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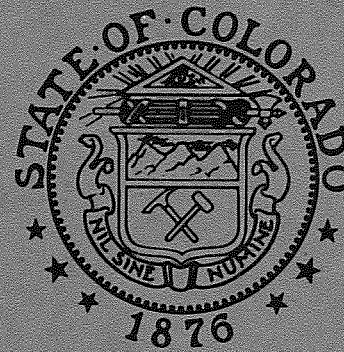
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ADP Report



ADP Performance Evaluation of the University of Northern Colorado Data Processing Activities



DIVISION OF ADP

Prepared by :

State ADP Plans & Coordination Section

April 1975

ADP Report

ADP PERFORMANCE EVALUATION
OF THE UNIVERSITY OF NORTHERN COLORADO
DATA PROCESSING ACTIVITIES

Division of ADP

State ADP Plans & Coordination Section

April 1975

(Retyped in order to be filmed)

S T A T E O F C O L O R A D O

UNIVERSITY OF NORTHERN COLORADO

ADP PERFORMANCE EVALUATION

APRIL 15, 1975

DEPARTMENT OF ADMINISTRATION

DIVISION OF ADP
PLANS AND COORDINATION SECTION
STANDARDS AND EVALUATION UNIT

DEPARTMENT OF ADMINISTRATION
DIVISION OF AUTOMATED DATA PROCESSING

2002 S. Colorado Blvd.
Denver, Colorado 80222

Richard D. Lamm
Governor

John I. Lay
Exec. Director

April 22, 1975

Mr. John I. Lay
Executive Director
Department of Administration
724 State Services Building
Denver, Colorado 80203

Dear Mr. Lay:

The ADP Performance Evaluation of the University of Northern Colorado was completed on February 20, 1975, and I am pleased to submit this report.

An oral presentation of the major findings, conclusions and recommendations of the study was given to the President and other top administrators of the University of Northern Colorado on March 5, 1975, at which time suggestions and comments were discussed and, where relevant, incorporated into this final report.

The ADP Performance Evaluation Team members who actively participated in this study were Project Leader Robert M. Little, Roy Jude and Anthony Gomez.

I would like to take this opportunity to express my appreciation for the cooperation and assistance, to all individuals who participated in this effort, and without whose help the completing of this report would not have been possible.

Sincerely,



Wilbur M. Richardson
Director of ADP

WMR/lc

cc: Robert Scott

STATE OF COLORADO
DEPARTMENT OF ADMINISTRATION
DIVISION OF AUTOMATED DATA PROCESSING
ADP PERFORMANCE EVALUATION REPORT
OF
THE UNIVERSITY OF NORTHERN COLORADO
April, 1975

Copies of this report have been distributed to:

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SECTION I

INTRODUCTION

BRIEF ADP HISTORICAL BACKGROUND

The University of Northern Colorado began the use of automated data processing in 1958 with unit record equipment. It was first used for administrative systems in accounting and student records. A few years later courses in the use of unit record equipment were added to the university's curriculum. In 1966 an IBM 1130 computer was added for instructional use only. In 1968 an IBM 360-30 computer was acquired to replace the unit record equipment and the IBM 1130 computer. In June of 1971 a Hewlett Packard minicomputer was purchased to provide additional instructional computer support. In September 1972, the current IBM 360-40 computer replaced the IBM 360-30.

APPRECIATION

The cooperation and assistance received from all personnel interviewed during the course of this evaluation is greatly appreciated. A special thanks is extended to Mr. Donald L. Myers, Director of the Computer Center for his assistance in arranging interviews and promptly furnishing all information requested.

STATUTORY AUTHORITY

This ADP Performance Evaluation has been conducted in accordance with authorities contained in the "Administrative Organization Act of 1968". Specifically, Title 24, Article 30, CRS, 1973 charges the Department of Administration with:

- 24-30-102(1)(a) "Study and make recommendations to the governor regarding improvements in techniques used by state

agencies for management specialties, including but not limited to, . . . data processing management."

and charges the Division of ADP, Department of Administration with:

24-30-603(1)(j) "Continually study and assess the data processing operations and needs of state departments, institutions, and agencies."

It is anticipated that the results of the individual evaluations will provide the State Legislature with factual information on the use of data processing products and services within the state, which will ultimately be used in formulating and coordinating statewide data processing policy and plans.

SCOPE AND OBJECTIVES

The ADP Performance Evaluation encompassed the analysis and assessment of the total data processing activities of the university, including:

- o Current data processing applications,
- o Utilization of data processing resources (personnel and equipment),
- o ADP plans and forecasts,
- o User information needs,
- o Controls exercised over the data processing activities, and
- o Management policy with respect to the data processing operations.

It is not the intent of this study to evaluate individuals performing ADP functions, but rather to assess the ADP functions performed, ADP products and services produced, and the usage thereof by the university.

In this context, the basic objectives of the ADP evaluation are to:

- o Review, study, assess and report on the data processing activities and needs, and

- o Prepare recommendations, where applicable, for improving data processing adequacy and efficiency, for the review, approval and implementation thereof by the university.

As noted in "Schedule of Activities", the last sub-heading in this chapter, the evaluation team worked on a controlled time-table. While the evaluation was in progress changes were taking place and no doubt still are. Comments made in this report are based on observations made at the time of the evaluation team's visit.

STUDY APPROACH

During the preparatory phase, the evaluation project team consisting of experienced data processing personnel was formed and an overview of the university was compiled and studied. Moreover, pre-evaluation materials obtained from the university and the Work Statement and Plan schedule were reviewed by the ADP Evaluation Project team.

The bulk of the study concentrated on:

- o Interviews with management, faculty and administration, Users of data processing products and services, and the Data processing staff at the university.
- o Review of operational and management documentation, and
- o Procedural review and observation.

Prior to finalizing the evaluation report, the findings, and conclusions drawn by the evaluation team were presented and discussed with the Administration of the university. This presentation served to:

- o Inform the Administration of study findings and recommendations

- prior to final publication of the report,
- o Resolve any misinterpretations on the part of the evaluating team, and
 - o Incorporate new information or revisions into the final report, as deemed appropriate.

SCHEDULE OF ACTIVITIES

- | | |
|---|----------|
| 1. Submission of project statement, schedule of activities and pre-evaluation information request list to the agency. | 12/17/74 |
| 2. Completion of project team orientation with the agency. | 1/10/75 |
| 3. Begin interviewing and data gathering. | 1/13/75 |
| 4. Completion of data gathering. | 1/28/75 |
| 5. Begin data analysis and synthesis. | 1/29/75 |
| 6. Completion of data analysis and synthesis. | 2/20/75 |
| 7. Oral presentation of findings and conclusions. | 3/03/75 |
| 8. Submission of final report. | 3/28/75 |

SECTION II

MANAGEMENT SUMMARY

The most significant conclusion of the ADP Performance Evaluation of UNC is that nearly all the computer center users are very well satisfied with the support received from the center. It also was determined that there is wide spread interest among current and potential users in expanding the use and accessibility of the computer via terminals. This interest is reflected from the President of the university through all levels of administration and academic responsibility. It is also noteworthy that the University President believes that both academic and administrative support should be provided from one computer center rather than separate installations for the two functions.

The body of this report is divided into three main sections and this summary is similarly structured. The sections are: Organization and Management, Systems Review and ADP Operations.

The recommendations made as a result of the evaluation concern problems that are well known to the computer center's management. We believe the recommendations will serve to reinforce their perception of the ADP deficiencies and aid them in establishing priorities.

ORGANIZATION AND MANAGEMENT

The Computer Center is organizationally under the Vice President of the University and Dean of Academic Services. This reflects the administrative policy of emphasizing that its prime function is to support the university's mission of student instruction. Although the instructional uses of

the computer are currently somewhat limited, there is considerable interest in expanding the use in this area. In order to assist and foster this, the computer center staff includes an Academic Coordinator and a Research Consultant, who are both educators and trained ADP personnel, to provide added liaison between the center and the academic areas.

It was found that the management of the university is very interested and supportive of the use of ADP in all areas of the institution. This support provides an excellent atmosphere for the extensive and effective use of ADP resources.

The university receives its major ADP support from the IBM 360/40 computer in the computer center. Additional instructional and laboratory support is received from three minicomputers. The minicomputers are independently managed with minimal coordination from the Director of the Computer Center. In order to provide for overall coordination it is recommended that the Director of the Computer Center be formally assigned the coordination responsibility for all ADP resources including the minicomputers and that they be included in ADP budgets and plans.

In order to more effectively provide input from all functional areas of the university it is recommended that the existing Computer Center Advisory Committee be revitalized and meet with greater frequency. The committee met only once in 1974. It was determined that there is some lack of effective communications regarding ADP activities and plans. It is recommended that the Computer Center Advisory Committee provide for communication regarding ADP throughout the campus and that internal communications within the Computer Center be improved.

Finally, it is recommended that the university's ADP Plan dated August 1974 be reevaluated, updated and extended. While it was found that the plan forms a good foundation, it lacks detail in several areas. These should be developed under the continuous planning process.

SYSTEMS REVIEW

Automated data processing systems are currently operated to support the programs in Instructions, Research, Administration, Library and Public Service. Under the instructional program there are three basic types of support. These are ADP skills courses (23 courses identified), support of courses that are in non-ADP disciplines (12 courses identified), and direct support of the faculty in carrying out their instructional activities. Many more courses were identified as being potential users of ADP support.

Most of the use of ADP support in the research area is to aid graduate students in their projects and dissertations required for Master and Doctoral degrees.

The administrative systems provide university officials at all levels of the institution with data needed to effectively administer the university. Systems exist to support most administrative areas and include systems for Student Records, Fiscal Control and Institutional Research and Records.

There are a number of systems used to support the Library in the areas of acquisitions, catalogs and circulation. The circulation system consumes a substantial amount of computer time on a daily basis. To try to reduce this run time a feasibility study is recommended to determine if a re-systemization would be cost beneficial.

On an as time available basis the University Computer Center also provides computer processing to a few outside agencies which are charged for this service.

ADP OPERATIONS

Based on the 1974 utilization information available for analysis it is the opinion of the evaluation team that the Computer Center's IBM 360/40 computer is capable of handling the current processing load. However, it is not capable of supporting the planned use of interactive terminals for instructional support and terminal inquiry and update in the administrative and student services areas. The utilization statistics currently produced at the center are very limited and it is recommended that they be expanded and improved to provide for a more thorough analysis of the efficiency of the computer.

The adequacy and thoroughness of training programs, feasibility studies, user manuals and documentation standards needs to be improved. It is recommended that programs be instituted in all of these areas with the highest priority being given to user manuals which are now almost non-existent.

Although cost figures are produced by system, they are only distributed to self maintaining property users and therefore pay for computer services received. Most of the users do not fall in this category and therefore cost figures are not distributed to them. To foster more cost conscious use of ADP resources it is recommended that accurate cost figures be provided all users.

The computer facilities were found to be poorly prepared for a possible fire and it is recommended that steps be taken to improve fire protection.

A condensed version of the recommendations made in this report and the page on which the full recommendation appears follows:

LISTING OF RECOMMENDATIONS

	<u>PAGE</u>
1. The Computer Center Director should coordinate all ADP activities and resources.	15
2. The Computer Center Advisory Committee should be revitalized.	16
3. ADP communications should be strengthened.	17
4. The ADP Plan should be reevaluated, updated and expanded.	19
5. A feasibility study should be made regarding the Library circulation system.	36
6. A comprehensive equipment utilization system should be acquired or developed.	45
7. An ADP training program should be developed and implemented.	48
8. Feasibility studies should be formalized and include cost projections.	49
9. User manuals for all systems areas should be developed and maintained.	50
10. Documentation standards should be established and implemented.	50

PAGE

11. ADP cost figures should be distributed to all users
and management.

51

12. Fire protection for the computer room should be
improved.

52

SECTION III

ORGANIZATION AND MANAGEMENT

GOALS AND OBJECTIVES

An overview of the university's goals and objectives for the computer center is stated in their Computer and Data Processing Center Development Plan dated August 1974. It states that the Computer Center exists to support the Instructional, Research and Administrative program of the university. It further states that the philosophy of the university in the academic areas is to produce students who are well rounded and cognizant of all tools available in their respective disciplines and that the Computer Center supports this by serving as an extension of the classroom learning experience. Also the Computer Center exists for the purpose of supporting the faculty and students in their research activities and providing the administration with data to aid them in administering the university.

The Computer Center Director emphasized that the ADP center stresses "Service" to all areas of the university and this was evident in discussion with ADP center personnel and ADP users.

ORGANIZATIONAL STRUCTURE

Illustration No. 1 depicts the Organization of the University of Northern Colorado as of November 21, 1974. The Computer Center is identified by the heavier border. It should be noted that the Computer Center is positioned under the Vice President of the University and Dean of Academic Services. While the Computer Center is expected to (and does) serve Administrative Services, Academic Services, and Student Services the positioning of ADP under Academic Services seems proper . . . as instruction is the primary mission of the university.

UNIVERSITY OF NORTHERN COLORADO
ORGANIZATION CHART

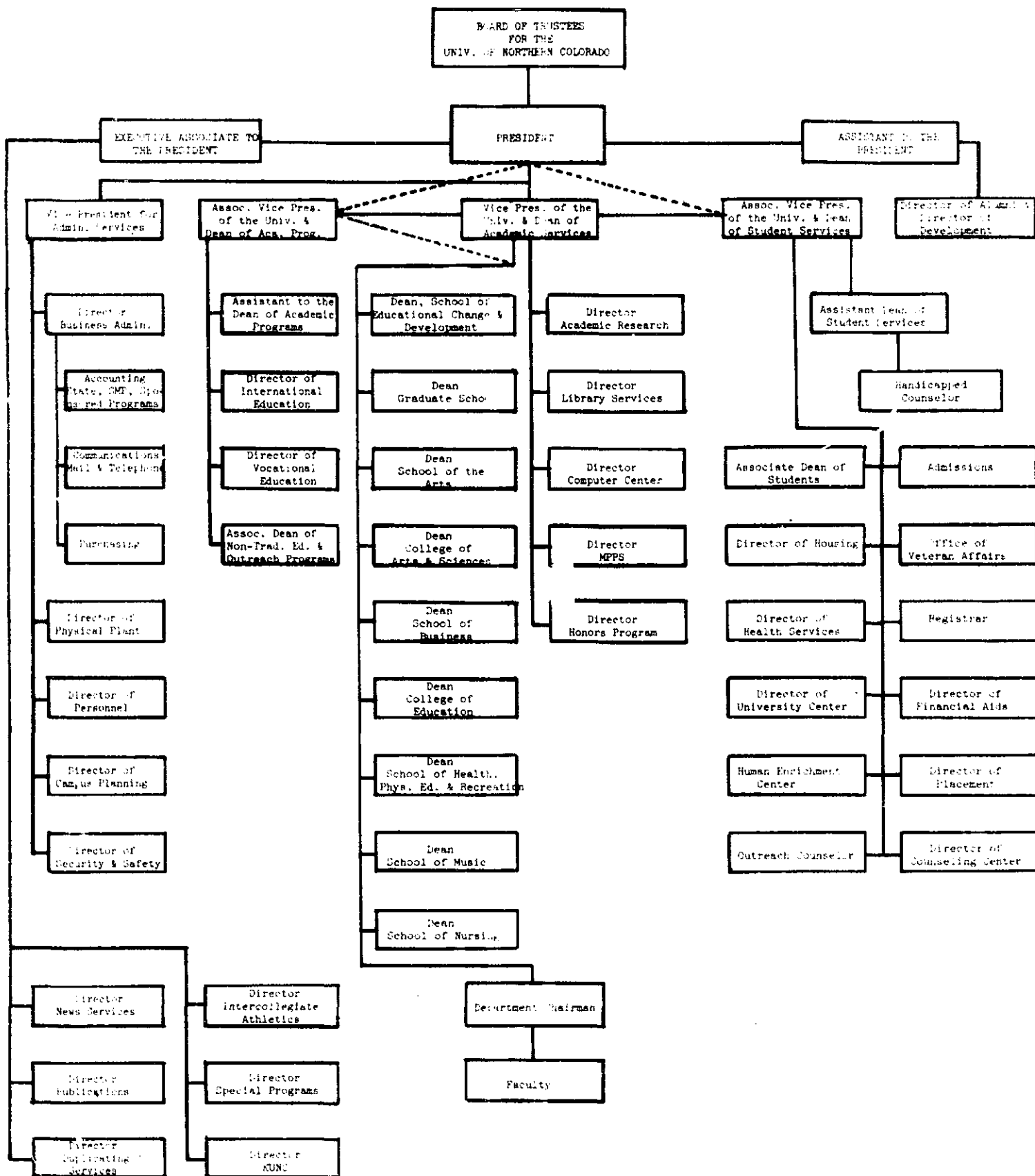


Illustration No. 2 is an organization chart of the Computer Center at the university. This chart was current as of January 15, 1975, the date this evaluation began.

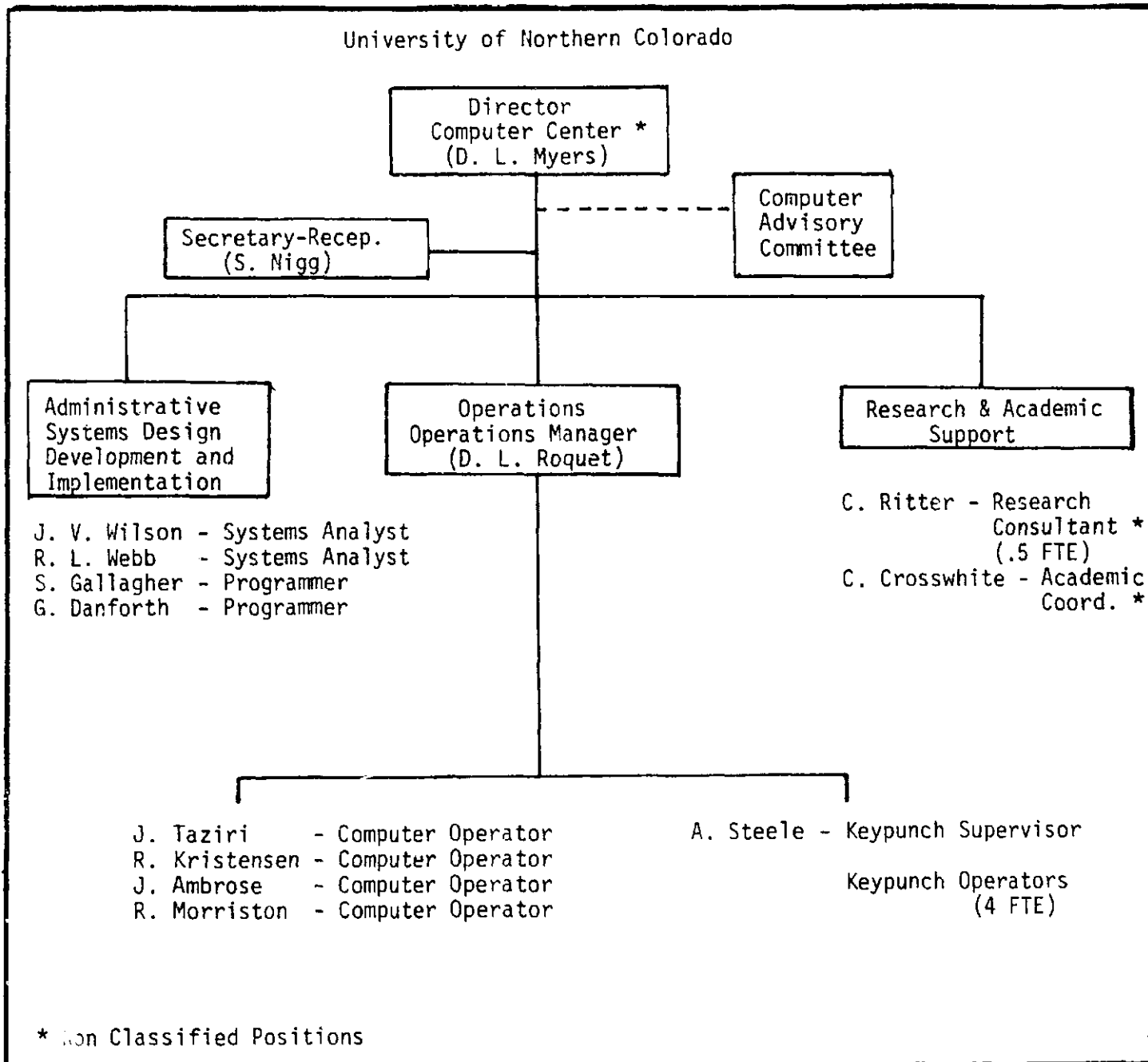


Illustration No. 2

EXECUTIVE MANAGEMENT

During the course of this evaluation the evaluation team met with the President and the four Vice Presidents of the university. All of these top administrators showed interest, knowledge and support for the use of ADP in the university. Evidence of top managements' interest in ADP is their membership on the Computer Policy Board which is the final arbiter for ADP matters. The boards membership is the Vice President of the University representing instruction and research, the Vice President for Administration representing general administration and the Associate Vice President and Dean of Students representing student personnel needs.

MANAGEMENT OF ADP ACTIVITIES

There are a number of areas in the university which have ADP activities. These are portrayed in Illustration No. 3.

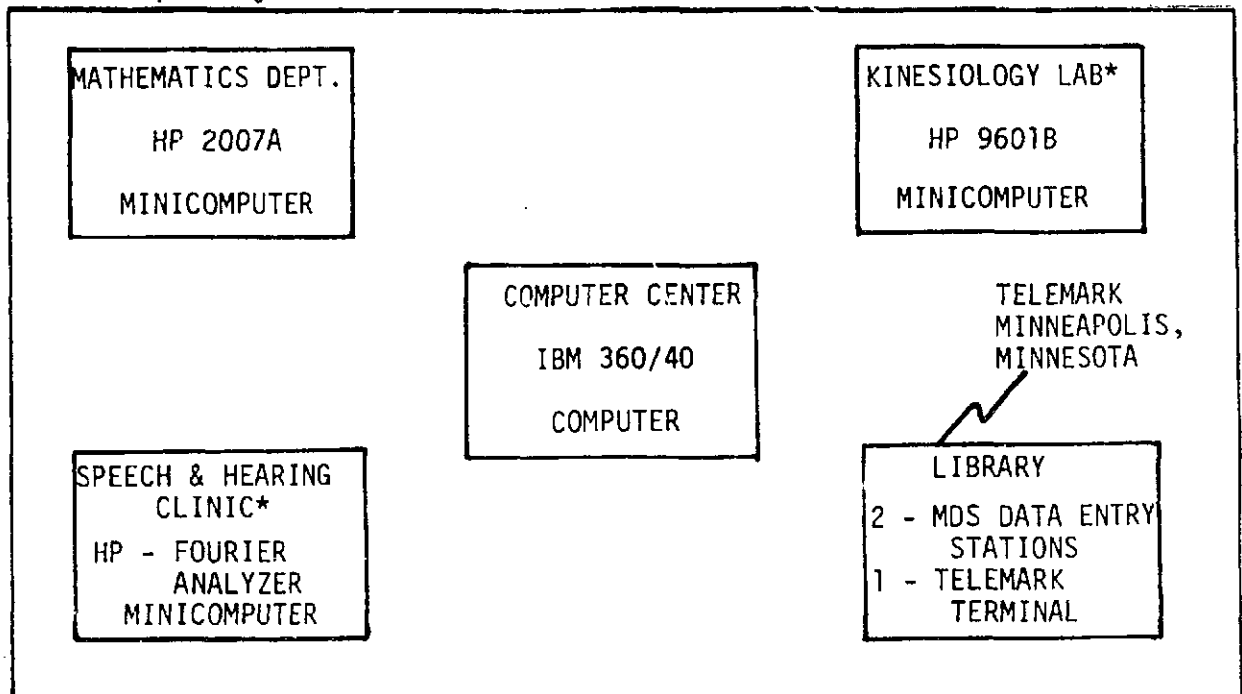


Illustration No. 3

* The minicomputers at the Kinesiology Laboratory and the Speech and Hearing Clinic are used as special laboratory devices.

In addition to the activities shown, keypunches are located at the Michener Library and McKee Hall of Education for student use. One additional keypunch is located at the University Center for use by the Bookstore.

Each of the computer activities portrayed in Illustration No. 3 is independently managed with minimal coordination from the Director of the Computer Center. In order to bring about complete coordination of all ADP activities and to include them in the ADP Plan and Budget, these activities should be formally coordinated at one designated point.

RECOMMENDATION NO. 1

COORDINATION OF ALL ADP RESOURCES INCLUDING THE MINICOMPUTERS AT UNC SHOULD BE ASSIGNED TO THE COMPUTER CENTER DIRECTOR.

COMPUTER CENTER ADVISORY COMMITTEE

This committee has eight members including the Computer Center Director.

The Committee operates under a written charter which charges the committee with:

1. Representing their respective areas needs and requirements.
2. Working with the Director (Computer Center) and the university administration to acquire the resources to meet their needs.
3. Evaluate and review priorities within existing and/or projected resources.
4. Reviewing the short and long range plans prepared by the center staff.

The committee last met on April 11, 1974 which was the only meeting in 1974.

In the opinion of the performance evaluation team the committee membership provides good representation for all areas of the university. The charge in the charter is good and the minutes of the meetings reveals that the committee was involved in meaningful issues. However, it is felt the committee does not meet frequently enough to carry out its charge.

RECOMMENDATION NO. 2

REVITALIZE THE COMPUTER CENTER ADVISORY COMMITTEE SO THAT IT CAN FULFILL ITS ASSIGNED DUTIES AND RESPONSIBILITIES. THIS INCLUDES MEETING WITH SUFFICIENT FREQUENCY TO BE INFORMED ON ADP ISSUES AND PROVIDE OVERALL GUIDANCE.

COMMUNICATIONS

Most communications regarding ADP at the university are on a one-for-one basis between the ADP center staff and the users. These individual contacts have been effective and the users indicated great satisfaction. Although the current users were well informed regarding their own systems, they as well as most potential user were not aware of ADP policies and plans. It is the opinion of the evaluation team that much of this void could be filled by a properly structured and functioning Computer Center Advisory Committee. Some faculty and administrative staff members interviewed were not aware that the advisory committee existed. Thus it is evident that the advisory committee was not now functioning as an effective communication vehicle.

Interviews with the Computer Center staff indicated that some of them felt they were not fully informed regarding the activities and plans of the center. While it is difficult to keep everyone advised of everything it is felt that additional internal communication efforts would be beneficial.

RECOMMENDATION NO. 3

A PROGRAM DESIGNED TO STRENGTHEN ADP COMMUNICATIONS SHOULD BE INITIATED WITH EMPHASIS ON INTERNAL COMMUNICATIONS IN THE ADP CENTER AND COMMUNICATIONS BETWEEN THE ADVISORY COMMITTEE AND ALL USERS AND POTENTIAL USERS.

ADP PLANNING

In accordance with standard procedure, the university submitted their ADP plan to the Division of ADP for review and approval. This plan was dated August 1974 and entitled "Computer and Data Processing Center Development Plan". During the period of this performance evaluation the plan was under review by the Division of ADP. Although the regular review process will result in a more detailed analysis of the plan than undertaken by the performance evaluation team, the following comments are considered important to this report.

Planning is a continuous function and the computer center management was having planning sessions during the period of this evaluation. As a part of this continuous planning the following additional details should be developed to add to and possibly modify the August 1974 plan. There is a need to project the volume and frequency of ADP resource use for instruction. What courses will use it, how many students, expected volumes and terminal time requirements.

It is recognized that there is considerable difficulty in projecting future instructional needs. A number of the faculty members said they

would use the computer more if it were more easily accessible. In some instances faculty members had a pretty definite idea of how they would expand their use of the computer. For the most part however, it appeared that specific additional uses were not yet identified. Part of this is due to the fact that the faculty does not want to spend time planning curriculum enhancements for a resource they may never actually get. It did seem apparent that if the resource was available its' use would expand.

A survey was made in June of 1972 regarding the projected use of ADP for instruction and this should be updated and projected volumes should also be made.

The plan includes considerable detail regarding the proposed uses of terminals in the administrative area although it is not clear as to how much analysis was done on projected volumes.

The plan states that UNC is proposing that it become a regional center to serve the surrounding area institutions (Higher Education and Public School) as appropriate. There is no indication that there has been any planning with these agencies to define what may be involved.

The lack of projected volumes and terminal time requirements makes it difficult to verify the validity of the particular equipment included in the plan.

Regarding the proposed administrative data base or common master file the evaluation team found that there is considerable work to be done in identifying what specific data will be included and how it will be processed. The Computer Center personnel are aware of this and are working on it in their planning meetings.

RECOMMENDATION NO. 4

THE UNIVERSITY OF NORTHERN COLORADO COMPUTER AND DATA PROCESSING
CENTER DEVELOPMENT PLAN DATED AUGUST 1974 SHOULD BE REEVALUATED,
UPDATED AND EXTENDED.

SECTION IV

SYSTEMS REVIEW

INTRODUCTION

The A.D.P. systems operating at the university will be discussed under five broad categories. These categories are synonymous with higher education programs of Instruction, Research, Administration, Library and Public Services.

INSTRUCTION

The instructional support can be separated into three types. One is for the purpose of the student acquiring skill in the use of the ADP equipment itself. Another is to provide support to the student in learning the various non-ADP disciplines. The third type support is to aid the faculty in carrying out their instructional functions. The ADP skills courses include instruction in keypunching, tabulating equipment, computer programming and systems design. The computer support of classroom instruction includes such programs as a simulation model in marketing and many statistical problems in various statistical classes. Examples of the use of the computer to aid the instructional process are dissertation cataloging and test generation programs.

ADP Skills Courses

In the university's 1974-75 catalogs there are 23 courses which directly provide instruction in A.D.P. skills. Fourteen of these are at the undergraduate level and nine at the graduate level. In the undergraduate level the School of Business has six courses, the Research and Statistical Methodology Department of the College of

Education has one course and the College of Arts and Sciences has seven courses. Five of the courses in the College of Arts and Sciences are in the Department of Mathematics, one in the Department of Physics and one in the Department of Chemistry. At the Graduate level two courses are in Business, two in Educational Administration, three in Research and Statistical Methodology and two in Science.

These courses provide skills the students need to utilize ADP as a tool in other courses as well as providing students with a knowledge of ADP which will be helpful in their future occupations. It was pointed out by several faculty members that more and more school districts are utilizing ADP in their administrative and educational functions. Therefore, those graduates of the university who become teachers and school administrators will be more valuable because of their understanding of and capability in using ADP. This is of course also true of many other occupations as ADP usage is greatly expanding in most fields.

Classroom Support

Some Colorado school districts provide computer support to secondary school students in math and other courses. A number of the faculty members said that these students expect this type of support in their university courses and that this demand is increasing.

Currently the following courses, which are not ADP skills courses, use the computer center to provide an extension of the classroom learning experience.

5 BIO 101 Principles of Biology

2 BUS 295 Introduction to Operations Research
2 BUS 365 Marketing Strategy
2 BUS 370 Business Finance
2 BUS 470 Financial Management
PSY 275 Experimental Psychology
3 SOC 460 Social Research I
3 SOC 461 Social Research II
RSM 613 Multiple Regression
RSM 633 Factor Analysis
-RSM 643 Seminar: Special Topics (applied statistics)
RSM 754 Research Seminar (Statistics)

In addition to these courses which are currently utilizing the Computer Center, many additional courses have been identified throughout the university that would be enhanced by using ADP. This includes courses in many disciplines at both the undergraduate and graduate level. The Computer Center employs a full time Academic Coordinator in order to support the current instructional use of ADP as well as to foster the extension of its use to additional courses and disciplines. This concept is well received by the faculty and appears to provide an excellent means of relating ADP to instruction.

Faculty Support

ADP is used by the faculty to test out and develop problems for classroom assignments. Also, it is used to provide administrative type support directly related to instruction. A faculty member in the Industrial Arts Department has developed a data base of test materials of over 7,000 questions and answers which is used to randomly generate

tests covering any selected portions of the course curriculum. Also, the Department has indexed all dissertation and research papers for easy retrieval.

Summary of Instructional Support

The use of ADP in the instructional area consist of individual programs or jobs for students and faculty. From January 1, 1974 thru December 31, 1974 the University Computer Center ran 26,369 instructional jobs utilizing 1,057 computer hours (elapsed time). This is an average job run time of 2.4 minutes. This is 43% of the jobs and 17% of the total computer time used in 1974.

In addition to the support received from the computer center's IBM 360/40 computer, instruction is supported by two minicomputers. The Department of Mathematics has a Hewlett Packard 2007a and the Kinesiology Laboratory of the School of Health, Physical Education and Recreation has a Hewlett Packard 9601B. The minicomputer in the Mathematics Department is used by a few other departments and for some interactive simulation models as well as statistical and mathematical problem solving. The minicomputer in the Kinesiology Laboratory is used to measure and plot physical activity and for statistical analysis.

The instructional jobs are given top priority at the University Computer Center and are normally run in a 126K foreground partition. This results in a rapid turnaround for these jobs. The Performance Evaluation Team's survey of 79 students determined that all students surveyed received less than eight hour turnaround on their programs. Three fourths of them always received at least two hour turnaround and

sometimes less than fifteen minutes. All faculty members interviewed by the evaluation team expressed great satisfaction with the support received from the Computer Center. They felt the turnaround time was the best that can be expected with the equipment available. Also, the minicomputers were considered very important as they have the capability of providing support in a limited interactive mode and to utilize BASIC language which is not available on the IBM 360/40.

Ninety-four per cent of the students who completed the performance evaluation teams survey rated the overall services of the center satisfactory. The availability of keypunch equipment is satisfactory according to 72 students out of the 79 surveyed. There were 17 students who felt user manuals were not satisfactory. Sixty-eight of the 79 students felt technical assistance was available as needed.

Deficiencies

The major deficiencies in ADP support identified by the faculty were as follows:

1. There is a lack of keypunch devices to handle peak situations. Peak situations are by the very nature of instruction a normal situation with students finishing their assigned problems at the end of the quarter.
2. Access to the computer center is difficult because it is located on the East campus and many of the students and colleges which need it are located on the West campus. Access to a computer via terminal was suggested as a means to overcome this problem.

3. BASIC language is not currently available on the IBM 360/40 at the computer center.
4. Interactive processing is not available on the IBM 360/40 computer.
5. The HP 2007A minicomputer in the Department of Mathematics is extremely limited in the size of programs it can process. Also, the speed of input and output to this mini is very slow because it is limited to two teletypewriter terminals.

RESEARCH

The job accounting system of the University's Computer Center shows that during the year 1974 there were 2829 research jobs which took 236 hours of elapsed computer time. This represents 4% of the jobs and 4% of the total computer time used in 1974.

Included in these jobs are the teacher evaluations by students. This system processes 20,000 to 25,000 evaluations every quarter. There are also several additional questionnaires processed quarterly by the Bureau of Research Services. Other research is also conducted by individual faculty members such as analysis of various school districts students, cost and staffing information.

Probably the largest class of users under this heading are the graduate students who process questionnaires and do statistical analyses for master degrees and doctoral dissertations. The Computer Center employs a Research Consultant to assist graduate students in their research projects.

Generally the faculty members were very complimentary of the support received from the Computer Center for research. There was some expression of a desire for terminals to make access to the center easier.

One problem identified is that graduate research projects have a low keypunch priority and this sometimes causes a delay of 4 or 5 weeks in creating the data for these projects. The students are told this and therefore know they must allow considerable lead time or procure their own key-punching services.

PUBLIC SERVICES

On a time-available basis the University Computer Center provides computer processing to a few outside agencies. Time has been provided to Weld county school district #6, Western Interstate Commission for Higher Education, Hensel-Phelps Construction Co., Weld county Opportunity Agency, Community Pesticide Project, Northern Colorado Board of Cooperative Services and the National Board of Chiropractic Examiners. These agencies are charged for this computer time and the payments returned to the State General Fund.

During the year 1974 approximately 2,492 jobs using 523.04 computer hours (elapsed time) were used for public service related jobs. This represents 4% of the jobs and 8.4% of the total computer time used in 1974.

ADMINISTRATION

The University's Computer and Data Processing Center Development Plan dated August 1974 states the relationship of ADP to the administration of the university in the following manner:

"In the administrative areas, the role of ADP is to provide university officials, at all levels of the institution, with data by which they can effectively and efficiently administer the university to the benefit

of the student and the State. The data collected and processed is used to manage the institution on a day-to-day basis, summarized into status reports and used to 'drive' management models to answer the 'what if' questions."

The evaluation team found that automated systems did exist to support most administrative areas of the university. The users of the systems were for the most part satisfied with the systems and very complimentary of the support received from the computer center. The most universal problem identified was that a faster response time would be helpful and that this could be accomplished through terminals to the Computer Center.

In 1974 28,351 administrative jobs were processed utilizing 3727 hours of computer time. This constitutes 46% of the jobs and 60.3% of the total computer time used in 1974. A discussion of administrative systems by area follows:

Student Records

These systems involve gathering information on the student from the time of initial application for admission, status and activities during enrollment and finally keeping track of the former student as an alumnus.

Included in this area are the following sub-systems.

- o Admissions - This system gathers and evaluates the various data elements necessary to consider a student for admission. It serves as the initial data for the students' academic record. Approximately 7,500 admission applications are processed annually. This system is working satisfactorily.
- o Financial Aids - This system processes 6,000 aid applications annually. It accounts for the dollars awarded and interfaces

with the accounting system. This system needs analysis and revision.

- o Registration - Pre-Registration - This system is the procedure by which 11,000 students are registered in 3300 different sections of courses each quarter. This system needs analysis and revision.
- o Student Records Maintenance - This system follows the registration system and is the record keeping aspect of the student record data. Approximately 32,000 changes to the records are made quarterly and 200 unique reports are produced for various agencies and users. This system is working satisfactorily.
- o Grade Reporting - This system records the students' academic progress at the university. Each quarter in excess of 55,000 on campus and 6,000 off campus grades are processed and recorded. This system is working satisfactorily.
- o Health Center - This system is to maintain, record, analyze and remit to doctors and laboratories for services rendered to students in the university's off campus medical services program. Processes approximately 5,000 records a quarter. This system is working satisfactorily.
- o Housing - This application processes and maintains the 3,200 on campus resident hall room records plus 800-1000 off campus meal contracts quarterly. It interfaces with the various accounting, student records and admissions systems. This system is working satisfactorily.

- o Development and Alumni - Relation - This system maintains addresses and personal data file on 32,000 alumni, parents and friends of the university. The system is expanding by about 3,500 a year. This system is working satisfactorily.

The subsystems are interconnected, with the admissions systems generating the basic student records. The other systems add to, change and extract from the records to update the files.

The Health Center and Housing Office pay for computer time used. In fiscal year 1973-74 this amounted to approximately \$800 for the Health Center and \$4,500 for the Housing system. These monies are returned to the State General Fund. The other subsystems in this area are not charged for their computer processing.

Needs and/or enhancements desired which were expressed by the users of these subsystems:

1. User manuals for all systems need to be developed and maintained.
2. On-line capability would be helpful to update housing files which would eliminate paper work and speed up processing.
3. Expansion of the housing system is desired to provide year to year comparisons, monthly billings (billings are now quarterly) and a perpetual inventory of consumables.
4. The Registrar expressed a desire to go to a "demand scheduling" system rather than the Department controlled scheduling system that is now used.

5. The Registrar would like on-line capability with terminal inquiry capability first and later on-line update of files.
6. The Registrar would like transcripts placed on microfiche.
7. The Dean of Student Services expressed a desire for terminals to be used to update student records for adds and drops, to enter initial admission data and to improve guidance and counseling by making records easily available to counselors.
8. The Admissions office would like to provide certificates of admission on the computer. (This capability is currently being added to the system.)
9. The Health Center would like to automate their "On Campus" report.
10. The Dean of Student Services is interested in a compatible matching of room-mates for housing purposes. Such a system is currently being piloted and will be evaluated to determine if it should be fully implemented.

Fiscal Control

This area involves the systems required for fiscal control of the university including accounting, receivables, payables, purchasing and payroll. Included in this area are the following subsystems.

- o General Accounting - This system records in an auditable process the daily accounting records of the university for all funds. It provides budgetary data and reports on the fiscal status of the university and processes in excess of 100,000

transactions monthly. This system is a rewritten version of the Rochester accounting package which was acquired centrally for higher education in July 1970. This system is working satisfactorily.

- o Accounts Receivable - This system extracts data from financial aids, student records and housing subsystems and produces quarterly statements to students. It also provides revenue projection and is integrated with the General Accounting System. The system needs analysis and revision.
- o Payables - This system accepts as a source document a requisition which generates a purchase order and saves information for payment at a later date. It also provides the capability for direct payment and handles Library acquisitions. It interfaces with the accounting, housing and financial aids subsystems. Volume is approximately 900-1,000 purchase orders and acquisitions a month and in excess of 3,000 checks per month. This system needs analysis and revision.
- o Payroll - This system provides records and issues checks to some 1,150 staff and 800 part time students. It provides tax calculations and an audit trail of payroll activities. This system is currently being revised.
- o Book Purchasing and Inventory - This system maintains inventory of books and orders materials from publishers for the Bookstore. Volume is approximately 1,200 requisitions a quarter covering 40,000 textbooks and 75 purchase orders a week covering 500 titles for paperbacks. This system is working satisfactorily.

In addition to these subsystems there are plans to add a new Student Loans subsystem. This system would compute the interest, issue statements and record the activity for approximately 8,000 loan accounts. Currently this is all processed manually.

The bookstore pays for computer time used. In fiscal year 1973-74 this amounted to \$798. Also, the Self Maintaining Properties Manager receives reports from some of the other fiscal systems as well as an investment listing. The cost of these services in FY 73-74 was \$536. The other subsystems in this are funded through the Computer Center and do not receive bills for computer use.

Needs and/or enhancements desired which were expressed by the users of these subsystems.

1. The loan fund section and the Director of Business Administration expressed a need for the planned Student Loan System.
2. The Director of Business Administration expressed a need for an automated "Cash Receipting Process" System.
3. The Director of Business Administration indicated that the subsystems are not fully integrated, uniform and flexible due to rapid growth of the university.
4. The Payroll Section would like to have balances, summaries and PERA deduction made by the system rather than manually as now required. Desire US Saving Bond Billing Report, and adjustments to accounts included in new system which is now being developed.

5. The Purchasing agent expressed a desire for direct access to files for inquiry and data input. This also would aid in overcoming slow turnaround which sometimes occurs.
6. There was an expression from several users that on line inquiry and data collection would benefit these subsystems.

Institutional Research and Records

This area provides systems to aid in the overall administration, control and decision making process of the university. There are two systems in this area.

- o Academic Records - This system includes the processing of the schedule of classes, facilities inventory and personnel inventory and analysis. It serves as an important facet of the registration and budget processes. This system is working satisfactorily.
- o Institutional Research - This system summarizes the universities data systems and produces program costs, support data for university administrative decisions and data to reporting agencies. This system is working satisfactorily.

Needs and/or enhancements desired by the Director of Academic Research.

1. Direct access to the system to modify on-line the faculty, facility and course schedule records.
2. Improved integration of the system and the capability to analyze the data.

LIBRARY

This area covers the systems which support the operation of the main university library. The systems classified as Library ran 1703 jobs utilizing 640 hours of computer time in 1974. This is 3% of the jobs and 10.3% of the total computer time used in 1974. Included in the area are the following systems.

- o Acquisitions - This system provides the record keeping process to account for and control the acquisition of new library materials. It is a subsystem of the payables system. During fiscal year 1973-74 approximately 71,000 volumes were acquired. This system needs analysis and revision.
- o Serials Catalogue - This system provides a current up-to-date catalogue of the approximate 7,000 serial titles in the library. This system is working satisfactorily.
- o Circulation System - This system keeps track of and controls approximately 150,000 annual circulation transactions. This system was obtained from Colorado State University and was converted and modified to run on U.N.C.'s equipment. This system needs analysis and revision.
- o Catalog System - This system consists of the inventory of approximately 691,000 volumes. The system is interfaced with the circulation system. This system is working satisfactorily.
- o E.R.I.C. System - This system contains and provides access to the educational data available from the 18 Educational Resources Infor-

mation Centers. It has approximately 1/3 million items and is increasing by about 15,000 a year. This system is working satisfactorily.

In addition to these five systems operated at the University Computer Center the library is a subscriber to the Telemark system in Minneapolis, Minnesota. A teletypewriter terminal accesses the system to produce library cards. Telemark has data on all books cataloged by the Library of Congress and approximately 70% of the books acquired by the UNC library are included in this category.

Needs and/or enhancements desired by the library.

1. A system to provide a Map Book Catalog is needed and has been included in the university's 1975-76 budget request. The system would provide a catalog of the current 30,000 maps now in the library and handle the approximate 8,000 additions a year.
2. They would like a terminal to Systems Data Corp. to enable searching their data banks which contain all published material. This would assist in determining the best material to be added to the library.

The library circulation system which was obtained from Colorado State University was originally designed to run on a CDC 6400 computer. This computer is substantially different from the computer operated at UNC and the circulation system in its present form consumes a considerable portion of the daily computer run time. The staff has expressed a desire to resystematize this system to reduce run time if possible. The Performance Evaluation Team feels a feasibility study should be completed to determine if a meaningful reduction of computer time can be made through redesign of the system.

RECOMMENDATION NO. 5

CONDUCT FEASIBILITY STUDY REGARDING POSSIBLE REDESIGN OF LIBRARY CIRCULATION SYSTEM TO DETERMINE TIME AND COST BENEFITS.

SUBSIDIARY SYSTEMS

In addition to these major areas there are some individual systems that are used for special purposes. These include the following:

- o Facility File - Data on all campus buildings which is used with other systems such as registration. This file contains building and room data consisting of room type, spaces, usage, square footage, etc. This system is working satisfactorily.
- o ADP Job Accounting System - Used to account for computer time by user. This system needs analysis and revision.
- o CCHE Reports and Files - System utilized to produce special reports on instructional facilities for the Colorado Commission of Higher Education. This system is working satisfactorily.
- o Budget - System utilized to help build the university ADP budget. This system is working satisfactorily.
- o Placement System - This system is used to tabulate questionnaires which are used to follow-up on graduates. Additionally, a system is under consideration which would give the Placement Center:
 1. Ability to handle the continued growth of enrollees without additional staff resources.
 2. "Personalized" vacancy lists for enrollees.
 3. Potential to expand the vacancy listings and the capability to handle the increased workload.

ADDITIONAL AREAS DESIRING SYSTEMS

Two additional areas indicated a desire for the development of ADP systems to support their activities.

The Director of Physical Plant would like a Preventive Maintenance Scheduling System and a Materials Inventory System.

The Director of Security and Safety indicated the University of Colorado Public Safety Office utilizes ADP support and felt this same type system would be beneficial at U.N.C. This system would provide data for performance evaluation, assists in ticket handling and otherwise reduce manual record keeping.

SYSTEMS SUMMARY

In reviewing the ADP systems including interviewing the users of the various systems and the ADP management and development personnel, three significant and predominant conclusions emerged.

1. The users of the systems are highly satisfied with the overall operation of the systems and the support received from the Computer Center.
2. Although there is a great deal of satisfaction regarding the systems, there is one area in which many users would like improvement. This is in the area of ease of access to the computer.
 - a. In the instructional area the desire is to have improved access to the computer for students and faculty for two purposes.
 1. There is a need to overcome the problem of physical location. The Computer Center is located on the East campus

and is some distance from the colleges and student dorms on the West campus.

2. There is a desire to improve instruction through the use of interactive terminals which would provide access to interactive learning packages. Also, this would provide a means to develop and use programs for problem solutions on an interactive basis.
- b. In the administrative area many users desire a method of capturing and changing data directly. Also, they desire a means of rapid inquiry into data files for information and management purposes.
3. The ADP management and development personnel as well as a number of the users indicate a need to design and implement an integrated data bank of administrative data. The current systems are tied together loosely and it is difficult to analyze the data for top management decision making and planning.

The issues described herein indicate a need to address them through further analysis and planning. See discussion and recommendation regarding Planning under Section III Organization and Management of this report.

SECTION V

ADP OPERATIONS

This section reviews the operation of the Computer Center which is located on the eastern portion of the campus in Carter Hall. The section is divided into the subjects of equipment, software, personnel, procedures, and facilities.

EQUIPMENT

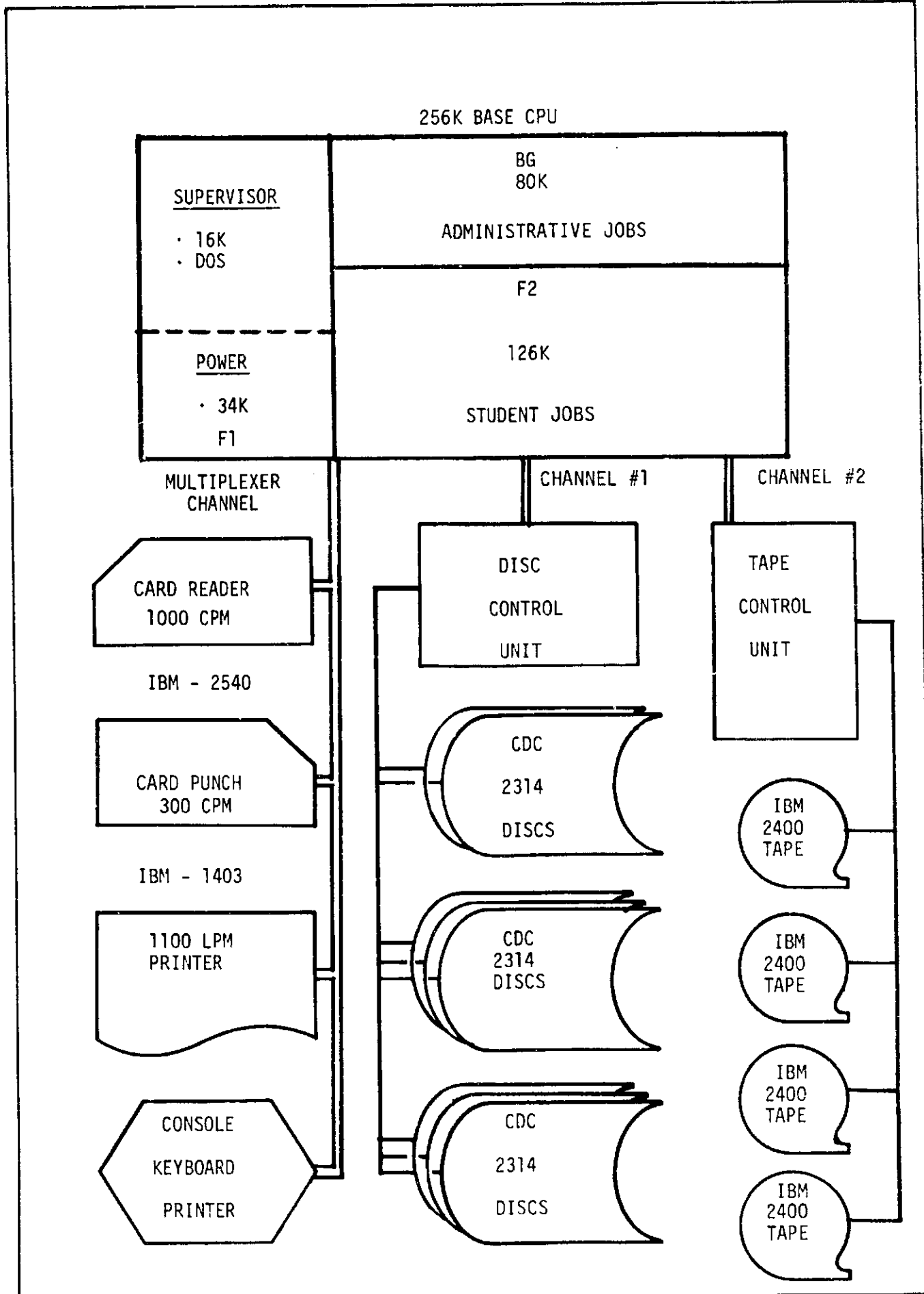
The Computer Center operates an IBM 360/40 computer, data creation equipment, and unit record equipment.

Description

The configuration of the computer is shown in Illustration no. 4. The original CPU and some of the peripherals were first leased by the Department of Revenue in 1965. They were transferred to UNC in 1968. In addition to the computer the center has the following equipment:

- 10 IBM 029 Key punch units
- 4 UNIVAC 1710 Key punch units
- 1 UARCO Buster
- 1 MOORE Decollator
- 1 MOORE Detacher/Imprinter
- 1 IBM 557 Interpreter
- 1 IBM 519 Reproducer
- 1 IBM 081 Sorter
- 1 IBM 083 Sorter

All of this equipment is located at the Computer Center except for three IBM 029 key punch units. One is located at McKee Hall of Education and two at Michener Library for the use of students.



Additional ADP equipment on campus consists of a teletype terminal and two Mohawk Data Sciences Key-Disk-Tape Stations at Michener Library, and IBM 024 keypunch unit at the Bookstore in the University Center and three Hewlett Packard minicomputers. As previously indicated in this report (illustration no. 3) one minicomputer is used by the Mathematics Department for instruction and the other two are principally used as special laboratory devices by the Kinesiology Laboratory and the Speech and Hearing Clinic.

Computer Scheduling

At the time of this evaluation the computer operation was staffed for nineteen hours a day, Monday through Friday and for Saturday morning. This represents a staffing of approximately 400 hours a month out of a total possible 730 hours a month. The computer was operated at other times, on an as required basis, to handle peak administrative processing requirements and to provide additional support to students and faculty for instructional programs and research projects. In February 1975 the schedule was extended to 24 hours a day, Monday through Friday plus Saturday morning.

Jobs are generally run on a first-in-first-out basis, with student jobs running mainly in the Foreground (F2) partition and administrative and other jobs running in the Background (BG) partition. There is no restriction on the number of computer runs for a student and they can be processed anytime the computer is being operated.

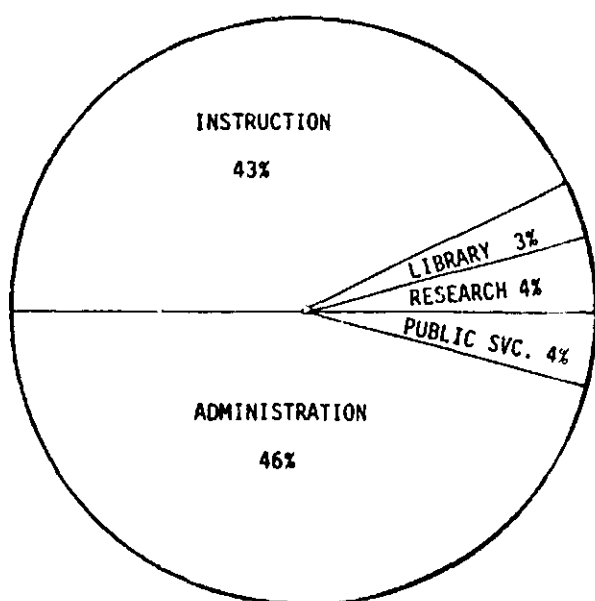
The length of student instructional runs is limited to five minutes. Up to 10 P.M., research runs can be extended to a maximum of 10 minutes

with prior approval of the center. After 10 P.M., research runs can be up to 30 minutes duration. During non-scheduled hours, longer instructional and research runs are permitted.

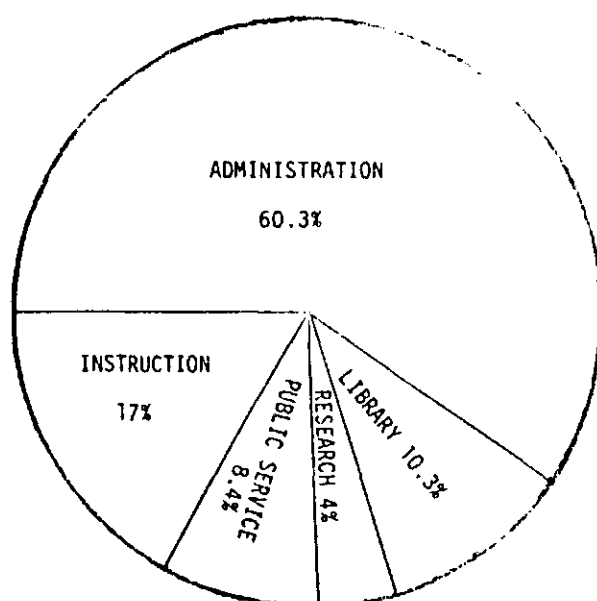
Computer Utilization

By program category the computer job runs and job hours utilized during 1974 were as follows:

NUMBER OF JOBS



COMPUTER JOB HOURS



PERIOD JANUARY 1, 1974 THROUGH DECEMBER 31, 1974

	<u># OF</u> <u>JOBS</u>	<u>%</u>	<u>JOB</u> <u>HOURS</u>	<u>%</u>
INSTRUCTION	26,369	43	1,057	17
RESEARCH	2,829	4	236	4
PUBLIC SERVICES	2,492	4	523	8.4
LIBRARY	1,703	3	640	10.3
ADMINISTRATION	<u>28,351</u>	<u>46</u>	<u>3,727</u>	<u>60.3</u>
	61,744	100	6,183	100

The 61,744 total jobs and 6,183 total job hours represent monthly average of 5,145 jobs and 515 job hours. Because of the variations in processing requirements during the school year the actual jobs and job hours utilized range widely from month to month. The maximum number of jobs during a month was 6,678 in May 1974 and the minimum was 3,499 in December 1974. The number of job hours ranged from a high of 762 in May 1974 to a low of 345 in December of 1974.

The instructional processing is heavy at the end of each quarter and particularly heavy at the end of the school year in April and May. This is because students are endeavoring to finish their assignments before the end of the quarter and at the end of the year before graduation. Administrative processing requirements are high at the beginning of each quarter to cover registration, student billing, housing, etc. It is particularly high in September and October to handle the large new enrollment at the beginning of the school year. By the same token the periods between quarters and the Christmas holiday season are periods of minimum computer processing needs.

As previously stated, during 1974 the computer was staffed 400 hours a month out of a possible total of 730 hours a month. As a result of the operating environment (DOS with two production partitions) the available hours are approximately $400 \times 1.40 = 560$ possible hours per month. The 1.40 factor comes from the fact that the two partitions allow two jobs to be in the computer at the same time with some overlap of their processing. It has been determined, by the computer center staff, that the average overlap is approximately 1.40. This is based

on a 50% degradation in the low priority partition and a 10% degradation in the high priority partition. The actual overlap at any one time is dependent on the particular jobs in each partition.

The center averaged 515 hours per month, which is a 91% utilization of staffed hours. As of February 1975 the facilities are staffed 500 hours per month which based on the 1.4 factor makes 700 hours of computer time available per month. Utilization figures are not as yet available for this extended schedule.

As evidenced from the 1974 utilization the IBM 360/40 computer is capable of handling the current processing load. However, it is not capable of supporting the planned use of interactive terminals for instruction and for terminal inquiry and update in the administrative and student services areas.

SOFTWARE

The Computer Center was operating under DOS (Disk Operating System) at the time of the evaluation. They were experimenting with OS (Operating System) for a possible upgrade in equipment. During the course of this evaluation it was decided to convert the IBM 360/40 to OS. POWER is utilized for input/output control and queuing. The system includes COBOL, FORTRAN and RPG compilers and IBM supplied utility programs. Also, the DOS Job Accounting and POWER Job Accounting packages are in use.

The job accounting packages capture a wide range of data to aid in measuring equipment utilization by user, purpose, and particular device.

The computer center has developed a few programs to process this data for statistical analysis of utilization. These reports are limited to showing elapsed job time by accounting code spread among Administrative, Instruction, Research and Overhead. This limited information is all that is currently available to analyze the operation of the computer. In order to better determine the efficient use of the equipment, additional statistics are needed to aid in analyzing the use of individual peripherals and the effects of individual programs.

RECOMMENDATION NO. 6

ACQUIRE OR DEVELOP A COMPREHENSIVE EQUIPMENT UTILIZATION SYSTEM. INCLUDE MEASUREMENT OF CPU, PERIPHERALS, PARTITIONS, CHANNEL TIME, I/O WAIT, IDLE TIME AND DOWN TIME. ALSO STATISTICS SHOULD BE GENERATED ON THE AMOUNT OF TIME FOR RE-RUNS, TOTAL OPERATING, PRODUCTION, TEST, OPERATING SYSTEM, SOFTWARE DEVELOPMENT, MAINTENANCE AND TIME BY APPROPRIATE COST CENTERS AND CATEGORIES.

PERSONNEL

Staffing

Staffing of the Computer Center at the time of the evaluation in January 1975 was as follows:

<u>TITLE</u>	<u>F.T.E.</u>
Director	1.0
Manager of ADP Operations	1.0
Senior Systems Analyst	2.0
Academic Coordinator	1.0
Research Consultant	.5
Systems Analyst	1.0
ADP Programmer	1.0
Senior Computer Operator	1.0
Computer Operator	3.0

Keypunch Supervisor	1.0
Keypunch Operator	4.0
Administrative Typist "B"	<u>1.0</u>
Total Regular Staff	17.5

In addition to the permanent staff, the center utilizes part-time student help as required and available. At the time of the evaluation the center was employing on a part time basis one programmer, three computer operators and two keypunch operators. The part time employees were working approximately half time so represent 3.0 FTE.

Personnel Skills Inventory

The Personnel Skills Inventory for ADP personnel is shown in illustration no. 5. Several items of interest are apparent in this chart. Teleprocessing experience is limited to two analysts and no Data Base Management experience exists in the staff. These items plus a review of the last two columns under TRAINING, coupled with future hardware, software, and systems plans, clearly identified areas where training will be required.

PERSONNEL SKILLS INVENTORY																						
NAME AND CURRENT TITLE	TOTAL ADP EXP.	YEARS SYSTEMS EXP.				YEARS PROGRAMMING EXPERIENCE								OPERATIONS		OTHER ADP		EDUCATION			TRAINING (Dates & Course)	
		Total	Supv.	T.P.	DBMS	Total	Supv.	COBOL	FOR- TRAN	DBMS	FMS	TP	Total	Supv.	Mgmt.	Non Mgmt.	H.S. Grad.	Yrs. Coll.	Degree	Last Course	Next Prev. Course	
Myers, Donald Director	12.5					2.0			2.0				1.5	1.5	9.0		X	7	MA			
Roquet, Donald Mgr. of ADP Oper	7.0	.5				1.5		.5					4.0	4.0		1.0	X	4.5	BA	OS Oper. Train 1974	BTAM(IBM) 1967	
Wilson, James V. Sr. Sys. Analyst	13.0	3.1				6.9	1.0	4.9	1.0				1.0	1.0	1.0	1.0	X	5	BS/BS	IBM ALC 1967	IBM SYSTEM FAC 1967	
Webb, Richard L. Sr. Sys. Analyst	10.5	3.5		1.5		6.5	1.0	4.5	2.5			1.5	.5				X	4	BS	O.S. JCL 1974	INTRO TO O.S. 1974	
Crosswhite, Carl Academic Coord.	10.5	3.5	1.5	2.0		6.0	1.5	1.5	2.5			.5					X	7	PhD	O.S. JCL 1974	INTRO TO O.S. 1974	
Gallagher, Sean Systems Analyst	9.0	3.0				3.0	1.0	2.0	1.0				2.0	1.0	1.0		X	3		O.S. JCL 1974	INTRO TO O.S. 1974	
Danforth, Geo. S. ADP Programmer	10.0	3.0				4.0	1.0	2.0	1.0						3.0		X	5	BA	O.S. JCL 1974	O.S. INTRO 1974	
Taziri, Jim V. Sr. Operator	9.0												9.0	4.0			X			O.S. OPERATOR TRAIN 1974-75		
Abrose, James F. Operator	4.0												4.0				X	2	AA	O.S. OPERATOR 1974-75	FORTRAN PROGRAMMING 1974	
Kristensen, Rob. Night Operator	4.5												4.5				X	3		O.S. OPERATOR 1974-75	PROGRAMMING 1968-70	
Morrison, Rodney Night Operator	2.0												2.0				X	4	BS	O.S. COPL 197 Dumb Debugging	O.S. JCL 1973	

Illustration No. 5

ADP Training

Two factors have limited the need for a formal ADP training program at the university. The first and most important factor is the relative stability of the Computer Center over the past several years. Use of the IBM 360/40, DOS, and no communications capabilities has made ADP training a relatively simple matter. The second factor is the small ADP staff coupled with a low turn-over rate.

Key punch training is conducted on-the-job by the key punch supervisor. Operator training is also accomplished on-the-job by the lead operator. The staff of three systems analysts and two programmers have received their training through vendor-supplied packages, self-study, and borrowed training packages. For operational needs, this training has been adequate.

State-of-the-art training, familiarization with new software, hardware, and methodology, such as data base systems has been extremely limited. The fact that the ADP staff is so small and money is limited would make it very difficult to offer training that would take people away from their jobs. There is a need for the exchange of technical information on software, hardware, state-of-the-art, and other technical ADP subjects. Such an exchange would be very beneficial in furthering ADP training.

User training in the instructional and research areas is not the full responsibility of the Computer Center. In those instructional areas where ADP support is required, user training is provided and appears to be adequate. Student assistants work part-time in the

Computer Center and provide help to students in using the computer. The Computer Center has a full-time Academic Coordinator, who is charged with faculty and student orientation. A half-time Research Consultant provides assistance to students and faculty engaged in research projects.

The Evaluation Team took note that UNC has planned for a hardware upgrade that will accommodate use of more sophisticated software and will provide communications capabilities, on-line instruction and data-base oriented systems. Such an upgrade, if it occurs, will greatly expand the instructional use of the computer as well as provide for integrated data-base management systems. In-house type ADP training would hardly suffice in this environment. The evaluation team concludes that proper preparation for the proposed mode of operation must include a formal ADP Training plan.

RECOMMENDATION NO. 7

DEVELOP AND IMPLEMENT AN ADP TRAINING PROGRAM DESIGNED TO PROVIDE THE NECESSARY KNOWLEDGE AND SKILLS REQUIRED BY THE HARDWARE, SOFTWARE AND SYSTEMS PROJECTED IN UNC'S ADP PLAN.

Systems Analysis and Programming

All Systems Analysts and Programmers function in the dual role of Analyst/Programmer. They are assigned to specific areas such as accounting or student records and then are responsible for user contact, analysis, systems design, programming and implementation for that area.

The analyst/programmer is responsible for establishing priority and determining the feasibility of projects in his assigned areas. If necessary a final determination is made by the Computer Center Director.

PROCEDURES

Feasibility Studies

Feasibility studies are informal and unstructured. The analyst/programmer assigned to the system area works with the user to determine the needs and projects a completion date. No cost figures are estimated either for the development effort or the operation of the system.

RECOMMENDATION NO. 8

FEASIBILITY STUDIES SHOULD BE FORMALIZED AND COST PROJECTIONS FOR DEVELOPMENT AND OPERATION OF APPLICATIONS SHOULD BE MADE AND FURNISHED TO THE USER AND THE COMPUTER CENTER ADVISORY COMMITTEE.

User Manuals

User manuals for administrative type ADP Systems, for the most part, were non-existent. In a few instances using agencies were in the process of writing user manuals. Even so, the composition, contents, and formats were different. No central control over these efforts existed nor had any target dates been established for completion of these projects.

Of 79 students surveyed by a questionnaire prepared by the Performance Evaluation Team, slightly more than 20% stated the user manual for instructional support was not satisfactory. This coupled with the fact that 12 of the 79 students stated user manuals were not readily available for their use suggests the status of user manuals for instructional support should be reviewed.

The status of user manuals was discussed with the Director of the Computer Center and he indicated that the development and implementation

of quality user manuals was high on his "do" list. An examination of user manuals, system-by-system should be included in the follow-up visit of this ADP evaluation of UNC.

RECOMMENDATION NO. 9

ESTABLISH THE RESPONSIBILITY FOR DEVELOPING AND MAINTAINING USER MANUALS. DEVELOP AND MAINTAIN USER MANUALS FOR ALL SYSTEMS AREAS.

Standards and Documentation

Programming, system and operation standards are very minimal and not uniformly followed. Each analyst/programmer is responsible for the documentation in his area. It was noted by the evaluation team and acknowledged by the Computer Center staff that documentation is lacking and should be upgraded.

As more systems are developed it becomes more critical to have proper and sufficient documentation. It was acknowledged that turn-over of systems personnel would cause disruption in proper maintenance and operation of the systems. The Director of the Computer Center agrees that more and better documentation is required and is endeavoring to have this accomplished as time permits.

RECOMMENDATION NO. 10

ACQUIRE OR DEVELOP AND IMPLEMENT FORMAL ADP OPERATIONS, SYSTEMS, AND PROGRAMMING STANDARDS. UPDATE AND KEEP CURRENT ADP DOCUMENTATION IN ACCORDANCE WITH ESTABLISHED STANDARDS.

Cost Figures Distribution

Cost figures for ADP resources are calculated and distributed to those users who are responsible for self maintaining properties. This

includes housing, bookstore, and the health center. General fund programs are not charged and ordinarily do not know the cost of services received. Charges are based on computer time used and include factors for keypunch and personnel including development personnel. In order for all users to have a proper appreciation for data processing cost they need to know the operating costs of their current systems and costs of new system development and operation. Direct charges for development costs would be more significant if charged on an hourly basis rather than as part of computer time. Thus instead of being an overhead to all systems, and especially to those who use a lot of computer time, they should be charged to systems actually under development and/or requiring heavy maintenance.

The distribution of properly developed cost figures would provide users with data to foster more cost conscious management and judicious decisions regarding ADP usage.

RECOMMENDATION NO. 11

DEVELOP ACCURATE ADP COST FIGURES FOR RESOURCES USED AND DISTRIBUTE THEM TO ALL USERS AND TO THE UNIVERSITY MANAGEMENT TO PROVIDE INFORMATION FOR MORE COST CONSCIOUS MANAGEMENT OF THESE RESOURCES.

FACILITIES

Adequacy

The computer center is located on the garden level of Carter Hall. Because of inadequate storage space, boxes of cards and paper are stacked in hallways. The space provided students is inadequate and crowded at times. The addition of terminal capability would significantly alleviate the need for student activity at the center location.

Security

Entrance to the center is unrestricted so that it is available for student use. The computer room itself is restricted to authorized personnel although it is not secured by a locking system. Exterior windows of the computer center are made of breakproof safety glass. There is no formal background check performed on computer center personnel.

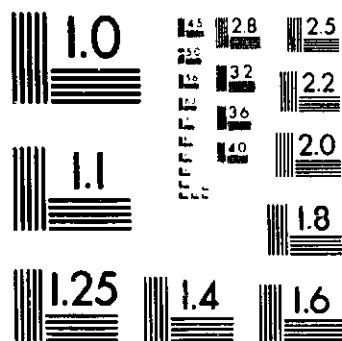
Disaster Control

All ADP hardware at the center is insured under the statewide master policy. All active master files are maintained in a fire proof vault located in the computer room and backup files are rotated and/or maintained offsite. All programs including JCL are copied on tape and kept in the fire proof vault in the computer room.

The computer room does not have an automatic fire detector or prevention system. Waste containers are not covered and smoking is permitted in the computer room which adds to the risk of fire. Two small fire extinguishers are located in the computer center and these were last inspected 18 months before the visit of the evaluation team. There is no fire exit sign. Electrical power down switches were readily apparent and easily accessible. There is no floor puller available to open up the false floor making it difficult to pull up the floor.

RECOMMENDATION NO. 12

INSTALL IN THE COMPUTER ROOM AN ADEQUATE FIRE DETECTION AND PREVENTION SYSTEM INCLUDING ADEQUATE COVERED WASTE CONTAINERS AND ADEQUATE PROPERLY INSPECTED FIRE EXTINGUISHERS.



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