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ELECTRONIC DATA PROCESSING AND THE MAINTENANCE OF INDIVIDUALIZATION IN THE SECONDARY SCHOOL

by

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APPROVED BY	DATE
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Clifford H. Dale

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CHAPTER I

THE PROBLEM: DEFINITIONS AND METHODS USED

The educational administrator in a school system of almost any size today has suddenly come into contact with electronic machinery capable of assimilating and using data at a speed thought of as impossible just a few years ago. In fact, the first refined commercial electronic data processing system dates back only approximately thirteen years.[1] The installation of computers has progressed from 3,613 in 1960 to 22,496 in 1965. By 1970 the International Business Machines Corporation alone expects to have 70,000 installed computers.

The installation and hence utilization of electronic data processing systems in the public schools, therefore, will be one of the significant aspects of future educational management. Grossman and Howe give indication of this in their now two year old book as they comment:[2]

> For the first time in the history of education it is feasible and practical to develop a system that (1)

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[1] D. S. Halacy, Jr., Computers: The Machines We Think With, Harper and Row, New York, 1962, p. 171.

[2] Alvin Grossman and Robert L. Howe, Data Processing for Educators, Educational Methods Inc., Chicago, 1965, p. 8.

allows the development of a historical file on all pupils, starting at kindergarten and extending until they leave school; (2) makes available the data for prediction studies, validation of curricula, correlation of test scores, marks, attendance, and other factors; (3) prepares reports and needed statistics when required, and while usable rather than after they become obsolete; (4) presents the opportunity to relate student performance to curricular data that can be programmed for individualized units of instruction, taking advantage of all the best instructional aids and audio-visual devices, and that will permit the development of the most effective program for each pupil.

Murry Tondow was quoted in John Loughary's book, Man Machine Systems in Education, as follows:[3]

> It is apparent that the computer represents one of the major social as well as technological changes of our time. It is equally apparent that we have not yet learned how to fully utilize this equipment and have limited sense of its ultimate impact. About ten years ago it was felt that ten to twelve large computers (which today could be considered small in terms of capacity) would more than serve all the information needs of the United States. With over 25,000 computers now in the United States it is apparent that few people had any real insight into the power and role of the computer in the changing world--or in its changing the world.
>
> The importance of the computer does not lie in the direction of super calculators, but rather in its social and intellectual meaning as an extension of man's ability in problem solving. That it has a special contribution to make to education must be self-evident.

Professional educators who must correlate, supervise, and often inspire the adoption of automatic data processing techniques have, then, the responsibility to maintain the

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[3]Tondow, Murry, "Computers: Concepts and Hardware," from Man Machine Systems in Education, John W. Loughary, Harper and Row, New York, 1966, p. 30.

principles and values which have become interwoven into the American educational pattern. The desire to make use of accumulated data and the solving of multi-faceted problems cannot over-shadow the fact that educational leadership and hence schools have varying philosophies and goals, the maintenance of which is important within any new pattern of administrative improvements.

Much of the current writing seems to point out that educators, not technicians, must be responsible for guiding the functions and implementation of electronic data processing systems. Whether a task is possible can be solved easily by a technician; whether the task is merited must be an educator's decision. The act of successfully programming an educational function on the computer could be compared to many other similar purely programming functions. While the mechanics and language are readily learned, the person writing a program representing the trajectory and ballistics of a missile must be proficient in mathematics and physics. The skill of programming merely enables this function to be described in computer language. While it is true that many educational decisions will be made following the implementation of electronic data processing merely because the accumulated material may point out some area needing attention, it is the writer's contention that during the very installation of data processing procedures administrative educational

guidelines are definitely needed. Many of the elements of individualization are found among the most insignificant of present procedural practices. Educationally these must be jealously guarded against the mass approach possible if done only in the name of computerization.

I. THE PROBLEM

In this study an effort has been made to seek specific evidence of what is being done to maintain and perpetuate individualization during the adoption and use of electronic data processing. An attempt will be made to construct successful guidelines for the formulation, installation, and utilization of data processing systems that will enable schools to maintain present effective techniques of individualization, yet use the diversity of the computer to gain new levels of individualizing student scheduling, planning, and record keeping.

Specifically, the author has attempted to identify (1) current and proposed educational adaptation of data processing; (2) specific problems encountered within electronic data processing utilization that would be considered infringements upon current procedures; (3) notable research pointing to individualization gained through adopting electronic data processing procedures.

Itemized, then, the purposes of this investigation were to determine:

1. What specific procedures will best guarantee the successful use of electronic data processing, yet not lose sight of individual student, teacher, and school identities?

2. What is the current status of automatic data processing in student scheduling and record keeping?

3. What supervisory techniques appear necessary to guarantee the educational use of electronic data processing?

4. What beneficial information has been derived from the author's position as supervisor of a pilot implementation of electronic data processing in a high school program?

5. What ramifications for future educational thought will further extension of electronic data processing systems cause?

6. What personal and personnel factors are important to insure the most effective installation and utilization of electronic data processing?

As an outgrowth of determining answers to these questions it is hoped that a series of guidelines in the form of valid considerations can be offered as assistance to school administrators who must be the practitioners of future educational developments.

II. DEFINITIONS OF TERMS USED

For the purpose of this study the following definitions of terms will be used:

Electronic Data Processing (EDP): The process of rapid accumulation, sorting, and processing of information through the use of electronic computers.

Individualization: The maintenance of student identity through instruction, scheduling, maintenance or records, and development of curriculum. The additional process of being able to make individual adjustments in programs and record keeping caused by attention to details affecting each student, teacher, and learning situation.

Since to some the vocabulary of electronic data processing is unfamiliar, a glossary of basic terms is provided as Appendix A.

III. BACKGROUND AND ORIGIN

The stories of loss of identity through the process of automation while generally unsubstantiated in fact are legion. Keeping abreast of new techniques caused by computerization has become an almost impossible task. Developments in hardware have involved miniaturization and speedup of activities and systems to a degree impossible for laymen to appreciate. The challenge of doing more and more at an ever increasing speed has become, on the surface at least, ideally suited to the multitude of clerical tasks in education.

It would seem that the very foundation and uniqueness of the American educational scheme depends on the maintenance

of a degree of individual identification of each student. This in turn would seem contrary at first glance to the casting of many names or numbers into a computer to receive blocks of information on a purely objective and calculated basis.

The initiation of this study came partly as a result of a job assignment. As assistant principal of Omaha Central High School it became the writer's responsibility to supervise and coordinate the establishment of a complete data processing system of student scheduling and student record keeping using local school district equipment. This meant, in essence, a correlation with machine specialists in the adoption of the principles of electronic data processing into one of the most traditional high schools in the midwest. These procedures would the following year be introduced into the remaining six Omaha public high schools.

Soon two aspects became apparent during this somewhat critical though exploratory and organizational stage. First of all, the installation of data processing methods had to be proven worthwhile, a task involving personnel and morale problems among professional and clerical staff members. Secondly, it was easily noted that minor exceptions to gross procedures were annoying; yet, it was these minor provisions which in many ways seemed to truly individualize our current methods.

It is felt that carefully reflecting upon these

problems coupled with an in-depth study of current electronic data processing procedures logically could provide a set of specific and needed guidelines for future assistance to other school administrators faced with a similar problem.

IV. THEORY

The future of educational systems will certainly be heavily influenced by electronic data processing equipment and its related developments. Whether this will become a purely mechanical function or one involving the best of educational thought will depend largely upon the adaptability and foresight of present and prospective educators. To assist these particular people in their relations with this new technological field there appears a distinct need for definite patterns or guides that can be used as suggestions to be followed during the implementation of an electronic data processing system. Not all educators are or should be authorities on electronic data processing use and employment. In fact, in the current maze of necessary attributes for successful school administration specific knowledge of data processing cannot be demanded or probably desired for every person. Fledgling school administrators, however, will be responsible for the efficiency and justification of any system under their control. Whether this process is guided by the best in educational thought will, or should be, solely the responsibility of educationally trained school specialists.

V. BASIC ASSUMPTIONS

A basic assumption of this study has been that new procedures in education must be related to the fundamental tasks of teaching and learning. Teachers should be able to realize advantages if they are asked to modify long standing procedures.

No one can deny the continuing influence of automation in the clerical, organizationl, and informational functions of all operations involving massive amounts of raw data. It must be assumed that good management techniques would dictate utilizing the advantages of data processing in education just as these have been proven irreplaceable in the various businesses and industries.

For the purpose of this study it is assumed, therefore, that selected procedures of electronic data processing can and should be used in school systems. The methods of implementation and use, however, will depend on certain internal restrictions and regulations arrived at as much as possible based upon educational philosophy and doctrine.

Specifically, the hypothetical foundation for this study has been formulated under the following assumptions whose merit it is hoped will be strengthened by the investigative procedures of the total project:

1. The successful utilization of data processing in a secondary school is determined by the thoroughness and

accuracy of the reported material.

2. The origin and control of data processing procedures must be educationally oriented with the adoption of such practices arising to achieve desired goals.

3. Beginning with the establishment and planning of data processing procedures certain guides are necessary to insure efficiency of operation yet individualization of student interests and controls.

4. One of the principal advantages of data processing to school personnel will be the production of data of current importance which may be utilized to improve the total school situation.

VI. SCOPE AND DELIMITATIONS

This study will include research into successful data processing applications in secondary school situations as well as a review of appropriate literature. Reflection based upon the personal experience of being involved in the adoption of data processing installation on a pilot basis at Omaha Central High School will also be generously used both directly and indirectly. An attempt then will be made to generalize some useful reference points capable of being used in a secondary school to maintain an individualized approach towards student enrollment and record keeping.

This study does not involve itself in the many budgetary and business possibilities of electronic data

processing nor will it enter into anything other than the secondary school level of utilization. The use of the computer with instruction and teaching will also be eliminated from this approach since this would seem to be highly involved in the psychology of learning, teaching methods and instructional strategies, to say nothing of the developing role of software in the refinement of computer assisted instruction.

VII. PROCEDURES USED

Review of Literature

For purposes of gaining background knowledge in the utilization of electronic data processing and determining current developments in the field, a survey of the following written sources has been made:

1. A review of published books dealing with the subject of educational use of data processing as related to student accounting and record keeping on a secondary school level.

2. A review of literature published in educational periodicals since 1959 related to the topic.

3. A screening of dissertations and dissertation abstracts published on electronic data processing and education since 1959.

4. A solicitation of materials from private industry concerning their developments in the field of education.

This literature was reviewed with particular emphasis on the following questions:

1. In the establishment of an electronic data processing system are any specific guides furnished to guarantee the retention or enhancement of individual characteristics?

2. Are the sources of data processing containing procedural information developed by school personnel or by specialists in computer-use and technology?

3. What information can be used to better prepare the teaching and administrative staffs of a high for the implementation of a data processing system?

4. Following the use of data processing techniques, what analysis can be performed to guarantee individualization in scheduling of students and student record keeping?

5. What recurring themes are found throughout the current literature on educational data processing?

Study of selected schools

Based upon preliminary reading and conversations with knowledgeable people in the field, the following schools and their implementation of data processing procedures were studied:

1. The Omaha Public School System is currently introducing computerization into all secondary school scheduling and grade and attendance reporting. This has offered a unique opportunity as described earlier to have a part in the

implementation and compilation of experiences.

2. Since Iowa schools are deeply involved in EDP reporting through the leadership of Iowa University, a sample study of the Iowa Card-Pac system was accomplished by visitation to the Council Bluffs, Iowa, public school system. In addition documentation materials were secured from the Area 9 Schools Information Center, Bettendorf, Iowa, which were particularly valuable because these represent the output and instructions of a sub-area organization for the administration of educational data processing.

3. Representatives of International Business Machines and much of current literature points to the Memphis, Tennessee, schools as the forerunner in educational systems in the possession and utilization of electronic data processing equipment and procedures. A visit to Memphis was made during July of 1967 to gain all possible resource data and interview EDP personnel and school principals involved in EDP.

VIII. SIGNIFICANCE OF THE STUDY

Because of the recently increased availability of federal funds under the Elementary and Secondary Education Act, educators today are being catered to by the sellers of hardware. By its very complicated and electronic nature a computer may be easily sold through glib presentations of a myriad of predicted uses and outcomes. Unfortunately,

however, the use of these machines in education must be guided by educational thought and procedure. A. V. Grossman in an article published in the National Association of Secondary School Principal's Bulletin made this statement:[4]

> While no technology can make decisions, it can put tools of decision making into the hands of the right people at the right time.

The AASA Committee on Electronic Data Processing made a lengthy presentation concerning the impact and potential of EDP in education.[5] The following is a small portion of that report:

> Many forces acting singly and in concert have produced a world set in turbulent motion. The computer, a relatively new invention, deserves credit for some of the ferment. It may do more to modify the shape and destiny of our world than did the invention of the wheel, the printing press, or the industrial revolution.
>
> No life will be left untouched by the pace of the technological revolution. The change generated appears to feed upon itself; the greater the rate, the greater the pressure for more. It would be unrealistic to assume that education will remain unaltered in a society committed to radical and unending change. A dynamic culture develops an almost insatiable appetite for services, particularly educational services. Furthermore, society demands more from its social institutions when faced with stresses and strains.
>
> Schools are changing in response to social forces. The functions of education have been redefined to

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[4]Alvin Grossman, "Data Processing: An Answer to the Shackles of Paperwork and Decision Making," National Association of Secondary School Principals Bulletin, April 1962, pp. 17-18.

[5]AASA Committee on Electronic Data Processing, Report to the American Association of School Administrators, May 1967, pp. vii-xi.

include expanded concern for a whole range of social problems as well as transmission of the cultural heritage. A new look can be found in what is taught, how it is taught, who is taught, and how long each person is taught. But are schools moving fast enough to keep pace with a world in ferment? This is the nub of the issue.

Responsibilities confronting the school administrator have multiplied in number and complexity. Traditional approaches to dealing with the demands of our times have been found wanting. The school administrator of today is beginning to look for assistance to the promise of a new administrative technology based in part on electronic data processing and the computer. Although the computer adds fuel to fire the forces of change, it can serve as a vehicle for coping with the very intricacies created. This powerful and sophisticated tool, just out of its teens is beginning to affect the very fabric of society, sparking amazement and apprehension. As an invention hailed as possessing more beneficial potential than any other in history, it is bound to have a profound impact on school administration as well.

That this is something more than idle speculation and empty promises by wild-eyed dreamers is demonstrated by the dramatic events surrounding computers in science, medicine, government, and business. The computer already has been put to work at hundreds of tasks ranging from the pedestrian to the sophisticated, from the mundane to the exotic. It is everywhere and is multiplying at a phenomenal rate. It can quickly solve complex equations, diagnose some human ailments, individualize some instructional approaches, prepare weather forecasts, check income tax returns, route long distance telephone calls, set newspaper type, and mix cake or cement--the list of applications never stops growing.

But what can it do for school administration? The uses of the computer and electronic data processing in administration of public education are limited only by the imagination of professional administrators.

. . . . . .

The AASA committee on electronic data processing states unequivocally that one of the important professional talents for an administrator today is proficiency in the use and direction of electronic data processing, software and hardware.

The responsibility of possessing such information is awesome and will make the job of the educator of the future

even more demanding. Upon him will depend the guidance of the total educational program through the implementation of such procedures. Upon him will depend the proper interpretation and utilization of the data received as a result of such a system.

In the following chapter an analysis of the material studied and the systems investigated make possible the preparation of a list of specific guidelines. The specific intention of this inquiry is that these guides will assist in guaranteeing that the implementation of electronic data processing procedures will enable secondary schools to retain and enhance an individualized approach to each student's record and placement within the curriculum.

CHAPTER II

REVIEW OF LITERATURE

There are five varied sources of information concerning data processing and education available today to the person seeking reference materials in this field. First of all, there is an increasing number of books being published on this rather narrow application of a technology with unfathomable capabilities. Not only are some now reflecting the thinking and learning of pioneers in this area, but they also include bibliographies of great value from which subsequent secondary sources can be derived. Secondly, increasing numbers of periodical articles on the subject are being given space in educational publications and periodicals whose entire content concerns EDP in education such as the Monitor produced by the Association for Educational Data Systems. While these by their very length cannot present deep and involved information, they do serve to identify current thinkers and projects in the area of the educational use of electronic data processing.

Third, because EDP will be the prerogative of many somewhat youthful school administrators, doctoral research studies are beginning to serve as a source of documentation