS's management level. According to the interviewed users, few of their requests for systems modifications were given effective attention. As a result, there are inaccuracies and weaknesses in OTIS's own system evaluation efforts. For the same reasons (poor communication and coordination) there has not been enough well planned in-service training for school personnel in data processing and systems procedures.

Objective No. 6 - *To implement, evaluate, and refine the total information system designed during the Project OTIS planning phase.*

The implementation and refinement of the "Total Information System" designed during OTIS's planning phase is still going on. Little real evaluation has been achieved internally because of the weaknesses in OTIS's coordination system. The systems and software implementation to date has been behind schedule for plausible reasons (delayed system delivery, complicated testing requirements, etc.).

Questions 6 and 12 relate to the user and non-user evaluations of OTIS's services. From our interviews, the following is summarized:

A. Users

Enrollment - The format and promptness of response were satisfactory in 95% of the cases. Accuracy was acceptable in all but one case. In that case, an elementary school had so many difficulties that they became alienated with OTIS.

Attendance -

1. Attendance reports were inadequate for most elementary schools. The format provided breakdown by grade, not class, and all schools queried stated teachers completed and maintained their own attendance, while school secretaries compiled results on the OTIS form, thus duplicating effort and causing redundant paperwork.

2. Similar problems were encountered at the high schools, in that all but one still require attendance by period, while OTIS will only report attendance by day and half-day. The result is duplicate records are again being compiled.

Report Cards - Applicable only to secondary schools. Format, accuracy, and promptness are very satisfactory.

Scheduling - Applicable only to secondary schools. Format and promptness were acceptable, but accuracy at the teacher level was inadequate in over half of the cases interviewed.

Testing - Test scoring as offered was well done. At present, only three tests are scored at OTIS. Expanded activity in this area is needed.

B. Non-Users

Non-users generally did not recognize the extent of current OTIS services nor did they believe that OTIS will achieve what they promise for the 1969-70 school year. Only two of the second wave districts plan to participate in the program.

OTIS's organization (Question 7) has just been altered. As structured, it can perform liaison and developmental work in an effective manner. Moreover, the key positions (Question 8) are staffed with above average to exceptional personnel. This was true of all the OTIS staff members interviewed while conducting this evaluation. There is a planned expansion to full exploitation of installed hardware (Question 9). The shortcomings in software (Question 10) are primarily associable with the size and efficiency of the programs. User-written programs are being recoded to garner improved efficiency. IBM's operating system has been used intact, an approach we highly endorse, and is being consistently improved by the manufacturer. OTIS has received all of the assistance it has requested from IBM (Question 11).

The Parkrose pull-out (Question 4) was primarily attributable to that district's participation in the Multnomah County IED data processing program.

As its involvement with its own IED was mandatory, and as Parkrose could not justify continued duplicate expense, it withdrew from OTIS.

The economic question (Question 3) is one that has been confused by OTIS's failure to communicate its objectives. If OTIS is evaluated as a preparer of reports which are analagous to those prepared by other less expensive approaches, then its costs are almost twice what they should be. However, that is not what OTIS is. As we have explained, OTIS's operation of GEMS should have an impact on the total costs of data processing by eliminating much of the expense associated with resystemization and reprogramming. A greater expense is incurred in implementing a "third level" or generalized system. The expense can be recovered during the operating life of the system because of its adaptability to changing information requirements. We cannot predict the economic worth of that capability. Similarly, we cannot predict the worth of the information potential of the integrated, responsive data base that is offered by OTIS. We can say that the ingredients for a large pay off exist because of the multiplicity of information processing requirements represented by so many potential users, each with individual constraints and reporting requirements. In addition, the education community with all of society is in revolution, so the ingredient of expected change is constant. In our opinion, OTIS is creating the standard by which Generalized Education Systems will be measured. There is no apparent tested standard in existence.

Question 2 references OTIS's relationship to quality and economic education in Oregon. Financing education in Oregon is a sensitive political problem. While there may be several actions needed to solve this problem, one way must certainly be to achieve public confidence in the financial management of the school system. The AOI report indicates a number of better business practices that education should consider. Improving a condition obviously depends on sufficient information about it. A thorough and adequate analysis of the education system of our state, unfortunately, depends on data that is both partial and fragmented. An expanded use of data processing can improve this information position to the degree that confidence can be placed in the statements of requirements to fulfill educational objectives. This confidence can be conveyed to the people. In that light OTIS possesses exceptional potential for reviewing the resources existent and required in the educational community.

There begins to emerge in the answers to these questions a definite pattern. The OTIS product (GEMS) is well developed. The OTIS services are not, which identifies OTIS's primary weakness. It has failed to communicate with those it would service. We indicated earlier that in the development of its product OTIS found it necessary to prepare specific reports. These have become the measurements of OTIS. OTIS has failed to communicate what its proper measurement should be.

Any data processing system is only as valuable as it is useful, and it is only useful to the extent its clients understand it. There is little in the professional development of an educator that prepares him to use the full capabilities of OTIS. There has been no successful attempt in conveying OTIS's potential to educators. There is no assurance that the education community can use OTIS's potential and, therefore, there is a serious question as to whether it should pay for it. The best way technically may not be the best way actually. We will deal with this issue further as a component of the answer to Question 1.

## IV. CONCLUSIONS AND RECOMMENDATIONS

"From every measurable point of view, is OTIS worthy of continuation and expansion?" (Question 1) From a technical viewpoint, OTIS is a worthy venture. They are working to meet their objectives and will be successful in developing their product. But a product is not a service unless it is converted to be so. OTIS has failed to successfully convert its product into a service. If it is to continue to exist, it must concentrate on that area.

The characteristics of a good marketing and user training program are already known to the OTIS staff. They recognize its components even if in the past they have failed to employ them. We state with certainty the necessity of concentrating on the marketing and communication problems. We cannot predict that they can recover from their current image. Moreover, the sophistication of their ultimate service objectives is such that we are concerned with the educational community's ability to appraise its full potential and worth to them.

These failings, if not overcome, would force us to conclude that OTIS cannot succeed or survive. However, with such a large investment at this point, it is reasonable to suggest specific recommendations designed to correct these failings.

These suggestions are based on the assumption that OTIS will be willing to initiate the correction of its coordination faults and the effective communication of its unique service advantages to educators in the state.

OTIS should meet the following requirements in these areas:

A. Immediately develop a specific, systematic marketing plan listing:

   1. All potential users.

   2. Individual strategies designed to insure contracts.

   3. OTIS's accounting for each potential user by documenting refusals and contract acceptances, expecting to be periodically measured by the number of such acceptances. Failure to obtain enough contracts to establish the required student base by November warrants the Department's withholding of project funds.

B. Simultaneously establish an internal costing and control reporting system to:

   1. Determine OTIS's actual operating costs.

   2. Determime the required student base to fund OTIS's operation.

C. Develop an operations schedule listing:

   1. Firm implementation dates through November for "Query" and related software routines that will allow real time inquiry and response on OTIS's data base.

2. Methods and dates of stepped-up in-service training for all levels of present and potential users.

3. The staff should expect evaluation of their schedule achievement by reporting to the department their progress through November.

Whether OTIS should be given the chance to implement these recommendations is a matter for management decision. The apparent time constraint is an obvious qualification on the probability of these recommendations yielding a beneficial result. If a decision to continue OTIS is made, the decision to endorse OTIS must accompany it. Without such an endorsement from the Department of Education and other appropriate agencies, the potential for success is eliminated.

If you should have any questions, please contact Mr. John Maddocks of our Portland office, or Mr. Floyd Bowers of our Salem office.

Very truly yours,

Touche, Ross, Bailey & Smart

Certified Public Accountants

# PREFACE

The objective of this document is to describe a plan for orderly evolution of Automated Data Processing (ADP) as a tool in the administration of state government. The implementation of the plan should provide a base on which a total responsive information system for the State of Oregon can be built.

This plan was conceived after conducting a review of all state agencies that use or contemplate near future use of data processing. Input included a December 1968 survey supplied by each agency in standard format, and face-to-face discussion with most involved agencies, such as Highway, Motor Vehicles, State Police, Employment, Welfare, Tax, Public Utility Commissioner, etc.

The review included existing and proposed applications, hardware and personnel. The contributions of four interested computr vendors have also been incorporated.

## A TEAM APPROACH

A team was appointed by the Governor's Office on December 1, 1968 to analyze Automated Data Processing within the State of Oregon and submit recommendations for the effective use thereof.

The team members were as follows:

| | |
|---|---|
| J. V. Wilson - Chairman | Division Accounting Manager<br>Pacific Northwest Bell |
| R. A. Burkholder | Planning & Procedures Manager<br>Pendleton Woolen Mills |
| L. J. Herberger | Systems Analyst<br>Department of Finance<br>State of Oregon |
| D. W. Price | Programming Manager<br>Pacific Power & Light |
| G. C. Schmitz | Director of Data Processing<br>Oregon State Board of Higher Education |
| G. R. Youngblood | Director Administrative Services<br>Board of Health<br>State of Oregon |

State agencies were asked for their plans for use of Automated Data Processing for the next five years. Formal replies were received. Agencies were visited and discussions were held with Directors, ADP Managers, and other interested parties.

EDUCATION

The diagram on page 12 shows a proposed consolidation effort on three fronts as the initial objective for Oregon's educational functions.

1. Higher Education has today a five year plan for development and implementation of business office applications for all institutions. We feel that this is a sound objective, but would recommend that those non-instructional applications, such as registration, student records, class scheduling, etc., not included in the present plan, be reviewed for possible inclusion at a later date. The proposed funding for 69-71 appears reasonable.

2. In another section of the education community, we see many school districts in Oregon initiating separate projects to automate school administrative services. At the same time we find that Oregon has an operating facility--OTIS--that was federally funded and designed to provide similar services. The Federal sponsors of OTIS are pleased with the results of the project, and other states, recognizing a successful $1.5 million development, plan to adopt the system for themselves.

   The Oregon System of Education can ill afford to let "pride of authorship" sentiments in system design and a possible misunderstanding of expenses result in their rejection of OTIS without a thorough evaluation.

   It is our recommendation that the Department of Education, all Community Colleges, and all I.E.D.'s plan to share a computer facility. Assuming a favorable evaluation, OTIS in present location, Eugene, is capable of considerable growth and would provide an excellent initial facility.

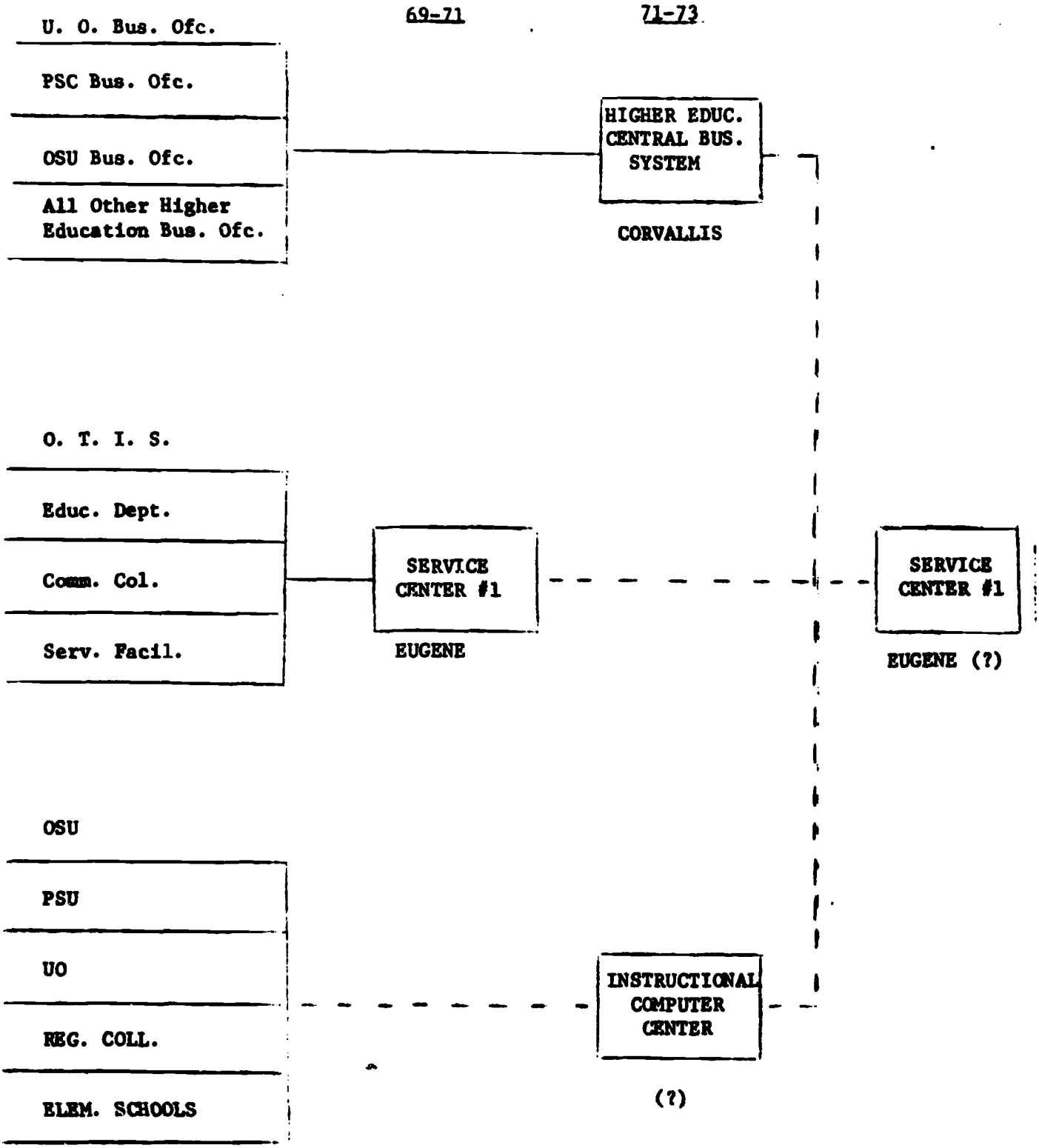
   Further assuming a favorable evaluation, immediate action should be taken to place OTIS under State control, reporting to either the Educational Coordinating Council or the Department of Eudcation such that it could qualify for an educational discount on equipment. Such a discount would amount to approximately $240,000 over the next biennium on the presently installed OTIS equipment.

   No additional funding other than that proposed should be required in the next biennium provided the educational discount on equipment could be realized.

3. Our final front encompasses the vast area of computer usage described as instructional. Today we find instructional computer centers in many of Oregon's Institutions of Higher Education, community colleges and even elementary schools. In addition, there is a continuing demand for more computer capacity in each of these centers. Recently, the demand for use of a larger facility required one of the Institutions of Higher Education to contract for the services of a very large service bureau facility.

   Our recommendation in this area is that the present computer committee in Higher Education study the potential value of a large instructional computer facility that could serve all of the Oregon Educational Community. The establishment of such a facility would not preclude the need for instructional computer centers at various educational institutions, but could well save the State millions of dollars in the proliferation of large centers on all campuses that would not be efficiently utilized.

   Additional funding of $50,000 is recommended to employ the services of a consultant to aid in the accomplishment of this study by September 1, 1969.


69-71
71-73
U. O. Bus. Ofc.
PSC Bus. Ofc.
OSU Bus. Ofc.
All Other Higher Education Bus. Ofc.
HIGHER EDUC. CENTRAL BUS. SYSTEM
CORVALLIS
O. T. I. S.
Educ. Dept.
Comm. Col.
Serv. Facil.
SERVICE CENTER #1
EUGENE
SERVICE CENTER #1
EUGENE (?)
OSU
PSU
UO
REG. COLL.
ELEM. SCHOOLS
INSTRUCTIONAL COMPUTER CENTER
(?)

OREGON BOARD OF EDUCATION
Public Service Building
Salem, Oregon 97310
Dale Parnell, Superintendent

Division of Instruction
Title III, ESEA
June 11, 1969

# PROJECT OTIS CONTINUATION REQUEST

Lane County IED

Title III, ESEA

## Background

The enactment of P.L. 90-247 in 1968 (amending the Elementary and Secondary Education Act of 1965), transferred Title III, ESEA administration from the U.S. Office of Education to the states. The amendments required that a state plan be submitted to and approved by the State Board of Education and the U.S. Office of Education. Upon the termination of U.S.O.E. grant awards, the on-going Title III projects were issued grant awards by the State Department of Education to complete originally approved budget periods. The Office of Education's grant award to Project OTIS terminated on February 28, 1969. To complete its budget period ending June 30, 1969, a grant in the amount of $254,744 (effective March 1, 1969) was awarded to OTIS by the State Department of Education.

## Provisions for Continuing Projects

Section 2.3.20 of the 1969 Title III, ESEA Oregon State Plan provides for the continuation of on-going projects for an additional budget year through negotiation by the Title III Administrative Staff and the project staff, providing evidence has been submitted and that the project is subjectively meeting its outlined objectives.

## OTIS Evaluation Review

To review the progress of Project OTIS and to satisfy the requirements of the Continuation Request provisions under Title III, the firm of Touche, Ross, Bailey, & Smart was contracted and the review was conducted between May 5 and June 3, 1969. The summary of the evaluation review report is found in the exhibit accompanying this request.

## RECOMMENDATION

The Superintendent RECOMMENDS that the Oregon Board of Education approve the Project OTIS Continuation Request for Title III moneys in the amount of $458,332 for the fiscal year ending June 30, 1969.

It is FURTHER RECOMMENDED that the Oregon Board of Education:

1. Commend OTIS for its exemplary and innovative work in educational data processing
2. Endorse OTIS as a Data Processing Service which has exceptional worth and merit to local school districts.

3. Direct the State Department of Education to evaluate OTIS as a Computer Resource Center suitable for its own data processing requirements.

4. Direct the State Department of Education to form an advisory committee for the use of data processing in education in Oregon. This committee should develop and submit proposed guidelines for data processing use by November 1, 1969.

5. Encourage local school boards to evaluate OTIS potential service to them and the State Department's guidelines for data processing in education before committing to further decisions in the data processing area.

Moved by_____ Action taken

Seconded by_____

PEAT, MARWICK, MITCHELL & CO.
CERTIFIED PUBLIC ACCOUNTANTS
1010 STANDARD PLAZA
PORTLAND, OREGON 97204

June 9, 1970

Mr. Clarence K. Mellbye
Coordinator, Title III ESEA
Oregon Board of Education
942 Lancaster Drive, N. E.
Salem, Oregon 97310

Dear Mr. Mellbye:

We have completed our evaluation of the marketing and user training activities of the Oregon Total Information System (OTIS), which were initiated as a result of recommendations in the Title III evaluation dated June 4, 1969. This letter report describes the activities we performed in conducting the evaluation and summarizes our findings.

EVALUATION SUMMARY

In general, the marketing and user training programs were all designed and based on realistic, practicable concepts. The plans established in August, 1969 were substantially followed during the subsequent months by the Field Services Division. As a result, the reputation of OTIS, judged by user response, has greatly improved. The only deficiency we believe worthy of comment is the failure to have included in the plans criteria for measuring their achievement. The effectiveness of the programs cannot be expressed quantitatively in absence of pre-established explicit targets to measure the success of the programs.

The primary obstacle facing OTIS in marketing its services is cost. Our discussions with school district personnel indicate that a combination of what, in their opinion, is excessive cost for the service provided and taxpayer resistance expressed in budget elections, create a marketing problem for OTIS. Personnel at OTIS are continuing to develop strategy designed to overcome the problem.

STUDY METHODOLOGY

We performed the following tasks in evaluating the marketing and user training activities performed by OTIS.

1. Discussed and reviewed with OTIS management the plans developed at the start of the 1969-70 year for marketing and user training.

2. Discussed with OTIS management the actions taken during the year in regard to the plans for marketing and user training.

3. Obtained from OTIS copies of letters, memos, and other documents used in marketing and user training.

4. Obtained from OTIS information for use in evaluation. This information dealt with such areas as improved utilization, reduced errors, improved understanding by users and potential users, improved user satisfaction, etc.

5. Reviewed impressions of the marketing and user training efforts by the school districts contacted by OTIS.

6. Analyzed the information obtained in performing the tasks listed above to evaluate the plans and actions taken in regard to marketing and user training.

SUMMARY OF FINDINGS

The activities undertaken by OTIS to develop and carry out a marketing and user training program are described in the following paragraphs:

(a) Marketing and User Training Plan

A written plan for marketing and user training for the 1969-70 school year was summarized during August, 1969. The plan was developed by OTIS personnel with outside assistance from consultants and equipment vendor personnel.

The plan was based on several key concepts, including:

1. Present users must be satisfied with OTIS before other school districts would accept its services.

2. A major element of the marketing activities should utilize communication between peers (Superintendent to Superintendent, Board Member to Board Member, etc.).

3. OTIS must offer a desired and reliable service at prices which are economically feasible.

4. Personnel in addition to those in the Field Services Division must be involved in the marketing effort.

5. The marketing effort should be oriented toward decision makers - Superintendents, Board Members, Principals, etc.

The activities followed in carrying out the plan included:

1. Coordinator workshops and area meetings to provide current users with more complete understanding of OTIS and data processing and to determine specific problem areas requiring attention.

2. Intensive training efforts for the two new districts (Dallas and Tillamook) to facilitate a smooth transition to the OTIS system.

3. Regional meetings to present material on data processing and OTIS to potential users and to identify those districts which were sufficiently interested to justify follow-up activities.

4. Follow-up activities with individual school districts, based on their degree of interest.

5. Miscellaneous publicity activities, such as booths or presentations at conferences, feature stories in newspapers, contacts with professional and other organizations, etc.

The marketing and user training plan appears to be well designed. It is based on realistic concepts (user satisfaction, economics, peer group communication, etc.). The planned activities were oriented toward those districts and I.E.D.'s offering the greatest new user potential. The major shortcoming of the plan is the lack of specific measurable objectives which could be used subsequently in evaluating the results of the marketing and training activities. We recognize, however, that it would have been extremely difficult to set such objectives on a realistic basis for the first year of the program. The experience gained during the first year will facilitate the setting of realistic objectives for subsequent years.

(b) User Training Activities

The user training activities performed during the year included those described above - the coordinator workshops, area meetings, and the training efforts for the Dallas and Tillamook school districts. Our interviews with the school districts indicate that these efforts were effective in improving OTIS' reputation with its users. (In the case of Tillamook, utilization will be expanded to all schools in the county next year).

One drawback has been the inability of some school districts to assign a coordinator with sufficient time to do an adequate job. For

those school districts which have supplied sufficient coordinator time, however, the training has aided the coordinators in helping the district better utilize OTIS' services. In addition to the user training activities described above, the Field Services personnel performed a number of other activities in response to needs as they occurred, for example.

1. User manuals for the two types of terminals used with OTIS were re-written. The new manuals are in simple, non-technical language a make good use of photography to illustrate the various terminal operations. The new manuals appear to be a significant improvement as borne out by comments in our interview with users.

2. A training course for school secretaries was conducted at Lane Community College and drew high attendance from the Lane County Schools. Our contacts with the school districts showed that the secretaries regard the classes as effective. The course covered many basic computer concepts and makes use of several films.

3. Classes for teachers and administrators were conducted at Coos Bay and Cottage Grove, through the Division of Continuing Education Participation at Coos Bay was good, but the Cottage Grove class drew less interest. These were two unit courses, the initial unit dealing wi basic computer concepts; the second with the computer's use in education The course appears to be well designed around its objectives. It makes good use of a variety of material, including films.

4. Memos to OTIS users, on approximately a weekly basis, have been issued since October, 1969. These memos are used to advise users on any matter of general interest, such as common problems and their solution; new services; changes in present services, OTIS organization, etc. Our interviews indicate that these memos have been effective in improving communications.

(c) Marketing Activities

The marketing efforts during the year generally followed the marketing and user training plan. The following paragraphs describe the major activities performed and summarize our evaluations.

1. Area Meetings. The area meetings appear to have been an effective means for explaining the OTIS services. The meetings included participation from personnel of the Oregon Board of Education, present users to provide peer group communication, and members of the OTIS staff other than the Field Services Division.

2. Individual Follow-Up. These school districts and I.E.D.'s which displayed a degree of interest in the area meetings were selected for individual follow-up. The follow-up was keyed to the prospect's level and type of interest.

Our interviews indicated that the majority of the prospects were favorably impressed with both the area meetings and the individual contacts. These contacts have resulted in an improved understanding of OTIS and a more favorable impression of it.

The major single reservation about using OTIS was the cost. In dealing with this reservation, the Field Services Division was able to develop an approach whereby a user could accept less than the total package, with a corresponding reduced cost. The effectiveness of this approach is evidenced by the fact that of the seven new users (school districts or I.E.D.'s), only one, the Tillamook County I.E.D., has selected the full package. Despite the availability of partial packages, many potential users still regard the cost as too high.

Additional factors which may have limited the number of new users were the general economic conditions, the uncertainty of some school districts or I.E.D's which were considering possible merger with adjoining districts, and a degree of uncertainty about the future of OTIS.

The area meeting activities and individual follow-up activities were reported to OTIS management through internal reports. These reports described the degree and type of interest shown by the school districts and I.E.D.'s and served as the basis for planning further follow-up activities.

A final feature of the marketing activities is that they were planned and carried out as much as possible to fit into the yearly cycle. Efforts were made to get the message to the key decision makers in time for them to include the costs in the budget.

During May, 1970, the OTIS Field Services Division initiated its own questionnaire to obtain evaluations by the users regarding the services they receive. The 262 responses were summarized using one of the OTIS Programs. The survey bears out that users now have a generally favorable impression of the services they receive. Future surveys will have a basis for comparison to determine the direction and degree of change in user attitudes toward OTIS services.

(d) Miscellaneous Publicity

The OTIS marketing effort has included a number of activities designed to provide wider and more favorable publicity. Presentations have been given before the State Principal's Conference, Association for Education Data Systems, and the PPBS workshop. Contacts have been developed with the institutions of higher learning and the N. W. Regional Laboratory. Feature stories have appeared in newspapers in six to eight cities and in "Your Taxes" published by Oregon Tax Research.

CONCLUSION

The marketing and user training plan was based on realistic concepts and included sound approaches for improving the OTIS reputation among present users and for communicating its services to potential users.

Our interviews indicate that the present users feel that the timeliness and accuracy of the services they receive from OTIS and the

quality of their communications from CTIS have greatly improved over the past year as a result of the marketing and training efforts. Our interviews with potential users indicate that their opinion of CTIS has similarly improved, although cost still remains a major obstacle to wider utilization. The marketing activities have resulted in additional users who are expected to provide approximately $59,000 in revenue during the 1970-71 year.

Based on the indications mentioned above, we believe the marketing and users training efforts of CTIS during the 1969-70 year have been effective, although we are unable to quantify the resulting versus planned achievement.

* * * * * *

During the course of our work on the study we received the best of cooperation from CTIS personnel and individuals contacted in the school districts and I.E.D.'s. We are grateful for this assistance and appreciate the many courtesies extended to us.

Yours truly,

Peat, Marwick, Mitchell & Co.

OREGON
BOARD OF EDUCATION

942 LANCASTER DRIVE NE ° SALEM, OREGON ° 97310 ° Ph. (503) 364-2171 Ext. 1602

TOM McCALL
GOVERNOR

BOARD OF EDUCATION

Dr. ELEANOR BEARD, Chairman
1580 S. Skyland Drive
Lake Oswego 97034

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1010 Corbett Building
Portland 97204

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Oakland 97462

FRANCIS I. SMITH
600 Morgan Park Building
Portland 97205

W. WARREN MAXWELL
Route 6, Box 144
Lakeview 97630

FRANK J. VAN DYKE
110 E. Sixth
Medford 97501

FRANK M. WARREN
621 S.W. Alder
Portland 97205

DALE PARNELL
Superintendent and Executive
Officer of the Board

JESSE FASOLD
Deputy Superintendent and
Secretary of the Board

TO: Mr. Kenneth Stanhope, Chairman
Advisory Committee on Educational Data Processing

FROM: Subcommittee on Review of Oregon Total Information System (OTIS)

SUBJECT: Subcommittee Report on OTIS

The subcommittee appointed by you at the first meeting of the Advisory Committee on Educational Data Processing has reviewed the present status of the Oregon Total Information System (OTIS) and respectfully submits this report. In order to meet the deadline for reporting by the second meeting on January 14, 1970, the subcommittee has restricted its review and its recommendations to the question of whether the full committee should take a position concerning OTIS's future existence as a service to the school districts of the state of Oregon. Our recommendation with reasons summarized in Part I. Several necessary observations relating to the subcommittee's findings are presented in Part II.

## PART I: RECOMMENDATION

The Committee should recommend the continued existence of OTIS as a data processing service organization for school districts.

OTIS provides a range of business, student service and educational data processing programs that cannot be obtained from any other one source in Oregon.

OTIS provides record keeping, reporting, etc., that are in compliance or conformance with State requirements. This is very important since school districts must operate under those reporting requirements. Commercial service bureaus and other sources that are not specifically oriented to Oregon school administration may be able to meet the requirements directly or may only be able to provide outputs that would have to be adapted by the customer to Oregon requirements.

After an initial period of difficulties, which is normal for any new organization of its type, OTIS has made substantial improvements in its programs and operations. The staff has benefited from significant reorganization and personnel changes that have been made recently. The effect of improvements has been reflected in favorable comments and compliments received from customers in recent weeks as compared to the criticisms received earlier.

A large school district with adequate manpower and financial resources could conceivably provide for itself the same variety of data processing services that OTIS offers. A school district with employees who are knowledgeable in the data processing field might secure "packaged" services from commercial sources or other non-profit service organizations. However, the majority of school districts in Oregon at this time are neither large enough to be self sufficient nor staffed with trained staff that could effectively manage a program of procured services from commercial vendors. Thus, OTIS stands in a unique position today in being able to (1) provide a wide range of services, (2) that are oriented to State requirements, (3) through a competent staff that has gained wide experience in dealing with the data processing needs and problems of Oregon school districts.

This recommendation does not constitute an unconditional or unqualified endorsement of OTIS to every school district in the state. Each school district must, in the final analysis, make its own determinations as to whether (1) it needs one or more types of data processing services, (2) can afford the cost of such services, and (3) whether OTIS would be the best source of services. There are a number of considerations that must be examined which will vary according to such factors as size, location, quality of present programs and procedures, availability of alternative or competitive service organizations, and financial condition. In the second part of this report, we will touch upon some of these considerations.

## PART II: OBSERVATIONS

The subcommittee in making its review of OTIS noticed a number of conditions or situations that point to the need for the type of study the Advisory Committee on Educational Data Processing was established to perform. Several of the most significant are discussed below.

A. Need for Definitions and Guidelines.

Reports and other literature dealing with educational data processing in Oregon emphasize hardware. The tendency has apparently been to "computerize" existing procedures or systems and to allow the hardware to determine criteria and guidelines for current operations and future change.

The primary need is to reassess our information requirements from both the administrative or business management viewpoint and from the educational use viewpoint. Out of this reassessment should come goal definitions, standards and criteria and guidelines to direct and assist school districts in acquiring data processing services.

B. Need for Technical Systems Assistance.

Even after basic statewide objectives are defined most school districts do not have trained personnel to handle the analysis and systems development work that is necessary to an economical and efficient transition from manual to computer oriented procedures assuming such a change is beneficial. For example, the determination of comparative benefit-to-cost relationships which is a key tool for objective decision-making in such cases is dependent upon the ability to identify accurately current costs and projected future costs. Even OTIS is not able to cost its services and programs in detail but works on the basis of overall per-ADM annual costs for the complete package of services.

The State Department of Education is the logical agency to coordinate and provide systems analysis assistance to school districts. While the Department cannot directly provide all the assistance needed by school districts, it should be in a position to help them obtain systems analysis services where its own personnel cannot provide direct assistance.

C. Need to Identify Sources for Educational Services.

While OTIS should be endorsed and supported, by its own statements OTIS can handle a maximum clientele of about 150,000 ADM. OTIS was never intended to be the only statewide central service center. Therefore, the data processing needs of the majority of Oregon primary and secondary schools must be served by other means. The Department of Education has to provide assistance in locating or selecting various alternate ways of securing data processing services. OTIS represents only one way that these services can be provided. Before such alternatives can be determined, however, the needs must be defined and methods for evaluating between alternatives have to be developed.

## CONCLUSION

OTIS is presently a unique source of data processing services for elementary and secondary school districts in Oregon. OTIS is operating effectively now and is continuing to improve its programs and its operations. OTIS is not the ultimate

answer to statewide educational data processing needs. However, OTIS could be a model for a statewide plan in many respects; and OTIS can definitely be a major element in the ultimate program for providing services. Therefore, OTIS needs to be supported until (1) a state plan is developed and implemented and (2) its place in the plan is determined or a better means for serving OTIS customers is established.

Miles Green

Walter Commons

Hideto H. Tomita, Chairman