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ELECTRONIC DATA PROCESSING--ITS PLACE IN THE

ADMINISTRATIVE AND ACADEMIC AREAS AT

EASTERN ILLINOIS UNIVERSITY

(TITLE)

BY

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YEAR

I HEREBY RECOMMEND THIS PLAN B PAPER BE ACCEPTED AS

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CHAPTER

INTRODUCTION TO ELECTRONIC DATA PROCESSING AT EASTERN ILLINOIS UNIVERSITY

Definition of Electronic Data Processing--Before attempting to define electronic data processing, a definition of the term data processing is needed.

Data--a group of facts or statistics¹

Processing--a series of actions or operations definitely conducting to an end.²

A combination of the two definitions gives the meaning of data processing as a group of facts or statistics, upon which are performed a series of actions or operations conducive to an end. In simpler terms, data processing is simply the handling and manipulation of information. It follows then that electronic data processing is the handling and manipulation of information by men, utilizing the speed, accuracy and tremendous power of electronic equipment.

There are many areas of data processing, but it can be generalized into two basic types--business and scientific.

Generally, data processing can be classified as either business data processing or scientific data reduction. Business data processing includes all necessary activities of business such as payroll

¹Webster's New Collegiate Dictionary, G. & C. Merriam Co., Riverside Press, Springfield, Mass., 1956, p. 210.

²Ibid., pp. 672-73.

preparation, sales analysis, inventory control, cost accounting, and general accounting. Business data processing can be further classified as mandatory and operational. Mandatory processing satisfies the requirements of government, stockholders, customers, unions, and other legal agreements. Operational processing is performed to advise management of the status of the various units of the company so that appropriate action can be taken. Scientific data reduction includes the analysis of data acquired and used for engineering and research purposes.³

It is important to keep in mind that electronic data processing is not an end in itself but is a means to an end.

Data processing is a means to an end and unless the results of the processing are used to obtain something of value, the data processing itself is valueless. We should not process data just to process data.⁴

Throughout this paper, the use of the term electronic data processing shall mean the utilization of electronic equipment in the handling and manipulation of information to reach some desired end.

History of Electronic Data Processing at Eastern Illinois University--The initial planning for an electronic data processing installation was made during the later part of 1954.⁵ At that time, Eastern's enrollment was approximately 1600 students. The primary application that brought about

³Richard N. Schmidt and William E. Meyers, Electronic Business Data Processing, Holt, Rinehart and Winston, New York, 1963, pp. 1-2.

⁴E. Wainright Martin, Jr., Electronic Data Processing, Richard D. Irwin, Inc., Homewood, Illinois, 1961, p. 17.

⁵Letter from H. K. Downey, IBM Branch Manager, Terre Haute, Indiana, October 4, 1954.

the need for a faster and more effective method of handling data was that of student registration and processing of grades.⁶ The installation was started with the bare essentials in terms of equipment and was handled by one man. The first two or three years after the equipment was installed, the utilization of the equipment grew at a slow rate. People seem to distrust what they do not understand. Most people are not familiar with electronic equipment, and they tend not to accept it too readily. Since that time, more and more applications have been systemized to utilize the equipment. The initial installation consisted of a card punch, a card sorter, and an accounting machine. During the next seven years, a collator, an interpreter, and a reproducer were leased. In November of 1962, an IBM 1620 computer system was installed to be incorporated with the already existing equipment.

In March of 1961, a full-time key punch operator was employed; Eastern now has two full-time people working in the installation. The office that housed the installation was called IBM Machine Records. It continued under that name until the computer was installed in 1962. At that time the name was changed to Computer Center.⁷

The cost of the initial equipment was \$232 per month.⁸

⁶Ibid.

⁷Letter from Dr. Maurice W. Manbeck, Registrar, Eastern Illinois University, Charleston, Illinois, January 9, 1963.

⁸Downey, loc. cit.

The cost of the equipment today is \$1152 per month.⁹ This cost would be much greater if it were not for the educational discount allowed Eastern. All of the equipment is leased from the International Business Machines Corporation. Their policy is this, that all educational institutions are allowed an automatic 20% discount. But if students are allowed access to the equipment, and the equipment is included in the instructional program, the discount goes up to 60%.¹⁰ Therefore, the Computer Center at Eastern is being charged only 40% of the actual lease amount of the equipment.

The administrative chart (Fig. 1) shows where the Computer Center falls in relation to the administrative organization.¹¹ As illustrated in the chart, the Computer Center, at the present time, is a part of the Records Office. All funds expended in the Computer Center are charged against the Records Office budget. Also indicated in the chart is the fact that, at the present time, there is no clear cut line of authority as to who is responsible for major policy making where the Computer Center is concerned.

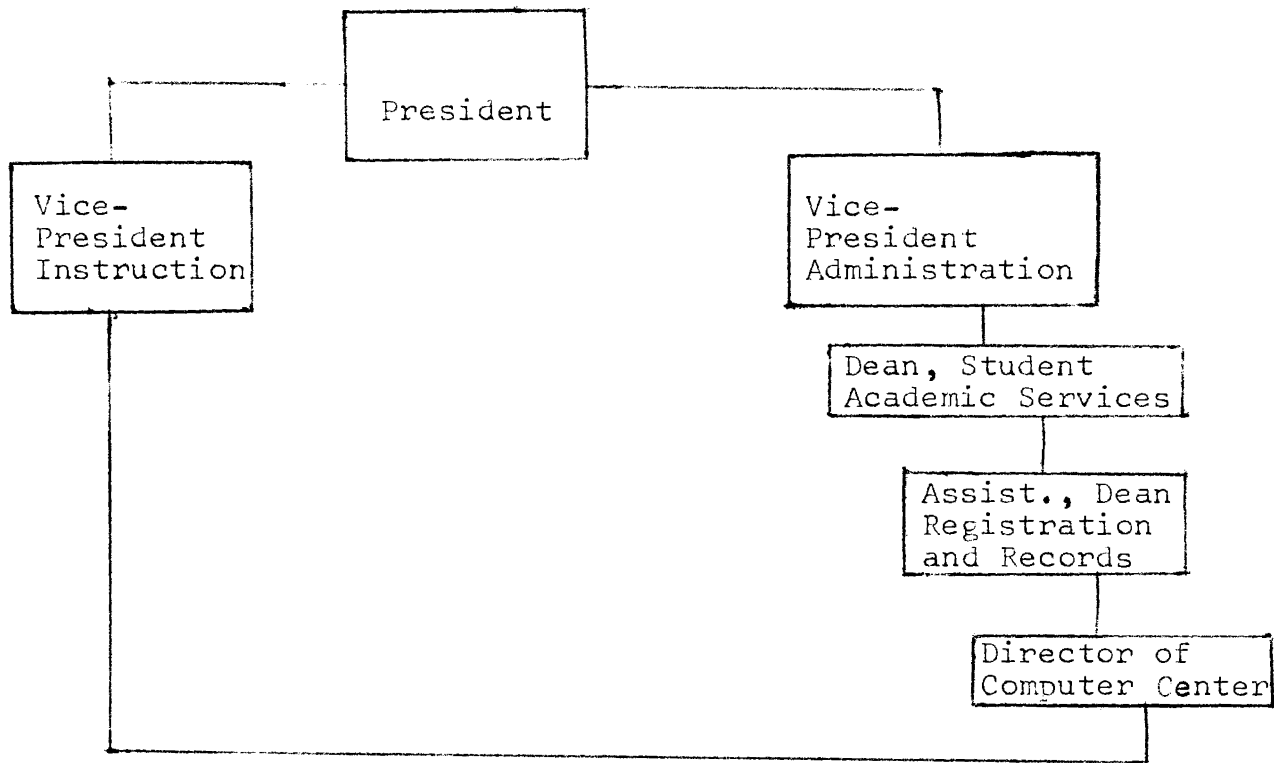
This is a brief history of the electronic data processing installation.

⁹Letter from Dr. Quincy Doudna, President, Eastern Illinois University, Charleston, Illinois, May 23, 1962.

¹⁰Interview with Mr. R. C. Steele, Sales Representative, IBM Corporation, Terre Haute, Indiana, January 24, 1962.

¹¹Letter from Dr. Quincy Doudna, September 19, 1962.

Figure 1



Administrative Organization--Eastern Illinois University

CHAPTER II

ELECTRONIC DATA PROCESSING IN ADMINISTRATION

Present Administrative Applications and Systems

Increase in Enrollment--Nearly all colleges and universities are finding themselves faced with the growing pains of a tremendously rapid rate of growth in their student body. The following quotation gives some indication as to what is now going on and what may be expected in the near future in Illinois.

Growth continues to characterize the Universities governed by the Teachers College Board. The 1962 enrollment of 22,384 is more than double the 1955 enrollment of 10,567. This is not a new phenomenon. The 1958 enrollment of 14,725 was double that of the 1953 enrollment of 7,357. Today's enrollment is more than three times the 6,451 in 1951.¹²

In the Fall of 1954, the year that the electronic data processing equipment was installed, the enrollment at Eastern Illinois University was approximately 1600 students. For the current school year, 1962-63, the on-campus enrollment is 3435 students. This represents an increase of more than double the number of students in 1954.

Increase in Data to be Processed--As the number of students increases, the amount of data or information to be

¹²Frederick H. McKelvey, "Increased Enrollments are Key to Requests," Education Today, Illinois State Universities, (Vol. XXII, No. 2), March, 1963.

processed also increases. The handling of this increased work load has been greatly facilitated by using the services of the Computer Center. As stated earlier, the primary office to utilize the equipment was Registration and Records. This is still true today. However, during each quarter, at one time or another, nearly every office on campus makes use of the services of the Computer Center. The services that they obtain range from small bits of information to much larger applications requiring many hours of time.

Registration and Records--In beginning a study of the Computer Center, the logical starting point would be student registration. Once each quarter, or four times each year, (if the student attends summer school,) Eastern's 3435 students will present new data to be processed through the Computer Center. This will begin during early registration, when the student turns in his preferred schedule of classes and has class cards reserved for the coming quarter. At the time that the student fills out his registration material, he is assessed the type and amount of fees that he should pay. The materials are then sent to the Computer Center where the student's name is punched into his registration material. Immediately following this, the registration fee bills are prepared and filed. During final exams, the student picks up his fee bills and goes to the cashier's office and pays his fees for the coming quarter.¹³

¹³Interview with Dr. Maurice W. Manbeck, January 15, 1963.

The material of the students who register early is merged together with the material of the students who complete registration on the regularly scheduled registration day. The day following registration, after all the registration materials have been processed, the class cards are sorted into class order sequence. Then class rosters are prepared and sent out to the instructors. Immediately following the preparation and sending out of class rosters, the Computer Center is confronted with a deluge of hundreds of students desiring to make changes in their individual class schedules. An average number of schedule changes during a given quarter would be somewhere in the neighborhood of 1200 dropped classes and 1400 added classes.¹⁴ The added classes include late registrants. The significance of the above statement is that the changes must be, in the main, a hand clerical operation. There is some utilization of the equipment possible, but it is basically a hand operation on each individual change. After the schedule changes have been made and the class enrollment is stable, the Computer Center sends out a set of revised class rosters to the instructors. This normally occurs shortly after the tenth day of the quarter.

At the mid-point of each quarter a mid-term grade roster is sent out to each instructor. The instructor records grades for the students who are doing failing or near failing work in each of his classes. These rosters are returned to the

¹⁴Letter from Dr. Maurice W. Manbeck, March 24, 1963.

Computer Center, and an alphabetical listing is made of all students having academic difficulty at the mid-point of the course.

On the first scheduled day of exams, the class cards are sent to the individual instructors. They record the final grade that each student is to receive for the course. The class cards, which are now called grade cards, are then deposited in the Computer Center. Grade cards are then punched with the final course grade. After all the cards have the grades punched in them, they are sorted into alphabetical order by student and merged behind a cumulative summary card. This cumulative summary card contains information pertinent to the academic standing of each student. The summary cards and class cards are run through the computer, where grade point averages are computed, and the probation list of students in academic difficulty is prepared. The next step is the preparation of student grade reports. The grade report is a six-part form. As soon as it is completed, the individual copies are sent to the various offices that are to receive them.

Following the preparation of the student grade reports, the grade cards are run through the accounting machine. A self-adhesive gummed label is prepared for posting to the permanent record cards on file in the Records Office.

Other statistical reports are prepared on the basis of each quarter's grades. The first of these reports is a

grade distribution, which is a breakdown of grades given within a department. That is, the number of A's, B's, C's etc. given in each department. A further breakdown of grades is made for each individual course.

From the individual student's grade point average card, lists are run as follows: (1) An alphabetical listing showing each student's cumulative grade point average and quarter grade point average is prepared. (2) A list in descending grade point average order, indicating the students who have a 4.0 grade point average, down to a 0.0 grade point average. (3) Two more lists are prepared in descending grade point average order, one is of men students, the other is of women students.

Many other reports are prepared for the Records Office. They are self-explanatory, so that a simple listing is sufficient to cover them. They are enrollment reports, student schedules, each student's load, (that is the number of quarter hours carried by each individual student) a student roster of all students enrolled at E. I. U., student rosters by major and minor fields, a student roster by year in school, a student roster by high school graduated from, a student roster by home county, a student roster by type of curriculum, and rosters of new and transfer students.¹⁵ This, in the main, covers the applications that the Records Office has for the Computer Center.

Business Office--The Business Office at Eastern is

¹⁵Interview with Dr. Maurice W. Manbeck, March 20, 1962.

currently making little use of the services of the Computer Center. They have, however, made a start in this direction. One of the biggest applications, at this point, is that of student registration fee accounting. Each day during early registration fee payment, and on registration day, the Business Office's paid copy of the fee bills are collected from the cashier. They are processed through the Computer Center to determine the amount of money that the cashier should have collected. This is a more important job than it might appear on the surface, because during this period of payment, the cashier collects thousands of dollars in one day. In addition to accounting for the money, the Computer Center also matches the file of all students in school against the Business Office's file of paid receipts. This is to determine that everyone has been billed and paid registration fees.¹⁶

During the past year, it was decided that students living in Eastern's residence halls should be billed for the room and board on a monthly basis. The Director of Housing presents a file of students living in the residence halls to the Computer Center. Fee bills are then prepared for the 1020 students currently residing in the halls. The system used in accounting for residence hall fees is similar to the one used in student registration fees. The Computer Center runs a list by dormitory, each day during the payment period,

¹⁶Interview with Mr. Gerald Green, Assistant Business Manager, Eastern Illinois University, Charleston, Illinois, May 20, 1962.

and determines the amount of money the cashier should have on hand. At the end of the payment period, each month, the Computer Center determines which students are delinquent in their fee payments.¹⁷

The two applications just discussed, with the exception of a few miscellaneous reports, cover the Business Office's applications for the Computer Center.

Housing Office--The Housing Office maintains an application file for rooms, in the residence halls, on IBM cards. Periodically, the Computer Center runs various lists, by date of application, and in alphabetical order, of this file. When it is determined who will be living in the residence halls, this file is brought to the Computer Center so that room and board bills can be prepared.

Each quarter a list of married students is prepared and presented to the Director of Housing for his use in conjunction with students living off-campus.¹⁸

Financial Aids Office--This office is using the electronic data processing equipment in the area of student scholarships. The Computer Center processes scholarship cards each quarter and prepares lists for distribution to the various offices that need them.¹⁹

¹⁷Interview with Dr. William D. Miner, Director of Housing, Eastern Illinois University, Charleston, Illinois, March 15, 1963.

¹⁸Ibid.

¹⁹Interview with Mr. Ross Lyman, Director of Financial Aids, Eastern Illinois University, Charleston, Illinois, March 15, 1963.

Address File For University Use--The Computer Center maintains a parent home address file and a student home address file. These files are used by various offices, when they have material that should be sent to either one of these sources.

There are many other reports and studies which are requested and run for various offices but are too detailed to include here.

At this point, some additional functions that should be a part of the Computer Center will be discussed.

Administrative Applications and Systems
Which Should be Considered

Registration and Records--In the area of registration, there is one job which requires approximately 227 man hours to complete.²⁰ The job is that of scheduling students in their desired classes for the following quarter. It is an extremely tedious job and presents a great deal of frustration on the part of the people doing the work. It becomes extremely difficult to try to revamp student schedules, when many of the classes become filled, and no more students can be allowed to register for them. The IBM Corporation has completed a student scheduling program which is applicable to Eastern. Some of the Schools that are currently using the program are: Washington and Lee University, The University of Akron, and Purdue University. The name of the program is

²⁰Interview with Dr. Maurice W. Manbeck, April 1, 1963.

called "Student". The program is capable of scheduling approximately 800 students per hour. The essential mechanics of the system are as follows: (1) Each student turns in the courses desired for the coming quarter, sometime prior to registration day. The system is flexible in that the students may be allowed to select sections of courses that they prefer, or they may disregard sections entirely. The computer will try to fulfill requested courses, and build the schedule which will be free from time conflicts. (2) The next step is to feed into the computer the previously established master class schedule of classes to be offered for the quarter. (3) The individual student request for class cards are then fed into the computer, and the computer builds the schedule for each individual students. (4) As the students are scheduled, the computer punches out the actual class cards with the student's name and other desired information.²¹

The really fine thing about this system is that it is possible to make "dry runs" on the scheduling for any given quarter. That is, the individual student requests can be run through the computer without punching the class cards. This will determine if there are enough sections to fulfill the student's requests. The master class schedule can then be revised to take into account these shortages. When it is felt that the optimum point is reached in the scheduling process, simply run the request cards through again and

²¹Ivan K. Lukey and Tamar D. Kirk, Student on the 1620, Flint, Michigan, July 15, 1962, pp. 1-2.

this time obtain the desired output of class cards.

Not only does this system cut down many hours of clerical work but allows a more nearly optimum level of scheduling students to desired classes.²²

There are other important applications that the Records Office might use, but enough time has been devoted to this area. The Office of Registration and Records has been the primary user of the electronic data processing installation and are much more advanced than any of the other areas at Eastern.

Business Office--At the present, the Business Office is doing little in the way of utilizing the equipment. This, in some ways, is rather unusual, because electronic data processing equipment was originally designed and built to handle accounting systems. Some additional jobs that the Business Office might be doing are: payroll accounting, inventory control, purchasing, and budgetary accounting. These are areas which lend themselves exceptionally well to electronic data processing equipment.

It is reasonable to suppose that a majority of firms with medium-to-large scale data processing problems have already installed tabulating equipment for one or more routines. Among the areas in which "tab" has been used with great success are (1) accounts receivable, (2) payroll, (3) accounts payable, (4) debit and credit distribution, (5) recording and controlling fixed assets, and (6) maintaining inventory records. As is the case with any mechanized data processing,

²²Lecture by Ivan Lukey, IBM, Flint, Michigan, at 1620 Users Group Meeting, Chicago, Illinois, February 14, 1963.

punched card systems are especially appropriate for repetitive operations in volume.²³

A great deal of time is spent on repetitive and tedious clerical operations in the Business Office. These operations might well be adapted to Eastern's equipment. The Business Office is currently using a National Cash Register Book-keeping and Posting Machine.²⁴ The National Cash Register Company has an attachment which may be installed on the machine. This device will produce punched cards as a by-product of the work already being done on the machine. These punched cards could then be processed and accounting reports prepared automatically. DePauw University at Greencastle, Indiana, is currently in the process of setting up this system.²⁵

The state records in Springfield, Illinois, are nearly all converted to electronic data processing systems. If Eastern were to convert their accounting to automated systems, the flow of data between Springfield and Eastern would probably be simplified and more efficient.

Library--The adaptation of electronic data processing equipment to libraries is in its infancy, but there is an extreme need in this area.

The unprecedented growth in libraries over the country coincides with a serious shortage of

²³Oscar S. Nelson and Richard S. Woods, Accounting Systems and Data Processing, South-Western Publishing Company, Cincinnati, Chicago, 1961, p. 455.

²⁴Interview with Mrs. Jane Freeman, Bookkeeper, Eastern Illinois University, Charleston, Illinois, March 7, 1963.

²⁵Interview with Mr. Herbert J. Swaltz, Assistant Director, Computer Center, DePauw University, Greencastle, Indiana, March 29, 1963.

professionally trained library personnel. The time is now ripe to adapt the genius of American industry to the library field. It is felt that modern mechanical and electronic equipment and systems will be of great service at this critical period in library development.²⁶

The principles, devices, and combinations developed will assist this library, as well as all other, to accomplish many of our present functions, meet our expansion of resources, and accomplish functions which are not yet foreseen. Possibly this will mean fewer personnel, but certainly more thorough and quicker service for the clientele. It can possibly mean a redirection of our efforts. Many library systems have grown up over the years without much question of functions and procedures.²⁷

In December 1960, the Council on Library Resources made a grant of \$50,000 to study the possibilities in the field of library applications to electronic equipment. This study was carried out at the University of Illinois at Congress Circle in Chicago, Illinois.²⁸

The library staff at Eastern Illinois University stated that the size of the Library at the University of Illinois located at Congress Circle is comparable to Eastern's library. The number of volumes in the library, as well as the number of staff members is approximately the same.²⁹

In the later part of 1962, a book was published on the results of the findings of the research project carried out at the University of Illinois at Congress Circle in Chicago.

²⁶Louis A. Schultheiss, Don S. Culbertson and Edward M. Heilinger, Advanced Data Processing in the University Library, The Scarecrow Press, Inc., New York, 1962, p. 11.

²⁷Ibid.

²⁸Ibid.

²⁹Interview with Mr. Patrick Barkey, Librarian, Eastern Illinois University, Charleston, Illinois, February 5, 1963.

One of the major findings of the project was that any service-oriented philosophy of librarianship for the machine age will require more efficient methods.

If maximum service to users is to be realized, the flow of both subject and control information must be improved. The first reason for improving the flow is that present costs are much too high. Even if these UIC costs are not unreasonable when compared to other libraries of similar size and kind, it seems ridiculous to pay \$8.67 to catalog one title. These cataloging costs, plus the \$4.84 cost of selecting and acquiring the material in the first place, make a book almost too valuable to circulate. Also, a circulation cost of 41 cents per transaction seems to call for careful investigation of ways to cut costs.³⁰

Another major finding of the project staff was that electronic computers are capable of manipulating bibliographic data and generating the documents and control records necessary to smooth operation of a library. The use of such capability seems desirable.³¹

The library staff at Eastern has expressed the desire for automating the library. The staff anticipates an extremely rapid rate of growth in the library in the next few years.

³⁰Schultheiss, Op. cit., pp. 106-107.

³¹Ibid., p. 110.

CHAPTER III

ELECTRONIC DATA PROCESSING IN ACADEMIC AREAS

Academic Areas Now Utilizing the Computer Center

Primarily Administrative Use--Until January of 1963, the Computer Center was used almost exclusively for administrative applications. Occasionally an instructor in the Business Department brought a class down for an hour lecture and demonstration on the use of the electronic data processing equipment. Two or three classes came down each quarter.

Investigation of New Equipment--In February of 1962, the IBM Machine Records Office, began investigating the possible types of equipment available for calculating grade point averages. The initial investigation with the IBM Corporation was in the area of calculators. The cost of the calculator would have added \$400 per month rental cost to the lease amount of the equipment. This calculator would have done the job desired. It had potential for extending the flexibility of the installation. But as further progress was made in the investigation, Mr. R. C. Steele, of the IBM Corporation suggested the idea of incorporating the data processing equipment into the instructional program. By

allowing the students and faculty access to the equipment, Eastern would qualify for IBM's 60% educational discount.³² Eastern would be able to lease an IBM 1620 computer and be required to pay only 40% of the actual lease price of all the equipment. This would raise the rental cost of the entire installation only \$440. This means that for \$40 per month more, Eastern, instead of having a calculator with limited possibilities, would have an electronic digital computer with almost unlimited potential.

When the results of the investigation were made known, the math and business departments reacted in an extremely favorable manner. It was decided to have the computer installed, and an order was placed with IBM.

Computer Class for Faculty--During the months of October, November and December, 1962, an IBM representative held classes at Eastern. The purpose of these classes was to offer instruction to interested faculty members on the operation and programming of the IBM 1620 computer system. The initial class started with an enrollment of about 50 faculty members. Throughout the course, the attendance dropped until at the completion of the course, approximately 20 people were still in attendance. Of the 20 people that completed the course, only five became active in utilizing the computer.

Math Department--The most active department, at this time, is math. Two instructors in this department are

³²Steele, loc. cit.

including computer programming in their classes. Math 351, Differential Equations, contains a three week unit on computer programming, as it pertains to the solution of problems encountered in the course.³³ Math 470, The Beginning Statistics Course, contains a three week introductory unit on computer programming. Math 471, The Advanced Statistics course, is built entirely around the computer and its use in solving statistical problems.³⁴ There are approximately 75 math students in these three classes. They come into the Computer Center and actually work with the computer.

As soon as the students are introduced to the computer, many of them become extremely interested and devote a large part of their time to programming various problems. The following statement shows a breakdown of administrative utilization and academic utilization of the computer. During January of 1963, the computer was used 12 hours for administrative purposes, and 167 hours for academic purposes.³⁵ It was used 18 hours for administrative purposes, and 121 hours for academic purposes in February 1963.³⁶ The academic use includes both faculty members and students working in the installation. The administrative use, at this time, is

³³Interview with Dr. Ferrel Atkins, Associate Professor of Mathematics, Eastern Illinois University, Charleston, Illinois, March 18, 1963.

³⁴Interview with Dr. Alphonso DiPietro, Associate Professor of Mathematics, Eastern Illinois University, Charleston, Illinois, March 19, 1963.

³⁵1620 Computer Usage Report, Eastern Illinois University, Charleston, Illinois, January 1963.

³⁶1620 Computer Usage Report, February 1963.

handled entirely by the Acting Director of the Computer Center.

Business Department--The Business Department currently is in the process of integrating electronic data processing courses into the curriculum. There are no students in that department making use of the Computer Center.³⁷

Academic use of the Computer Center was introduced at Eastern in October 1962. Considering the short span of time since it was started, satisfactory progress is being made.

Academic Areas that Should be Utilizing the Computer Center

Responsibility of Higher Education--The idea of colleges and universities having a responsibility to society to provide educational experiences in the area of electronic data processing is a problem that did not face educators ten years ago. However, this problem is knocking loudly on the door of our educational institutions today.

The following quotations give some indication of the impact of computers upon our society and of their use in electronic data processing.

We are presently engaged in a political struggle that will in all probability be decided on the basis of the productivity of capitalism as opposed to that of communism. Thus, the development of the electronic computer may not only influence our future standard of living, but it may help determine the future political

³⁷Interview with Dr. James Giffin, Head, School of Business, Eastern Illinois University, Charleston, Illinois, February 2, 1963.

situation under which we will live, or (in the extreme case) whether or not our civilization, as we know it, can continue to exist. It is apparent that the electronic computer may be one of the most significant developments of our time.³⁸

It is impossible to divorce data processing from science, engineering, automatic control, management science, and the use of the computer in simulating human thinking processes.³⁹

Colleges and universities should be in a position to provide the top quality personnel needed to cope with developments brought about by computers and their use in data processing. Many colleges and universities have already reached a decision as to their responsibility in this matter.

According to Dr. Clarence B. Lindquist, Specialist in Mathematics and Physical Sciences of the U. S. Office of Education, there are now at least 158 institutions which have digital computers. Courses on computer programming, data processing, and numerical analysis have appeared in the curricular offerings in a rapidly increasing number of colleges and universities.⁴⁰

Business Department Considers New Courses--Below

is a brief description of three courses which are currently being considered for addition to the curriculum in the School of Business.

The Use of Computers in Modern Business Operations

A course designed to provide familiarization with the theory of computer operation, types of tasks to which the computer can be put, programming

³⁸Martin, op. cit., p. 15.

³⁹Ibid.

⁴⁰"Breakthrough in High School Computer Education," Occupational Outlook Quarterly, (Vol. 6, No. 4, Dec. 1962) p. 7.

problems for the computer, and integration of the computer with accessory equipment for data processing. A course primarily for students in business.

Machine and Electronic Accounting Methods

A study of the use of punched cards in connection with accounting problems and the processing of accounting data. Applications such as payroll, inventory, control, accounts receivable, etc., Processed on both the smaller punched card machines and the larger computer.⁴¹

Data Processing Laboratory

Experiences in the processing of information by the use of punched card equipment and Computer. Includes the use of the card punch, sorter, reproducer, accounting machine, and the Electronic Computer in the University Computing Center under the direction and supervision of the Supervisor.⁴²

These courses should give business students an opportunity to gain knowledge in the field of electronic data processing.

New Type Math Course Needed--One of the areas which should be given some serious thought is that of math. This should be a type of math that fits in with a student's major area of interest in college.

Most of the current literature recommends a rather extensive background in math. Not engineering and liberal arts math, but math for the social scientist and the management technologist. Math for linear programming, game theory, queue theory, statistics, etc.⁴³

A math class, that utilizes computers and electronic data processing in connection with the student's major area of interest,

⁴¹Doudna, loc. cit., May 23, 1962.

⁴²Minutes of the Council on Academic Affairs, Eastern Illinois University, Charleston, Illinois, January 24, 1963.

⁴³"Data Processing in Business Education," paper prepared for Electronic Data Processing class, State University of Iowa, Iowa City, Iowa, July 20, 1962, p. 8.

should be of great value.

Faculty and Student Research--Webster's New Collegiate Dictionary gives the following definition of research "(1) careful search. (2) studious inquiry; usually critical and exhaustive investigation or experimentation having for its aim the revision of accepted conclusions, in the light of newly discovered facts."⁴⁴ The last part of the definition which states "in the light of newly discovered facts" brings into play the potential power of the electronic data processing equipment when used in connection with research. The equipment, of course, will not discover the facts. However, it can take a vast amount of data and assemble it in such a manner that the researcher will be able to discover the facts. Utilizing the electronic equipment can take much of the tedious drudgery, and tremendously time consuming aspects, out of the area of research.

Eastern, in the past, has not had a substantial amount of research carried on by the faculty but now is beginning to make some progress in this direction.

At the present time there is little supported academic research at this university, but I have made a request for a sum of money in the next biennial budget to give us some start in this direction.⁴⁵

Education presents an area with thousands and thousands of student records with various kinds of data. These data

⁴⁴Webster, op. cit., p. 720.

⁴⁵Doudna, loc. cit.

could be analyzed in research projects. One such research project is currently being carried out by two graduate students, under the direction of faculty members on Eastern's staff. This group is extracting data from student records in the Mattoon School System. They are trying to gain some insight into the high school drop-out problem. They are recording the raw data on punched cards. They will use the facilities of the Computer Center to process the data into a form that may be more readily analyzed.⁴⁶

In utilizing the Computer Center for research, one must be careful not to go overboard in the processing of raw data.

During a single instant in the life of a company, it is theoretically possible to generate enough data to keep all the employees busy forever collecting, sorting, analyzing, and reporting the data. Company executives could spend their entire life merely trying to interpret the data.⁴⁷

However, one must hasten to say that from all appearances, Eastern may not be faced with this problem in the near future.

Vocational and Technical Education--The area of the state served by Eastern Illinois University has need of vocational courses for people who have no desire to complete a four year academic curriculum. There are tremendous possibilities in the area of vocational education

⁴⁶Interview with Dr. Curtis Garner, Associate Professor, Department of Education, Eastern Illinois University, Charleston, Illinois, March 6, 1963.

⁴⁷Schmidt, op. cit., p. 30.

which Eastern might fulfill. The electronic data processing equipment might well be used in the evenings in connection with training and educating people in this area.

The following statement will give some idea of the existing problem in the area of technical vocational education.

Existing institutions are enrolling only a small fraction of the number of students needed in technical fields in the next few years. In Illinois it is estimated that by 1965 an annual enrollment of 62,000 full-time and an equal number of part-time students will be needed in two-year technical curricula to meet the demands in the 40 major occupations in that state. This rate would be sixty-two enrollees each of full-time and part-time students per 10,000 gross population. Projecting this rate to the entire nation would mean a need for over one million students or ten times the present enrollments.⁴⁸

The best possibility of fulfilling the increased needs for technical people lies in the area of public education. "Responsibility for accomodating most of the increased need must be met through public institutions."⁴⁹ The cost of providing courses of a technical nature in electronic data processing could be kept to a minimum. The equipment is currently used very little in the evenings. The increased rental costs would be minor because of IBM's educational policy of a 60% discount. The additional rental cost for instruction in the evening, would be minor. The Federal Government recognizes the need for vocational courses and will contribute a considerable amount of funds

⁴⁸"The Challenge of Vocational and Technical Education," Phi Delta Kappan, (Vol. XLIII, No. 5, February 1962) p. 216.

⁴⁹Ibid., p. 217.

toward the program.

The National Defense Education Act provides aid to schools under 10 different "titles." Concerning vocational education, title VIII states that matching Federal funds can be used in vocational education programs in the "less than college" courses. Equipment held under the title must be used for the training of individuals as highly skilled technicians in recognized occupations requiring scientific knowledge. Data-processing education meets the requirements of this law. Thus, many schools have used Federal funds for obtaining data-processing equipment for teaching purposes.⁵⁰

There are no known plans, at this time, for Eastern to go into this type of vocational program.

⁵⁰"Breakthrough in High School Computer Education," Occupational Outlook Quarterly, (Vol. 6, No. 4, Dec. 1962) pp. 6-7.

CHAPTER IV

THE FUTURE OF THE COMPUTER CENTER

Planning is Essential--As Eastern progresses into the future, the administration should do some extended planning concerning the Computer Center. Unless this planning is done, the services of the Computer Center may increase in a haphazard fashion. These plans are essential, if the institution is to derive maximum benefits from the installation.

It is readily apparent that one does not often achieve spectacular improvements by merely inserting a powerful computer in the place of less powerful machines and humans without revising the over-all system. What is relatively efficient in a manual system may be quite difficult to produce with computers, while very desirable information that is too costly to produce through a manual system may be efficiently produced by a computer.⁵¹

If the objectives that one is striving for are not held clearly in mind, it will be difficult to achieve maximum benefits from a data processing installation.

The futility of such situations is expressed in Alice in Wonderland in the well-known conversation between Alice and the Cheshire Cat

"Cheshire-Puss," she began, rather timidly--
"Would you tell me which way I ought to go from here?"

"That depends a good deal on where you want to get to," said the cat.

⁵¹Martin, op. cit., p. 378.

"I don't much care where...." said Alice
 "Then it doesn't matter which way you go,"
 said the cat.

A computer is a challenging and extremely glamorous piece of equipment, and, in a number of cases, one has been obtained primarily because someone wanted a computer. In other words, the major objective has been to obtain an electronic computer. This is a relatively easy objective, but it does not necessarily lead to the attainment of anything else worthwhile, and, in the absence of more rational objectives, it may well lead to considerable unpleasantness.⁵²

The administration at Eastern must support the Computer Center, if the university is to derive full benefit from its services.

It is often said that it is impossible to successfully install a computer without the support of top management. This statement is obviously true. However, it is likely that this statement has frequently been misinterpreted. It does not merely mean that top management must want a computer--it is easy to want a computer, and it is equally easy to not want a computer later on when the problems involved begin to arise. Top management must understand the implications involved in the use of the computer before the word "support" has its proper meaning in the above statement.⁵³

The function of the Computer Center, in the administrative organization, should be that of a separate department. It should not be a part of any one office, but its services should be available to all areas of the university. It should be on neutral ground, to be effectively integrated into the administrative and academic structure at Eastern. It should be thought of in terms of neutrality, much as

⁵²Ibid., pp. 379-80.

⁵³Ibid., p. 381.

one thinks of the school library as belonging to everyone and not a particular group of individuals.

Processing on a computer must be centralized, but the benefits of the potential efficiency are not achieved unless the system is redesigned so that it becomes truly integrated. To build an integrated system, it is necessary to make changes in input, processing, and output, and to reassess the fundamental information requirements of the organization.⁵⁴

Because of the difficulties associated with crossing departmental lines and the natural tendency of employees to be interested primarily in the areas of direct concern to their immediate superior, the location of a data-processing center should not limit the opportunities to effectively utilize the equipment.⁵⁵

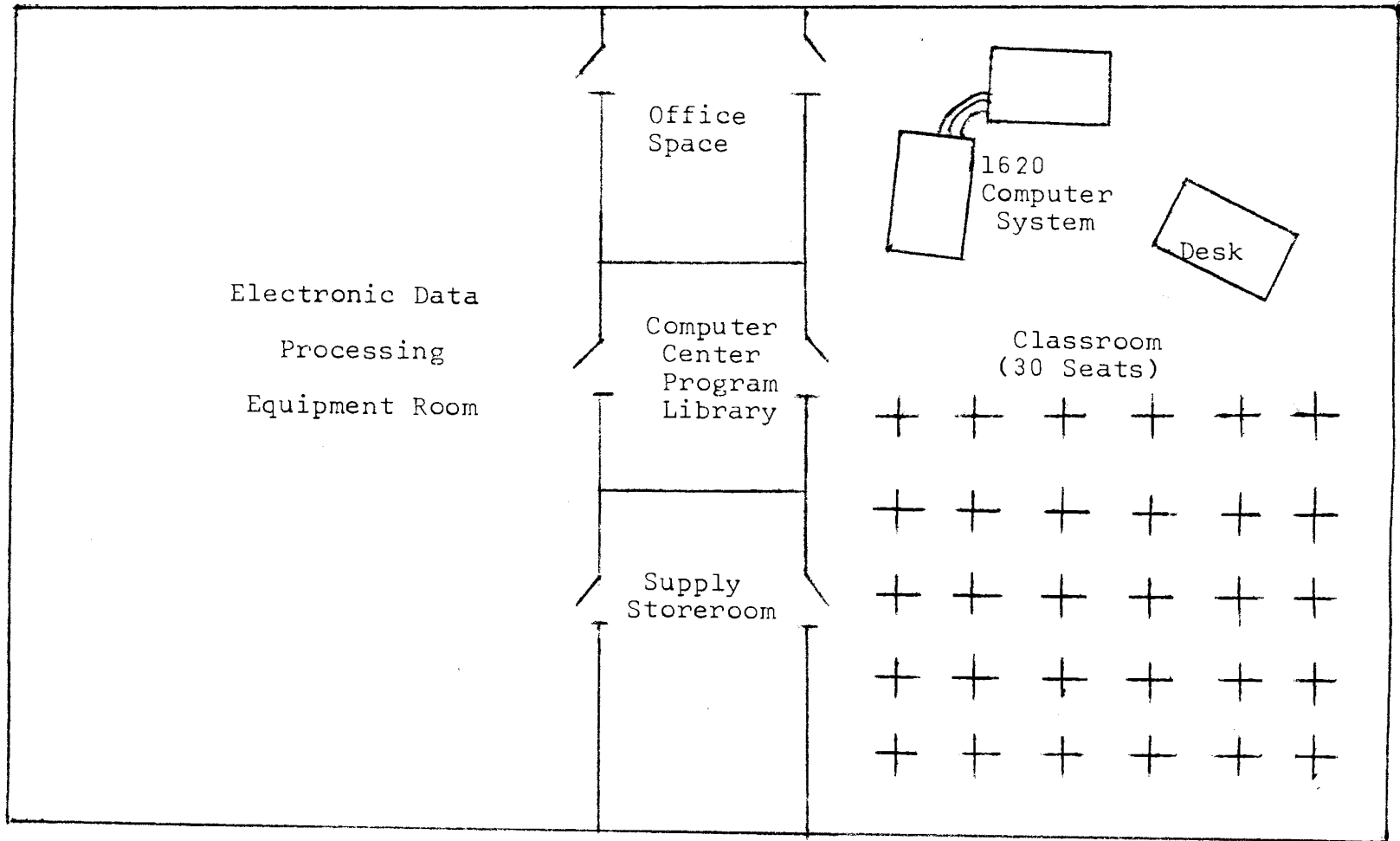
Desirable Physical Facilities--The diagram (Fig. 2) shows what is desirable in meeting the Computer Center needs, in terms of physical facilities. The computer could be placed in a classroom for use in academic work. Instructors could hold the class sessions, having access to the computer, when it was needed. This would allow the routine functions carried on in the Computer Center to be uninterrupted, unless the other equipment was needed in the class work.

If the additional applications outlined earlier in the paper were put into effect, it is very probable that additional equipment would be needed to handle the increased work load. This would essentially be key punches and other inexpensive machines.

⁵⁴Ibid., p. 378.

⁵⁵Ibid., p. 345.

Figure 2



Desirable Physical Facilities For Computer Center

Future Presents Challenge--Eastern must continually evaluate the systems that it is using in the Computer Center. The systems used must not become static.

There is a constant change in the use of procedures, machines and cards to meet changing conditions of the University. We believe a static system is weak and one which is not keeping up with new developments in data processing equipment.⁵⁶

Electronic data processing and computers present a great challenge for the future. Eastern is taking the initial steps to meet this challenge.

A fitting comment to conclude with--"the future will belong to those who are prepared to accept its responsibility, and we have no place to look except to our schools and colleges for this preparation."⁵⁷

⁵⁶IBM Data Processing Machines at The University of Oklahoma, IBM Corporation, New York, 1961, p. 28.

⁵⁷"How Automation Will Affect the Schools," Phi Delta Kappan, (Vol. XLIV, No. 5, February 1963) p. 227.

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