

## ● Innovations in Education

### EDUCATIONAL INFORMATION CENTERS

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AS WE view the vitality of the "new education" and appraise the impact of the infusion of large amounts of new private and public funds into the educational enterprise we consistently find that more and more people want more and more information about education. They not only want more information, but better information.

One kind of information that is sought is the raw knowledge that is to be transmitted through the curriculum of the nation's schools and colleges. Another kind of information is that required by the administrators and planners of our nation's educational programs. This kind of strategic use of information has been much in demand in recent years. Yet another kind of information need is that required by local teachers, principals, and superintendents, simply to keep the doors of the school open. Class schedules, student schedules, academic marks, test scores, attendance and like data, constitute important tactical information necessary in the operation of the day to day classroom activities.

Education has for many years generated a great deal of information about its pupils, its programs, its organization and structure, its goals, and

its performance. Therefore, one might assume that there has grown a rigorous discipline of systematic records within the profession. In fact, no such generalizable system has been devised, and education finds itself adrift in a sea of isolated facts and meaningless statistics. Technological innovations in the form of data processing hardware and computers as well as conceptual innovations are now beginning to emerge as a means of handling this problem.

Educators may choose from a number of organizational alternatives in "gearing up" to meet the information problem. The local school may choose to purchase or lease the required equipment, hire the needed personnel and develop the necessary programs, plans and other software. Given appropriate and adequate resources in personnel, hardware and software, this alternative probably represents the superior choice. However, the capital and personnel investment required by this strategy is large.

Local installations can be organized on a multiple-district, cooperative basis, through intermediate school units or simply shared with other districts. Service contracts can be negotiated with the many agencies in the data processing business, with businesses

willing to share their own data installations, or with educational agencies willing and able to help local districts. Conceivably, state departments of education or professional associations could underwrite the relatively large initial investment needed to establish an information system. The newly formed regional laboratories also represent appropriate resources for the development of sophisticated information systems.

The educational information dilemma is essentially a local school dilemma. In addition, universities, study groups, professional associations, regional laboratories, state and federal governments all have a vital vested interest in what the local district does with its information system. Because of the historical development of education as a state function in the United States, the state stands closest to the local district in its need for educational information.

### **The Iowa Approach**

A unique cooperative approach to the local school's data dilemma is being tried in Iowa. This approach brings the local school districts, the State Department of Public Instruction and The University of Iowa together in seeking a more orderly development of educational information systems.

The Iowa Educational Information Center is the organizational creation of this union of interests. The intent of the coalition is to combine the State Department's need for comprehensive data with which it can carry out its regulatory and leadership functions with the University's research interests, while simultaneously serving the information needs of Iowa's local school districts.

The University and the State Department joined in this cooperative venture with the Measurement Research Center, a not-for-profit, University-based corporation with a long and influential history in data processing and test scoring. The Measurement Research Center is able to contribute leadership skills, technical staff, and data processing capabilities to the program.

Prior to, and undergirding the formal establishment of this new Information Center in December 1963, the Iowa Center for Research in School Administration had been experimenting with local school districts on problems of student scheduling. A dozen high schools worked with the University in actually scheduling their students. This early experimental program of services was named UPDATE, which stood for *Unlimited Potential Data through Automated Technology in Education*. This program of services persists today as one phase of the developmental work of the Information Center.

The UPDATE program currently includes student scheduling, student rankings, the reporting of academic marks, attendance accounting, and permanent record information. The UPDATE program at present involves over sixty thousand Iowa students and a few demonstration programs beyond the boundaries of the state.

The larger purpose of the Information Center goes beyond planning and providing this kind of tactical information to the schools. This significant work of the Center is an attempt to provide statewide strategic planning information to and about pupils, teachers, supervisors, counselors, administrators, school board members, and parents.

Carefully defined pupil information was first collected on a statewide basis from all secondary school students, in May 1965.

The instrument devised to collect this information was given the name CardPac. A pack of prepared machine readable cards was made available to each public secondary school student throughout the state. The first of these cards was used to identify the student as an individual. Two cards were used to collect basic information such as that normally found in school records: student age, sex, home address, telephone number, etc. One card was used to collect responses to a pupil inventory questionnaire and a series of class section cards was used to obtain information about each of the classes in which the student was enrolled.

CardPac was designed to be "read" by document scanners developed by the Measurement Research Center. These high speed scanners made it possible to read the three million cards, representing 227,079 secondary school students, collected in that first year of operation. In the spring of 1966 the statewide CardPac program was repeated for secondary schools and an initial abbreviated information program for Iowa's elementary schools was initiated. Currently the third year of operation of this continuing system is in progress. Each year detailed reports describing the student body of each local school system were prepared by high speed computer printers and distributed in multiple copies to local school districts.

Three features of CardPac were: (a) the statewide questionnaire; (b) the semi-permanent student identification system; and (c) the ability to associate

any one item of data with any other item. The questionnaire card was used to collect information about the student's aspirations and expectations for further education and occupations, his attitudes toward school, the occupational and educational background of his family, current academic preferences, extra-class activities, work and homework, and similar items of concern to teachers and educators in general.

Student identification was accomplished by assigning student numbers within each school district. These numbers follow the students through school as long as they stay in the same district. If a student moves, his number is traced, making possible a wide variety of longitudinal research studies. It is one thing to collect information on a large scale, quite another to store it so that it is retrievable for many different purposes, and in different ways as defined by local school teachers and administrators. This feature requires that any selected data item can be associated with any other. Thus analyses by student, grade level, sex, age, ability level, school, school district, geographic area, etc., are not only possible but practical.

This ability to associate one bit of information with yet another is characteristic of the concept of an information system. For example: Through the Iowa Testing Programs nearly every student can take the Iowa Tests of Educational Development, or the Iowa Tests of Basic Skills, as a part of a generalized testing program throughout the State. The CardPac information system was planned in such a way that the test data accruing through the Iowa

**Testing Programs** could be integrated and associated with the kind of basic pupil information just described. Thus, information about the pupil's courses, including academic marks, could be combined with test scores for each pupil.

In addition, the state's professional staff reporting system was modified in order that it too might be associated with the pupil subsystem. The professional staff data include official teacher certification records, academic preparation, past experience, salaries, grade levels, academic assignments, etc. Thus the information system now provides the capability of analyzing what was taught, to whom, and by whom.

Current work in the Center deals with the nature of the school facilities and environment and the financial costs associated with the educational programs. Ultimately the Center's system should be able to answer the questions —Who was taught?—What was he taught?—By whom was he taught?—In what kind of facilities?—At what cost? Assuming this level of achievement, it should be possible to better analyze our current educational environment, and to project into the future the effects of policy decisions currently under consideration. It may even be possible to establish and maintain meaningful and realistic performance criteria throughout the several levels of our educational enterprise.

### **Other Considerations**

Careful planning of the system was maintained throughout its development. Classroom teachers, counselors, supervisors, principals, central office staff

and superintendents participated in its development. In addition, research workers, members of the State Department of Public Instruction and University personnel advised and assisted the Information Center staff in the development of this large-scale information system. Funds from local school districts, the State Department, Measurement Research Center, and the University were employed during the development stages of this program. However, the principal support came from two major sources: The U. S. Office of Education (Cooperative Research Project No. E-031), and the Ford Foundation.

In addition to its work with the UPDATE and CardPac programs, the Information Center staff is active in a number of other directions. Foremost among these perhaps is the development and operation of a sophisticated central data bank for research purposes. It is currently involved in assisting the evaluation of Title I projects throughout the state. Through the Interagency Case Information Service, it is helping to develop a statewide resource in the field of mental retardation.

The Center also assists local school districts in planning and establishing their own local information systems, including the use of local computer facilities. Some success in this direction is indicated by the recent establishment of a number of local as well as intermediate unit data processing programs and several other programs focusing on educational information with funds supplied through Title III of the Elementary and Secondary Education Act. It is felt that local school districts should

be doing as much as possible of their own information processing. At this time it is obviously necessary to link together our many relatively small administrative units as they try to build data processing capabilities. In the long run this developmental partnership between local and state agencies should result in an enhanced statewide information approach.

## Persistent Problems

A number of problems were found strewn along the developmental path of this statewide information system. One of the most difficult was that of devising a numbering system which would identify each student throughout his school experience. This important ability to trace individuals longitudinally, useful in many research studies such as dropout behavior and exceptional student abilities, also means that any one person in the group can be isolated for study.

This raises the issue of an individual's right to privacy. The security of school and personal records represents a real concern for many educators as well as the general public. The Information Center employs tight security over its files and normally provides only summary statistics to qualified researchers using the data. Beyond this level of generalized identification, permission to use information, individualized by district, school, class, etc., must be obtained from the local school. The moral and legal issues associated with these new information systems are currently in flux throughout society. For example, should we store school records on pupils and staff indefinitely? If one makes a mistake should that rec-

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ord be maintained indefinitely? Does one get a second chance?

Tax reports, drivers licenses, social security benefits, credit and banking reports and many other facets of modern living can be associated with computerized information systems. The way we use our new data systems is just as important if not more important than the technology that made them possible. The value of an information system is too great to junk it

and the issue of privacy is too important to shrug off. We will have to make hard choices among alternative data protection systems. The educational community should be in the forefront in seeking reasonable and workable solutions to this problem.

Another problem faced by the Iowa Center and one to be faced by others is somewhat technical but so crucial that it shall be included here. One side of this argument states that the entire information system must be planned as a whole with all the many bits and pieces fitting together—the systems approach. The other side asserts that we can accomplish the same thing by developing each application separately (scheduling, attendance, staff, etc.) and that by defining and coding the data very carefully, the needed association can ultimately be achieved. In fact, neither side of this argument has yet proved its point in operational terms. The force of logic is on the side of systems rather than the application approach. Economic realities have so far prohibited a real operational test of this concept. Currently the most feasible means of solving this dilemma appears to lie in planning the entire information system as an entity but in implementing this plan on an application by application basis as increments in our resources become available.

One of the largest tasks facing the Information Center was that of informing the local school districts about the new data collection procedures and use of the information reports received by the local school staffs. Included in this problem was the selection of the most appropriate information for inclusion in the system. It is possible for such a

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large data system as the one just described to end up with simply a big bucket of facts.

Unless these facts are pertinent to the real problems faced by classroom teachers, administrators and other educators, they will be of little value. The science of information is still in its infancy. It is very difficult for researchers and educators to specify precisely *that* information of most worth. The *a priori* definition of all parameters of potential utility to educators is an immense and nearly hopeless task. To date, we must simply rely on the best intelligence available, the best seat-of-our-pants guesses. Our systems will no doubt continue to be revised and improved as we learn more of this new demanding science. 

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