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USE OF A MICROCOMPUTER SYSTEM AS A TOOL FOR ACADEMIC RECORDS MANAGEMENT IN THE MICHIGAN STATE UNIVERSITY DIETETIC PROGRAM

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By

Stella Hall Cash

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ABSTRACT

USE OF A MICROCOMPUTER SYSTEM AS A TOOL FOR
ACADEMIC RECORDS MANAGEMENT IN THE
MICHIGAN STATE UNIVERSITY
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The purpose of this feasibility study was to design and test a computer-assisted student academic records management system for use with the TRS-80 Microcomputer (Model I, Level II) with processing capabilities for data storage; single and multiple item recall, tabulation, and summarization; item analysis within and among discrete categories, and itemized and summarized print-outs (videoscreen and hard copy).

Twenty-four selected information elements associated with each of fifty academic record files of students enrolled in the Michigan State University dietetic major were used to establish the information data bank. A single software program was written to include the aforementioned processing capabilities which represent the routine, repetitive academic data demands departmental personnel are presently required to perform manually.

Although limited in scope, the study findings clearly indicate that this relatively simple microcomputer-assisted system for academic records management is feasible and can provide a cost-effective, labor-saving, efficient means of handling such records rapidly and accurately.

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COMPUTER NOMENCLATURE

BASIC	A high-level, general purpose computer language, which is an acronym for "Beginners All-purpose Symbolic Instruction Code."
Binary Processor	A computer program that puts another program into a form acceptable to the computer using a binary system (only two symbols or digit values--0 and 1).
Bit	Abbreviation for "binary digit"; smallest amount of memory in the computer capable of representing values 0 and 1.
Canned Software	A program for general purpose use rather than designed for a specific task.
Central Processing Unit (CPU)	That unit of a computer system which fetches, decodes, and executes programmed instructions and maintains the status of results as the program is executed.
Chip	Integrated circuit (often a Silicon chip).
Data	Numeric and alphanumeric information encoded in a suitable binary code.
Data Bank	Information stored in the computer memory which is operated on during the execution of an instruction.
Data Processing	The converting (as by a computer) of crude information into usable or storable form.
Disk Drive	A storage device which utilizes magnetic medium in the form of a floppy disk or hard disk.
Expansion Interface	An extension of the computer in which one finds additional memory, input/output parts, i.e., for the printer, disk drives, etc.
Hard Copy	A print-out copy (in connection with a computer) that is readable without a special screen device.

Hardware	The electronic, mechanical, and magnetic elements from which the computer is fabricated.
Higher-level Language	Makes it possible to communicate with a computer using English language words and mathematical symbols without the need of detailed knowledge of the computer's internal architecture.
Input	To transfer data from outside the computer (from a disk file, keyboard, etc.) into RAM (Random Access Memory).
Integral Circuits	A tiny complex of electronic components and their connections that is produced in or on a small slice of material, as silicon.
"K"	A unit of computer storage capacity.
Large Scale Integration (LSI)	A computer unit that totalizes large quantities or numbers in a manner comparable to mathematical integrating of differential equations.
Line Printer	A high-speed printing device that prints each line as a unit rather than character by character.
Magnetic Disk	Provides large storage capacity for binary data (more expensive than tape but is faster).
Magnetic Tape	Most popular medium for storage of large quantities of binary data.
Mainframe	The computer itself and its cabinet as distinguished from peripheral devices connected with it.
Memory	Any electronic storage medium for binary data.
Microcomputer	An entire system with microprocessor, memory, and input/output controllers whose CPU is a microprocessor.
Microprocessor	Single LSI circuit which performs the functions of a CPU.
Microprogramming	The use of routines stored in memory rather than specialized circuits to control a device.
Output	To transfer data from inside the computer's memory to some external area, i.e., a disk file or line printer.

Password	A security clearance code sub-routine consisting of up to eight alphanumeric characters included in the program. A file requiring a password cannot be accessed without use of this specific code.
Program	Any sequence of instructions that direct the computer to perform a specific task.
Program Menu	A directory from which a processing capability can be selected.
Programmer	One who develops the sequence of instructions in some form that can be easily deposited in the computer memory.
RAM	"Random Access Memory"--semiconductor memory which can be addressed directly and either read from or written to.
ROM	"Read Only Memory"--semiconductor device designed for having data read from it.
Software	Refers to the binary patterns stored somewhere in the computer system memory which represents instructions that control the operation of the computer.
Subroutine	Sequence of instructions which performs a specific function and is available for general use by other programs.
Transistor	An electronic device that transfers an electrical signal across a resistor.

CHAPTER I

INTRODUCTION

The steady growth in undergraduate enrollment for the dietetic major experienced during the last ten years by the Department of Food Science and Human Nutrition (hereby referred to as FSHN Department) from 75 students in 1969 to 274 students in 1978, has greatly increased the academic record handling problems associated with the departmental responsibilities of (a) maintaining accurate up-to-date student academic progress records, (b) determining individual student status regarding course enrollment eligibility, and (c) projecting and handling student enrollment needs for courses which vary in relation to academic term availability, class hour scheduling and/or class-size restrictions. Parallel with this growth in student numbers is the concomitant increase in the volume of academic record data requiring manual processing by departmental staff. The need to modernize and/or modify the current cumbersome departmental system of academic records management for students enrolled in the dietetic major is readily apparent.

Development of a computer-assisted student records management system designed for orderly compilation, storage, and processing of such data appears to be one promising alternative. Conceivably, such a system could decrease the man-hours currently expended to cope with the time-consuming, repetitive manual processes and problems of academic record handling for dietetic majors encountered at the departmental level; improve the organization, completeness and accuracy of the stored data; and, on demand, provide ready-access to the array of informational elements for each student available from such a data bank.

During the past decade the concept of operational accountability and its importance, whether in government, industry, or education, has become more mandatory than ever before. According to Denovellis and Lewis (11) and Johnson and Grafsky (20), accountability, especially in the area of education, has a wide range of connotations reflecting different attitudes toward its effect. For the purpose of this study, the concept of educational accountability is reporting the congruence between agreed upon student and institutional goals and their realization. This concept of accountability is associated with such variable parameters as measurable objectives, competency in basic skills, comprehensive management, stringent planning and allocation of resources, and a system of cost effectiveness.

Revolutionary changes in operating practices in industry, government, and education have led to a number of technological advances designed to replace routine work by humans, which may be slow and inaccurate when compared with machines. This technology has advanced through time from Pascal's digital machine, which could repeat mechanically the multiplying of one number by another, to devices such as computers, which can store information for future retrieval and processing.

Large scale data multiprocessing systems have been used in industry, government, and education systems for some time in an effort to balance the operational demands of growth, but these systems are very expensive, need large areas for storage, and require programming by professional computer scientists. However, Hargreaves (18) and McGlynn (28) have indicated that recent advances in the field of large scale integration semiconductor process technology have made significant reductions in the cost and size of digital logic circuits possible. During the 1970's computer system building blocks have progressed from discrete components such as single transistors to complex functional integrated circuits containing many logic gates on a single semiconductor "Chip." The first proposal for a "computer-on-a-chip" came from this concept, which has materialized into what is now known as a microprocessor. The microprocessor utilizes chips that are capable of performing the essential functions of a computer central processing unit (CPU) which is the part of an electronic computer system that controls the interpretation and execution of processing instruments. A microcomputer is an entire system with microprocessor, memory, and input-output controllers, whose CPU is a microprocessor.

Because of more recent developments concerning microcomputer capabilities with attendant moderate costs (1979 systems cost of $6,000 or less), it was believed that a computer-assisted program could be developed which would allow for accuracy and efficiency in academic record assembly, monitoring, and analysis while serving as a cost-effective labor-saving management tool.

The purposes of this exploratory investigation were:

1. To identify the relevant academic record elements (and their sources) essential for development of a comprehensive departmental student informational data base to assist in the management of academic records for dietetic majors in the Department of FSHN, College of Human Ecology, Michigan State University.
2. To design and test a computer-assisted student academic records system model for use with the Tandy Corporation TRS 80, Model I, Microcomputer System with processing capabilities for:
   a. accumulative information storage;
   b. single and multiple item recall, tabulation, and summarization;
   c. item analysis within and among discrete categories; and
   d. itemized and summarized print-outs.
3. To assess the relative merits of and the initial and continuing costs associated with changing from the present manual system of handling student academic record data to a computer-assisted system of academic records management.

CHAPTER II

REVIEW OF LITERATURE

The past twenty years have been called the "Information Age," and for good reason. More information has been generated in the past ten years alone than in the entire history of mankind, mainly because of the advent of the computer (49). Computers and their business applications have been evolving ever since World War II, when the United States Army needed great computational capacity for the calculation of ballistic tables. Consequently, in 1943, the Ordinance Division of the War Department contracted with the University of Pennsylvania to build the Electronic Numerical Integrator and Computer (ENIAC) (50). The ENIAC, completed in 1946, was an enormous piece of equipment which had 30 separate units (plus power supply and cooling equipment) with 18,000 vacuum tubes, 70,000 resistors, 10,000 capacitors, and 6,000 switches. It weighed over 30 tons, required a large environmentally controlled area for operation, and could perform approximately seven instructions per second. Its major weakness, other than size and cost, was a lack of stored programming capability. As much as a full day was required to reprogram the computer before a new program could be analyzed (33).

Although the main line of early computer development originated with ENIAC at the University of Pennsylvania, Harvard University also played a substantial role. Construction of the Harvard Mark I (Automatic Sequence Controlled Calculator) started in 1939 by Harvard University and IBM (International Business Machines) was completed in 1944. The Mark I was an electromechanical device 51 feet long and 8 feet high with 760,000 parts--including 500 miles of wire, 60 registers, a control multiplying and dividing unit, more than 1,500 ten position switches, and several thousand electromechanical counter wheels (13). During the 1940's, IBM concentrated on electromechanical calculators because it did not believe that a commercial market existed for computers (16).

Construction of EDVAC (Electronic Discrete Variable Automatic Computer), 1946 to 1950, under another United States Army/Government contract incorporated the concept of the internally stored program, which was the final element necessary for the future development of the modern computer (50).

Numerous references in the literature indicate that most large businesses acquired their first computers in the period from 1953 to 1958 (6, 14, 58). These machines employed vacuum tubes and magnetic records, usually in the form of magnetic drums and tapes, and had limited capabilities. Few of the businesses acquiring these computers had clear cost-based justification. Acquisition was based on hope and the attitude of the time that to be progressive a company had to have a computer. Perhaps the only advantage of having one of these first computers was the psychological effect such a purchase had on competitors (58). Disadvantages, such as exorbitant costs, limited operational capabilities, and personnel technology, plus the physical demands for space and controlled environment, plagued the computer industry during its infancy (35).

The advent of transistors (1958 to 1966) marked a turning point in computer design, and as transistors quickly replaced vacuum tubes, computers became smaller, faster in operation, and slightly less expensive. IBM became the leader in the commercial computer industry primarily due to its constant emphasis on service and support (44). During this period, systems software (trade jargon for programs used to run the computer system) came into major use (45). The middle of the 1960's marked the point where software and hardware (computer machinery) development and application costs became equal (44). Wise (57) reported that IBM spent upward to half a billion dollars on software development for the 360 series. The computers of this era were highly practical, oriented to tasks that were well understood, and were designed to support the concept of time-sharing. Mauze (26) stated that Massachusetts Institute of Technology, through its Project MAC, was actually the first to prove the feasibility of time-sharing in 1963.

Time-sharing is a method of allowing many users to share access to a large computer. A number of users are assigned to a block of time on a central processing unit, and prepared instructions enable the device to take data and process it as time on the computer becomes available. Time-sharing is offered in two rather broad forms: interactive and remote batch processing. In each case the user has access to the remote large computer, through a resident, using a terminal. In the interactive system, the user addresses the computer directly and communicates with it by entering data and receiving an almost instantaneous reply. Remote batch processing systems enable the users to enter data that have been accumulated in batches, have the data processed on the remote computer, and receive the results later. The actual processing time may be the same as that required in the interactive system, but the elapsed time from start to finish will usually be longer, which can cut costs, because the computer is used only at the times when it is in least demand for priority tasks.

The period 1966 to 1974, as described by Withington (58), saw a dramatic drop in computer costs due to the development of large-scale integrated circuits, which are capable of holding hundreds to thousands of basic electronic elements. Equally important to this period was the development of new types of remote terminals, allowing geographically dispersed users to communicate with centrally located computers. Smith (43) reported that when the IBM 360 series was marketed in the mid-1960's, it was felt that the system to end all systems had been developed and the factors supporting centralization became dominant. Three primary factors that tended to move the organization to centralized computer systems were money, management, and standardization. As applied to the organization's computer costs, executives felt that use of a large centrally located computer, accessible to all departments, would cut hardware and software expenditures. Use of the central computer would be in lieu of positioning smaller computers (not then called minicomputers), at each departmental level. With the centralized management approach, needs could be assessed and with a centralized staff of specialists, user needs could be met. The argument for improved standardization of computer systems was never verified, except for the proliferation of thousands of records.

As reported in Industry Week, 1976 (3), there was growth and confusion in the computer industry in the early 1970's due to advances in technology and conflicting terminology. During this era, the term "minicomputer" became prevalent. Originally, minicomputers were really small-scale general-purpose computers (5). However, with annual cost reductions of 70 to 80 percent by the early 1970's, through the use of integrated circuit technology and the fact that large general-purpose computers were not suited for many smaller applications, a new trend in the computer industry was born (17). Albrech et al. (2) defined a minicomputer as a small, stored-program, digital computer that can be programmed in an assembly or higher language and has the following attributes:

1. Sells for less than $50,000 for a minimum stand-alone configuration comprised of a central processing unit, memory, input-output equipment, and system software.
2. Contains a memory of at least 4,000 eight-bit words.
3. Performs normal computer functions (inputs, transfers, stores, processes, and outputs data) under stored-program control.
4. Is usable in a broad range of applications.

Gardner (15) commented that small computers are getting bigger, at least in terms of computing power and versatility, and many people have trouble identifying what is and what is not a minicomputer.

His broad definition of a minicomputer is that they range from very small, inexpensive personal machines costing as little as $1,000 to full-blown interactive data processing systems that sell for $60,000 or more. Some minicomputers are "interactive" in that they can communicate or "talk" to one another, compared with some that are "stand-alone," self-contained, non-communicating units.

Selsky (39) also observed that minicomputers have been defined in different ways. He states that they have been described as binary processors with 16-bit word lengths and also as machines whose mainframes sell for less than $20,000, or some say, between $20,000 and $100,000. In any instance, minicomputers cost less than large computers and have equal or greater capabilities. For example, the Sperry Univac V76 minicomputer selling for $8,400 can store from 16,000 to 1,024,000 bits of information in comparison to the Univac II which had a core memory of 10,000, 12-bit words and sold for $115 million.

With the increased growth of minicomputers, computer network systems developed. A computer network system, as defined by Kelly and Ball (23) is a means of resource sharing by all computer users in an organization. The architecture of the network system may be point to point (a direct connection between two devices), the loop or ring (a group of terminals connected in a ring-like structure where each terminal can communicate only with the two adjacent terminals) and the hierarchical network (assistance is required from more powerful elements, such as minicomputers to feed into a larger, host computer).

Another change in computer operations brought about by minicomputers was the replacement of the large centralized computer in some distributed data processing (DDP) applications. Selsky (39) reported that Datapoint's Attached Resource Computer System (ARC) allocates processing among multiple minicomputers, each performing specific portions of a total program, with each connected to the other. No large computer is involved. The minicomputers in any DDP configuration may be located in many geographically dispersed divisions of a company. Each division uses the minicomputer to do local processing and to communicate with other minicomputers and/or a large computer located at the company's headquarters (a network system). As a means to increase reliability in the total computer operation, some data processing units have developed a concept which involves the pairing of minicomputers to assure continuous service.

Smith's (43) findings indicated that in a great number of cases organizations could have utilized a time-sharing service or central computer facility but chose not to. The contributing factor toward this concept of decentralization has been the decreased cost of the minicomputer. Findings further indicated that the move to decentralize data processing by using minicomputers has increased line managers accountability for their own data processing, has reduced paperwork and other manual routine work, reducing errors and freeing staff members to spend more time on customer services (46).

In the early to mid-1970's, the confusing term microprocessor became common. The first part of the word as defined by Sippl (42), "micro" simply indicates the tiny physical size of the components involved. Large-scale integration (LSI) produced tiny silicon-based "chips" of components (transistors, diodes, etc.). The term "processor" indicates that section of a computing system that is dedicated to performing the basic system control for executing the operations and processing the data as specified by the user's program. Traditionally, this has been referred to as the central processing unit or CPU function. Microprocessors are often as small as one-fourth inch square and contain on a single integrated circuit "chip" all the elements of a central processor, including the processing (arithmetic) and control logic, the instructions for decoding, and main or operating memory. Microprocessors have become the CPU of minicomputers and also for the microcomputer, which emerged in the mid-1970's as a "hobby" or "personal" computer.

Microcomputers as defined by Sippl (42) are indeed "real" computers, with the prefix micro relating to size and fabrication technique only, not to performance and versatility. A microcomputer is an entire data processing system consisting of five basic components (10, 12, 51):

1. Central processing unit (CPU). The CPU is the main component of a computer system and is quite often referred to as the "brain" of the system because it controls all the operations of the computer. The CPU of a microcomputer is contained in a large-scale integrator (LSI) chip and is the microprocessor of the system.

2. Memory. This is an electronic storage medium used to hold the programs which instruct the CPU and to store data. There are several types of memory devices but two that are very common in the types of systems being discussed are the RAM and ROM memory. RAM refers to random access memory or, more accurately, "monolithic random access memory." This type of memory is contained in an integrated-circuit chip and may be accessed at will so that this memory can be used to write and execute programs. The biggest limitation of this memory is that it is volatile and when power is removed from the chip, all memory in the chip is lost. This means that programs written through the RAM memory must be stored elsewhere if they are to be used again. The common types of storage are magnetic tapes or one of several types of magnetic disks. ROM refers to read only memory, and is similar to RAM memory except that it is permanently programmed and cannot be written into. ROM memory is not volatile, so when power is removed from the chip, the program contained thereon is not lost and may be recalled as many times as desired. ROM chips are used in systems being discussed to program the CPU to accept a suitable programming language.
3. Input/Output devices (I/O devices). These are devices which give the CPU contact with the "outside world." Many forms of information can be entered into the CPU for treatment but there can be no significance for the computer or the individual entering data, unless it can be turned into an understandable

form. The purposes of I/O devices are to translate the CPU operations into signals usable by the computer and then interpret the results of the computer deliberations to the human requesting its services. I/O devices include keyboards, teletypewriters, video displays, paper tape readers, magnetic tapes, magnetic disks, paper tape punches, and dot matrix printers.

4. Input/Output interfaces. These are the complex wiring systems which give the actual hard-wired control of the I/O devices listed previously.

5. Program. Regardless of the complexity of the computer hardware, the system cannot operate without proper instructions in the form of a program which is referred to as software. A number of basic software programs, on magnetic tapes or disks, have been developed and may be purchased from several sources. However, the tremendous growth in the use of small computers has far outdistanced the ability of programmers to supply "canned" software for many applications, so it is usually necessary to develop programs for specialized projects. In either instance, the program can be reused many times if it is saved on the magnetic tapes or disks.

Although the small computers may have the capability of being programmed in any one of several languages (BASIC, FORTRAN, COBOL, FOCAL, SNOBOL, PILOT, etc.), the most popular language among computer users today is the BASIC language (7, 24, 25). This Beginners

All-purpose Symbolic Instruction Code (BASIC) was developed at Dartmouth College and was originally designed as a simple language which could be learned in a few hours by beginning programmers, whose professional backgrounds were not necessarily oriented toward computers. Improvements of the original BASIC language have made it more complex and somewhat harder to learn, but these changes have made the language a more powerful computer tool, which is still not beyond the capabilities of most individuals to learn on a self-taught basis (24, 25, 51).

According to Kaplan (22), the "hobby" computer market as it exists today was born in January 1975, when Popular Electronics published a cover story on MITS Inc's hobby computer, the Altair 8800. Yasaki (59) suggested that what started as a hobbyist movement has quickly grown into a serious business. Rosefsky (34) has noted that perhaps the most important advance in the computer field is that the electronics industry has set its sights on the small business person as a buyer of its products. According to Newman (30), the personal computer is finding its way more and more into the business/institutional environment, and its presence requires a new way of looking at the administration of information processing. Personal computers are now being networked. For example, Nestar Systems, a new high-technology firm from Palo Alto, California is marketing a system they call Cluster-One which can interconnect up to 30 personal computers, such as the TRS-80, the Apple II, or Commodore Pet. The concept allows sharing of expensive resources such as large capacity disk storage and high quality printing, but does not decrease the advantages of the powerful but cheap computer units.

The technology, in both hardware and software, has developed to the point where even hardened cynics in the data processing area have had to admit that personal computers are here to stay. Newman (31) suggested that many managers are by-passing data processing departments and purchasing their own "personal-size" computers, and calling them desk-top calculators to avoid conflict with data processing departments. There are two reasons why this is happening. First, high performance systems that can duplicate the power of extremely expensive mainframe computers are now available through "personal computer" stores at a fraction of the cost (usually under $10,000). These highly reliable and versatile devices can fit practically anywhere and operate under rugged environmental conditions. They are available in 4-, 8-, 12-, 16-bit word lengths and can interface with most other computers or peripheral equipment. Secondly, corporate DP departments have tended to create and contribute to a "computer priesthood mystique" that frequently has alienated DP types of personnel from the rest of the corporation. Now managers can by-pass the DP department and computerize their operations at the same time. Other authors in the field (8, 41, 48, 54) concur with Newman that basic personality and organizational differences between computer specialists and users often resulted in conflict between the two groups and eventually in computer system failure.

The development of "micro" technology has had a great influence on the "big" computer market. Selsky (40) and Pettis (32) emphasized that big computers are in no danger of being made obsolete by the "micros," but the computer market is changing. One result is that prices of the big computers, typified by the IBM/370, 3031, 3032, and 3033, which range in cost from $500,000 to several million dollars have decreased. Another change is that the big computers are entering the age of interchangeable parts. In the past, once a computer user chose a particular manufacturer's equipment, the company was committed to dealing solely with that supplier, since each manufacturer's hardware and software was unique. No interface was possible with another manufacturer's system without undertaking a costly and time-consuming software conversion process.

In the late 1970's, terminology is still conflicting and confusing. Systems may be called minicomputers, microcomputers, personal or hobby computers, small business computers, or desk-top computers. As indicated by several authors (15, 41, 47), today's differences among computers are sometimes due more to historical and marketing factors than to technical factors.

According to Cerullo (6), the seven most frequently automated business in-house computer applications during the 1950's and 1960's were:

1. Payroll;
2. General Bookkeeping;
3. Accounts Receivable;
4. Accounts Payable;
5. Customer Order Processing and Billing;
6. Sales Analysis and Control; and
7. Inventory Control.

All of these applications, with the exception of inventory control, were routine in nature, designed to provide companies with direct measurable savings in clerical, general, and administrative expenses, as well as to provide an increase in speed and accuracy in processing large amounts of repetitive data. Cerullo also indicated that four major problems hindered the development of more sophisticated, higher-payoff applications during these two decades.

1. Recruiting qualified computer specialists;
2. Integrating the computer with the rest of the company;
3. Planning what applications to automate; [and]
4. Management acceptance of the computer.

However, during the 1970's these four problems became less of a hinderance and more technical computer applications were available.

Forest (14) pointed out that in 1958 General Electric's Appliance Division developed the first successful computer application for industrial payrolls which was programmed on a Univac I. It was another year before the Bank of America designed and developed ERMA, the first automated check processing system.

Withington (58) commented that by the end of the 1960's, a full range of computer applications had evolved. Universal credit card use, airline reservation systems, and stock market quote systems demanded rapid access to file data. Consequently, implementation of on-line inquiring systems using primitive versions of communication controllers and random-access file storage devices came into existence. Computers enhanced the abilities of businesses to vary product styles and product lines, as in the auto industry, banking, and insurance, and to monitor and control operations more closely, as in merchandising.

This early computer period (1950's to 1960's) had a heavy impact on clerical jobs. Some classes of clerical personnel (check-sorting clerks, billing clerks) were reduced to a remnant or eliminated entirely. The time required to implement the new computer application usually allowed personnel reductions to occur by attrition, and the new application often created as many jobs in keypunching and machine operations as it destroyed in other areas. The usual end result was not fewer clerical employees, but a new pattern of clerical work.

Computer application in the 1970's accelerated primarily due to the development of large scale integrated circuitry which made minicomputers, microcomputers, microprogramming, and teleprocessing possible (53).

The literature contains numerous references concerning the impact of the computer on the banking industry as a means of records management during the 1970's (4, 9, 15, 36, 52). Gardner (15) advocated the use of IBM 3608 point-of-sale terminals in 2,800 retail outlets handling First Chicago Bank's Visa credit cards. These terminals led to a significant increase in transaction volume in stores that previously used conventional methods for handling credit card transactions. Management at the First Chicago Bank feels that the use of these terminals is a fast and economical way of processing credit cards which is appealing to both the merchant and the customer.

City Savings Bank of Meriden, Connecticut turned to the minicomputer as an alternative to complete reliance on service bureaus for their data processing needs. This change was due to the decreased cost of the minicomputer, lack of service bureau programs to meet specific needs, and the desire to have more control over data processing operations. The bank developed its own computerized record-keeping program using BASIC computer language, and the program provided the base for a comprehensive, accurate, and up-to-date management information system (36).

Gardner (15) described the use of Datapoint 6600 small computers in the Chase Manhattan Bank's money transfer system. Small computers are being used in a banking system that normally performs more than 20,000 transactions and moves more than $40 billion a day. These computers operate as a means of record-keeping at a low cost and powerful efficiency.

Watson et al. (52) advocated the use of the computer for routine record-keeping processes to free managerial time and to increase accessibility to data which would allow for better decision-making. For instance, bank officers daily have to decide the final disposition of checks written against insufficient funds; credit managers must decide for each applicant who will or will not be issued credit cards and personnel managers must screen individuals seeking employment. Data must be readily available to make such decisions.

Personnel record-keeping has expanded through the use of the computer in the 1970's in many areas. Shick et al. (38) outlined the computer-assisted personnel data system developed for the University of Missouri-Columbia Medical Center Department of Dietetics and Nutrition. The manual system for maintaining personnel records and preparing personnel and labor cost reports was studied to gain familiarity with policies and procedures and to access the efficiency of the present system. From this survey, it was decided that a computer program using a minicomputer would be designed with eight objectives in mind:

1. Develop a data base to accommodate procedural differences related to the bi-weekly and non-academic or academic appointment status of employees.

2. Develop a security system.

3. Define transactions to create, update, and maintain the data base.

4. Compute accrued vacation, sick leave, and holiday time and automatically calculate balances for full-time employees.

5. Include an audit trial.

6. Maintain historical employment records.

7. Retrieve on-line information contained in the Master Personnel and Attendance Files.

8. Prepare non-repetitive reports with minimum programming effort.

Seven transactions were defined to create, delete, and change records in the files. After all of the programs were tested for accuracy, the data base for the personnel data system was implemented as a module of the computer-assisted management information system for the Department of Dietetics and Nutrition. The findings of Moe _et al._ (29) further indicated that the computer-assisted personnel data system developed at the University of Missouri-Columbia Medical Center saved time, was cost effective and in addition, yielded data which hitherto have not been available.

Wilcox et al. (55) pointed out that in 1964, dietitians at the University of Missouri-Columbia Medical Center began developing computer applications for hospital foodservice. By 1970, in addition to the personnel data system, four computer subsystems had been implemented:

1. Food Cost Accounting sub-system identifying weekly, monthly, and yearly food costs for each cost center in the department.

2. Patient Nutrient Intake sub-system permitting clinical dietitians to calculate a patient's daily nutrient intake.

3. Production Control sub-system adjusting recipes and consolidated stores requisitions.

4. Inventory Control sub-system maintaining a perpetual inventory, generating recommended quantities to purchase, and providing summary reports of purchases.

These computer applications, as a means of record management, have proven to be successful at the institution cited.

Scherba and Smith (37) confirmed the fact that the small computer can be a useful tool when working with personnel records and problems. The mechanics of an absentee control program are often cumbersome and involve lengthy and tedious clerical operations, with accompanying errors, especially in programs covering large numbers of employees. A computer program was developed for an unidentified company to accurately and efficiently record absentee information, from which a method was established for identifying problem absentees.

Short (41) noted five major reasons why personnel operations should not be included in large, complex information systems.

1. The need to redesign the personnel information system.

2. The possibility of loss of confidentiality.

3. The reduced accessibility of computerized information.
4. The need to restructure the personnel data base.
5. The psychological problems that noncomputer personnel have with computerized operations.

The computer, both large and now small, has established its place in Colleges and Universities throughout this country. Earlier computer applications in these institutions usually supported only the administrative services of the college or university including business affairs such as general ledger, accounts payable, financial aid, fees, and obligations. Student affairs information, including admissions, registrations, records, and transcripts were also handled by the computer (19).

However, with the computer technology that has developed during the 1970's, other areas in education have expanded the use of the computer. Wilhelm (56) reported data which suggested that computer-based career guidance systems were not only affordable but also innovative. Counselors used the power of the computer to help store, analyze, and summarize educational, occupational, and personal information to assist students in the career development process.

Aitken and Conrad (1) suggested that academic advising and record management could be improved through computerization. The University of Denver developed the computerized Academic Progress Report (APR), a quarterly print-out organized by degree requirements and listing the courses each student has taken, his grades, and the hours still to be completed. In the summer of 1975, 40 faculty advisors from 12 departments were each given departmental files on 10 junior and senior majors in their field and were asked to list all of the degree requirements that each student still had to meet. Of the 40 advisors, 33 responded, and the lists were scored by noting the number of errors and omissions in each. In the fall of 1975, the procedure was repeated using the same faculty advisors, but the respondents were divided into four groups with 10 students' files each. The members of Group A, the control group, received 10 ordinary files. Group B received with the files a statement taken from the college bulletin listing course options and degree requirements. Group C received only the Academic Progress Record. Group D was given both the Academic Progress Record and the statement of requirements. Faculty members from nine departments, representing 61 percent of the sample, responded, and scoring was repeated on the same basis.

T-test comparisons revealed that errors and omissions for Groups A and B did not differ from the earlier sample, while errors and omissions for Groups C and D were reduced by more than 80 percent. Aitken and Conrad (1) concluded that the Academic Progress Record and not the statement of requirements led to the reduction. These results suggest that a computerized system can be useful in providing information for academic advising.

Juola _et_ _al_. (21) developed a computer-assisted program for academic advising for students on academic probation. The computer program was used to help identify students who were in need of specific individual contact because of questionable enrollment practices. Their findings suggested that improvement in academic standing could be secured by judicious procedures in course selection and enrollment.

Whatever means is used to improve academic advising, it must be an accountable system. Denovellis and Lewis (11) define accountability as the degree to which a system succeeds in utilizing the resources provided to accomplish the objectives sought. Academic departments that have experienced increased enrollments and in which excellence in academic advising is stressed, have found the manual clerical types of duties that must be performed to maintain accurate student academic record sets costly, time consuming, and inefficient because of the time required by academic advisors in keeping files updated or in retrieving data by reviewing individual student records.

According to several authors (27, 41, 47), the use of small computers for record-keeping management systems appears to be a logical method for fast record retrieval, efficient use of time and human resources, and cost effectiveness. Seven advantages for using small computers cited by Short (41) include:

1. The physical hardware of the computer and all vital information can be maintained in the user's office.

2. The microcomputer, which is highly reliable and requires little maintenance, can operate within the normal temperature and humidity range of the average office.

3. Most systems would require only minor changes in the information gathering format which is presently being used because the program could be written around that format.

4. A user does not have to be a trained computer programmer in order to operate a specific software program.

5. The system could be developed to use the existing data base, ensure confidentiality, and provide quick access to the information.

6. By locating and operating the microcomputer in the users office, the psychological problems associated with computerization should be greatly reduced for the user.

7. A complete electronic data processing system, which could handle 300-500 student record sets, would cost less than $6,000 and the same computer could be used for many software programs.

CHAPTER III

METHOD OF INVESTIGATION

Sample Selection

The systematic selection of 50 sets of student academic records for dietetic majors to test the proposed student records handling model designed for use with the TRS-80, Model I, Microcomputer System required three sequential processing steps.

Step 1

Identification and stratification by class level of the total number of academic record sets available for declared dietetic majors at the end of Winter Term 1979. The criterion for eligibility for the pool of student academic record sets from which a test sample of 50 was drawn required that the student had been continuously enrolled as a dietetic major throughout Winter Term 1979.

Because of official university computer-processing errors, omissions and/or interval processing time lags as well as changes which occurred during Winter Term 1979 due to student transfers in or out of the dietetic major and student withdrawals or dismissals from the university, two university sources of student enrollment record information were reviewed to identify and reconcile inconsistencies, validate student enrollment status, and determine record set eligibility for pool membership:

a. The MSU official computer print-out report entitled "Student Name Card List, Major List R4401" processed by the Office of the Registrar, January 12, 1979.

b. Individual academic record files for dietetic majors maintained by assigned departmental academic advisors.

From these two informational sources, a list of 274 students, identified by name, university student number, and class level, was compiled for the dietetic majors who satisfied the pool eligibility criterion for this study. Class level percentages of the list were calculated (see Table 1).

Step 2

Calculation of the number of sets of academic record data needed from each class level in the pool in order to retain approximately the same percentage relationships among class levels for a test sample of 50 as was true for the pool of eligible students.

As shown in Table 1, the class level percentages for the pool of eligible student record sets were 9.1, 14.6, 26.3, and 50.0 for class levels 1, 2, 3, and 4, respectively. To retain approximately the same percentage relationships among class levels for a test sample of 50, calculations for 9.1%, 14.6%, 26.3%, and 50.0% of 50 were made to determine the specific number of sets of record data needed from each class level. Actual calculations were rounded to the nearest whole number resulting in comparable percentages of total composition of the test sample by class level of 5 (10%), 7 (14%), 13 (26%), and 25 (50%) for freshmen, sophomores, juniors, and seniors, respectively.

Table 1. Test Sample Composition: Retention of Percent of Total Population by Class Level

MSU Class Level Identification[a]		Major List R4401[b]	Additional Acad. Adv. Files	W'79 Not Continuously Enrolled	Continuously Enrolled W'79		Test Sample Drawn Class Level Balance Retained		
Class Level	Code No.	No.	No.	No.	No.	% Total	Actual[c]	Rounded[d]	% Total
Freshman	1	28	+3	-6	25	9.1	4.55	5	10.0
Sophomore	2	45	+3	-8	40	14.6	7.30	7	14.0
Junior	3	82	+2	-12	72	26.3	13.15	13	26.0
Senior	4	134	+5	-2	137	50.0	25.00	25	50.0
Total		289	+13	-28	274	100.0	50.00	50	100.0

[a]Based on MSU earned credits: 1 = less than 40; 2 = 40 - 84; 3 = 85 - 129; 4 = 130 or more.

[b]MSU Registrar processed, January 12, 1979.

[c]Percentage continuously enrolled W'79 per class level x 50.

[d]Rounded to closest whole number.

Step 3

Selection of the 50 sets of student record data to be used for testing the proposed microcomputer assisted academic records management model developed for this study.

The procedure for selecting the 50 student academic record sets to be used as a test sample (5, 7, 13, and 25 for the freshman, sophomore, junior, and senior levels, respectively) from the pool of 274 eligible record sets established in Step 1 (25, 40, 72, and 137 for the freshman, sophomore, junior, and senior levels, respectively) involved two sub-processes within each class level.

a. Alphabetically ordering the student surnames and numbering them in ascending order (1-n).

b. Beginning with number 1 and at intervals of 5 thereafter systematically selecting the number needed from the class level for the test sample.

TRS-80, Model I, Microcomputer Program Development

Student Record Data Elements and Official Sources

Thirty (approximately 10%) of the active student academic record files maintained by departmental academic advisors of students enrolled in the dietetic major were used to compile a list of the types of academic record elements present in the current files. The particular files examined during this preliminary review effort were representative of all undergraduate class levels as well as typical and atypical methods for progressive fulfillment of the academic requirements for a Bachelor of Science degree in Dietetics. Each of the student record files designated for this preliminary review was carefully examined by the researcher to identify:

a. the different kinds of student record elements which should be included in the formation of a comprehensive academic record data bank for all dietetic majors, and

b. the official sources (university, college, department) from which the elements identified in (a) are readily obtainable at useful established intervals for timely addition to a departmentally centralized academic record bank for students enrolled in the dietetic major.

As a result of this preliminary review, 24 types of informational elements (6 for student identification and 18 related to academic program concerns) were identified as essential for such a data base and were obtainable from 9 different official student record sources within the university student academic records accounting system. The 24 types of informational elements designated for inclusion in the academic record bank needed for this study and their available source(s), original and duplicate, are detailed in Table 2. Examples of the seven university, college, and department forms used to produce an itemized, accumulative academic progress record for each student are shown in Appendix A, items A-1 through A-7, pages 62 through 68.

Table 2. Academic Student Record Data Bank Elements and Official Information Sources (x = original source; d = duplicate copy)

	Official Information Sources								
	Michigan State University					College of Human Ecology		Food Science and Human Nutrition Department	
Information Elements	MSU Report of Standing--Registrar's Office	MSU Credit Evaluation--Admissions Office	MSU Administrative Action Form	MSU Transcript--Summary of Academic Progress	MSU-University College Independent Study Exam Report	CHE Approved Academic Program Adjustment	CHE Dean's Student Academic Record Folder	Coordinated Study Plan Admissions	Academic Advisor's Student Academic Record Folder
<u>Student Identification Elements</u>:									
Name	x	x	x	x	x		d		d
MSU student number	x	x	x	x	x		d		d
Sex	x	x	x	x	x		d		d
Permanent address	x	x	x	x	x		d		d
Dietetic major--program option							d		x
Dietetic major--study plan							d		x
<u>Academic Elements</u>:									
MSU class level	x	x	x	x	x		d		d
Acad. advisor identification	x						d		d
Acad. counseling dates (dietetic major)									x
Credits earned prior to W '79	x						d		d
MSU credits earned W '79	x						d		d
Credits earned--total end W '79	x						d		d
Total credit/courses trans. in		x					d		d
Trans. college/university name		x					d		d
MSU--GPA prior to W '79	x						d		d
MSU--GPA winter term '79	x						d		d
MSU--GPA end of W '79	x						d		d
MSU required courses completed	x		x				d		d
MSU required courses--repeated	x						d		d
MSU required courses--waived		x					d		d
MSU required courses--cr. by exam					x		d		d
CHE required courses--waived[a]						x	d		d
Major required courses--waived						x			d
Major required courses--(approved substitution)						x			d

[a]CHE = College of Human Ecology.

Additional Essential Documents

In addition to the types of information elements pertaining to individual student record sets, three other comprehensive documents were needed to design a program for the TRS-80, Model I, Microcomputer System capable of providing selected information recall in itemized and summary form for an individual student, for particular sub-groupings of students and for all students enrolled in the dietetic major. Copies of these documents are included in Appendix B, items B-1 through B-3, pages 69 to 73.

Dietetic Curriculum. This document is the official list of courses required for completion of the dietetic major at Michigan State University (approved by Academic Council, April 1972, revised June 1978). The list is subdivided into four sections denoting the minimum courses needed to satisfy (a) the General Education requirements, (b) the required Human Ecology Core courses, (c) the Dietetic Base courses required of all dietetic majors, and (d) the specific courses required for each of the four Professional Options. General Dietetics is the only professional option offered under two different study plans, the Conventional Study Plan and the Coordinated Study Plan (Appendix B, item 1, page 69).

MSU-ADA[1] Master Checksheet Plan IV--Conventional Study Plan. This document lists the basic requirements of the MSU dietetic curriculum which must be completed under the Conventional Study Plan to fulfill the minimum academic requirements for ADA membership and/or

[1]Michigan State University-American Dietetic Association.

registration eligibility for a dietetic professional. The courses listed include the basic courses required for all majors in the Conventional Study Plan and the additional required courses for each area of specialization (option) (Appendix B, item 2, page 72).

MSU-ADA Master Checksheet Plan IV--Coordinated Study Plan. The MSU Coordinated Study Plan is in compliance with the ADA Plan IV minimum academic requirements specialization (option), General. The MSU-ADA Master Checksheet Plan IV includes both the basic course requirements and those courses required to meet the specialization. The courses designated on this ADA-approved Plan IV Master Checksheet satisfy both the minimum academic requirements and the clinical experience requirements for eligibility for membership and/or professional registration in the American Dietetic Association (Appendix B, item 3, page 73).

Data Bank Development

Acquisition and assembly of student record data. To ensure safety of the 50 student academic record sets selected for study, copies of all existing academic record information contained in each file were made and the official files returned to their primary departmental storage areas as soon as possible. Next, a Student Academic Record Data Tabulation Form was developed for the orderly summarization of the available data for each student (Appendix C, item 1, page 74). All of the essential available data for each student was manually recorded on this form prior to being entered into the microcomputer for storage.

Data bank codification system. The item entry form of informational elements in personal and academic categories were identified by construction of the codification system shown in Table 3.

Updating memory deposits. After the existing academic record information from the 50 selected student record sets was deposited in the data bank, three systematic procedures for periodically updating the memory deposit of individual student record information were devised.

1. Addition of new records: Academic advisors receiving new student records will complete a Student Academic Record Data Adjustment Form and forward it to department personnel assigned the responsibility for entering data into the dietetic student record data bank (Appendix C, item 2, page 75).
2. Deletion of an existing record: Academic advisors requested to return a student academic record to the Assistant Dean's Office, will complete a Student Academic Record Data Adjustment Form before returning the file and will give the Adjustment Form to the department personnel responsible for entering data into the data bank.
3. Alteration of existing record: In order to ensure that student academic records are continuously updated to reflect changes in academic progress, all documents, Appendix A, items 1 through 7, supporting alterations in student academic records should be forwarded to department personnel assigned the responsibility

Table 3. Data Bank Codification System

Information Type	Informational Element	Item Entry Form
Personal	Name	Direct entry--surname, given name, middle initial
	Student number	Seven digit number, University assigned
	Sex	0 = female; 1 = male
	Permanent address	Direct entry
	Dietetic program option	1 = General; 2 = Clinical; 3 = Community; 4 = Food-service management
	Study plan	0 = Conventional; 1 = Coordinated
Academic	MSU class level	1 = Freshman; 2 = Sophomore; 3 = Junior; 4 = Senior
	Academic advisor identification	1-n alpha order by surname
	Last date of academic counseling for dietetic major	Numerical designation
	Total credits earned prior to W'79	Direct numerical entry
	MSU credits earned W'79	Direct numerical entry
	Total credits earned end of W'79	Direct numerical entry
	Transfer College/University name	Direct entry
	MSU-GPA prior to W'79	Direct numerical entry
	MSU-GPA W'79	Direct numerical entry
	MSU-GPA end of W'79	Direct numerical entry
	MSU required courses completed/not completed	0 = not completed; 1 = successfully completed (1.0 or greater on a 4.0 scale)
	MSU required courses waived	2 = waived
	Transfer courses accepted by MSU	3 = courses transferred
	MSU required courses--approved substitution	4 = substituted

for entering data into the data bank. After data have been entered into the data bank, documents supporting the alteration of student academic records would be returned to the appropriate faculty.

Microcomputer Processing Program

Processing capabilities. A program menu consisting of seven processing capabilities was developed for use in this study. The estimated number of student academic record sets that can be handled with this program is 300. Brief descriptions of these processing capabilities are as follows:

1. Individual student record retrieval: A search of the data bank may be made by entering either the student's name (last, first, initial) or the individual's assigned student number.
2. New student record: A memory file may be established for an individual upon officially declaring a dietetic major preference.
3. Selective recall capabilities: A print-out of the information in the data bank for the seven following categories may be recalled singularly or in specific combinations of categories as shown in Table 4. The heading of each print-out, regardless of the category or categories selected, includes the name of the University, the Department, the academic major, and the date of the print-out.

    a. All students alphanumeric;
    b. All students by class level;
    c. All students by academic advisor;

Table 4. Selective Recall Capabilities and Combinations

Capabilities	Combinations							
	Alphanumeric	Student Number[a]	Class Level	Academic Advisor	Transfer College	Study Plan Coordinated	Grade Average Striation	Counsel After Date
Alphanumeric	--	x	x	x	x	x	--	--
Class level	x	x	--	x	x	--	--	--
Academic advisor	x	x	x	--	x	x	--	--
Transfer college	x	x	--	x	--	--	--	--
Study plan (Coordinated)	x	x	--	x	x	--	--	--
Grade average striation (cumulative)	x	x	--	x	x	--	x	--
Counsel after specified date	x	x	x	x	x	--	--	x[b]

[a]Not a processing capability, but included in all combinations.

[b]Specific counseling date given.

d. Transfer students from a College/University other than MSU
e. Students enrolled in the General Dietetics Coordinated Study Plan;
f. All students by grade average striation (GPA); and
g. All students not counseled by academic advisor after a specific date.

4. ADA Plan IV and MSU graduation requirements: A search may be made for an individual student regarding course completions and/or deficiencies, for both ADA Plan IV and MSU graduation requirements. This search may be made by student name or number.

5. Selective search for courses: An alphabetical search, by class level, for students not having successfully completed required courses can be made with a maximum of four courses included in each search.

6. Data bank security: A computer sub-routine has been included in the program to limit access to the data bank. Two security measures are incorporated into the access design of the program to protect the confidentiality of the data. Authorized use of the student record data bank is controlled by two passwords. Personnel having authorized access to the "Primary" password are allowed to review data, but cannot make data bank alterations. The "Master" password is available only to persons authorized to alter student records.

7. Shutdown system: This process shuts down the system and terminates all operations, thus protecting data in the data bank. Continued accessibility to data in the data bank can be made only after re-entry of the specified passwords by authorized personnel.

Pretesting. Academic record information from 30 dietetic student academic record sets not selected for the test sample were used in the preliminary testing of the processing functions of the program. Both correct and incorrect record information were included to assure that the program could detect errors. Technical modifications in the processing program were made as needed until all processing operations were judged reliable.

Model testing. After data were manually recorded on the Student Academic Record Data Tabulation Forms, Appendix C, item 1, page 74, for the 50 students selected for this study, the forms were randomly divided into three approximately equal groups for data entry into the data bank. This division of the forms into three groups allowed multiple periods of time for total data entry into the data bank for processing and also multiple testing of processing capabilities.

Evaluation of Microcomputer Assistance in Academic Records Management

All programmed processing functions applied were evaluated for speed and accuracy of information retrieval and for usefulness of itemized and summarized print-out formats. Assessment of the feasibility and/or practicality of replacing the present manual system of student academic record management with a microcomputer-assisted system involved comparative consideration of the six basic factors listed below:

1. initial investment in microcomputer equipment, essential accessories and installation costs;

2. suitable equipment and space for the data bank storage and security;
3. information storage capacity of the microcomputer system used in this study;
4. processing function limitations of the microcomputer system used in this study;
5. estimated recurring costs for materials and for equipment maintenance; and
6. labor time and labor costs associated with the continuance of an accurate, up-to-date, comprehensive student academic record data bank for dietetic majors.

CHAPTER IV

RESULTS AND DISCUSSION

A systematic procedure was established to randomly select 50 student academic record sets from a pool of 274 eligible dietetic majors to serve as a test sample for this study. To maintain approximately equal enrollment percentage relationships among the four class levels (freshman, sophomore, junior, senior), calculations were made to determine the specific number of academic record sets drawn from each class level (5, 7, 13, and 25, respectively). The 50 selected academic record sets of the test sample were then randomly divided into three approximately equal sub-groups for data entry into the data bank. All available data related to the 24 informational elements listed in Table 2, page 32, were uniformly coded as detailed in Table 3, page 36, and were entered into the microcomputer for storage.

Seven Processing Capabilities

During each step in the development of the computer program needed for this study, every function and processing capability was tested immediately after it was programmed, using data related to the 24 informational elements identified in Table 2, from 30 dietetic student academic record sets not included in the test sample. Problems encountered during this initial pretesting stage, such as programming errors, commands, logic, and ordering of the data, or the deletion and addition of data were corrected and then the processing capability was retested. Using this technique, the program was continuously tested and modified so that when the program model was finally tested the various functions would operate accurately.

Individual Student Record Retrieval

At present, any additions or alterations in the accumulative record data related to the 24 informational elements listed in Table 2 must be compiled and manually processed for each student by his/her academic advisor. Because there is no centralized departmental procedure established for the continuous and immediate updating of student academic records, each academic advisor, upon receipt of official documentation, adds such papers to the appropriate student's academic file folder. Then, when time permits, the academic progress record of each advisee is manually updated by the advisor. As a consequence, student academic records may, at any given time, be incomplete and/or out-of-date.

The computerized student record storage and data retrieval system designed for this investigation offers a centralized, systematic departmental procedure for progressively adding to or altering student records associated with the 24 informational elements studied. In addition, approved alternatives for the fulfillment of specific major requirements are indicated if certain required courses have been waived, substituted, or accepted in transfer as general credit, i.e., math transfer credit substituted for the MTH 108 or 111 requirement. When official notification supporting one or more alterations in a student's academic record is received by an academic advisor, such changes can be made immediately through the programming procedure provided for updating a student's academic progress record on deposit in the data bank. In less than one minute an individual student's academic progress record can be retrieved, listing both personal identification and all departmental academic record data currently on deposit in the data bank.

After testing the data retrieval capability of the program for each of the 50 student academic record sets stored in the data bank and comparing the retrieved data on the computer print-outs with the data manually recorded on the Student Academic Record Data Tabulation Form (Appendix C, item 1, page 74) for each student, the results showed that the program as designed was capable of accurate individual student academic record data retrieval without program modifications.

However, it was necessary to modify the videoscreen output to prevent rapid scrolling of the data and allow review of the data at a self-paced rate. This change in the program, which was included where needed for the other processing functions, was made possible by ordering the data into logical groups for review and altering the program commands.

New Student Record

At the beginning of each academic term, the department receives a copy of the official MSU computer print-out entitled, "Student Name Card List, Major List R4401" stating the student's name and number, sex, college and major curriculum, class level, residence, last school attended, and entrance record data using university assigned number codes, for each student enrolled in a specific major, such as the dietetic major. However, the R4401 Major List soon becomes outdated during the academic term due to changes in major enrollment status for many students. Currently there is no established departmental procedure for progressively updating this list during the academic term. New student academic record sets are sent directly to assigned academic advisors from the Assistant Dean's office of the college without notification to the departmental office.

With the microcomputer-assisted processing capability to add data from new student academic record sets to the data bank, it is possible to have an accurate, up-to-date listing of all students enrolled in the dietetic major and a record of their academic progress available at any given time during the academic term. Ready access to these data for all dietetic majors provides a means for more accurately identifying, scheduling, and/or contacting particular students or groups of students regarding academic needs and related academic matters.

The method used to add academic record data for a new student to the existing data bank is the same as the two-step process used to establish the data bank initially.

Since total number of credits completed, MSU cumulative grade point average, and student status regarding each of the required courses of the dietetic major are the primary concerns for the completion of MSU graduation requirements and ADA membership requirements, records of elective courses and grades for individual courses were not deposited in the data bank. For a new student entering the dietetic major at the junior class level, approximately three minutes are required to manually transfer all of the necessary data from the new student's academic record file to the Student Academic Record Data Tabulation Form (Step 1). In less than two minutes all of the data manually recorded on the Student Academic Record Data Tabulation Form can be deposited into the departmental data bank to add this new student record information to the existing bank (Step 2).

The processing capability for adding new student academic records to the data bank was tested during four stages of data entry (once after entering the student academic record data for each of the three sub-groups of students and once after all data for the 50 student academic record sets had been deposited), and a comparison of data listed on the computer print-outs was made with the 50 individual Student Academic Record Data Tabulation Forms initially prepared for depositing student record data into the data bank. Results of this item-by-item manual comparison showed that the data from all 50 student academic record sets had been accurately deposited in the data bank, confirming the functional ability of this program to add new student academic record information to the existing data bank as the need arises.

Selective Recall Capabilities

During the academic year, many questions arise related to the student data items or item combinations outlined in Table 4, page 38.

Currently, to address and respond to questions regarding specific data located in individual student record files, each record set must be manually reviewed, the required information extracted, tabulated, and then summarized. This tedious manual system has three basic deficiencies:

1. Requests for summarized information concerning some or all of the dietetic enrollees often have response deadlines which preclude careful review of individual student file data. Estimated responses frequently prove to be incomplete and/or inaccurate.
2. The amount of faculty advisor time involved in repetitive manual review of student record files to extract, tabulate, and summarize specific data relative to dietetic majors is costly. Because of the numbers of records involved and the tediousness of the activity, the resulting summarizations are often incomplete and/or inaccurate.
3. The lack of a centralized systematic departmental procedure for immediate and continuous updating of student academic records often generates inaccurate and/or obsolete summarizations.

Use of the microcomputer-assisted management system designed for this study allows ready access to and rapid review of all student data bank entries related to the information categories detailed in Table 4. These data items may be recalled and printed-out singularly or in the combinations specified in tabular and summarized form.

Each of the seven selective recall categories listed in Table 4 was tested a minimum of four times using the informational items from the 50 student academic record sets on deposit in the data bank. The data on each of the computer print-outs were compared for accuracy against the data recorded on the manually prepared Student Academic Record Data Tabulation Forms. No differences were found to exist between the data from the two sources, indicating that the computer processing capability for selective recall was functioning accurately as designed for this study.

MSU Graduation and ADA Plan IV Requirements

During the final term of his/her senior year, the academic progress of each dietetic major must be checked to verify the completion status of all MSU graduation requirements as specified in Appendix B, item 1, page 69. Presently this is another manual process that requires departmental review of the array of academic papers in each student's departmental academic folder. The time needed to complete this process ranges from 10 to 15 minutes per student folder.

While verification of successful completion of ADA Plan IV minimum academic requirements is not mandatory for MSU graduation, this verification is essential for proof of eligibility standing for membership and/or registration in the American Dietetic Association. Usually at the beginning of their senior year, dietetic majors enrolled in the Conventional Study Plan individually submit official documentation in support of their completion or projected completion of the ADA Plan IV academic requirements as approved for MSU for departmental review (Appendix B, item 2, page 72). In contrast, students enrolled in the Coordinated Study Plan submit official documentation in support of their successful completion of the ADA Plan IV academic and clinical experience requirements as approved for MSU upon completion of their senior year (Appendix B, item 3, page 73). These validations, which are, in part, similar to that for MSU graduation requirements, must also be done manually and require 20 to 25 minutes per student folder.

Using the computer program designed for this study, in less than three minutes a single records search may be made and a print-out obtained for an individual student's academic progress regarding required course completions and/or deficiencies, and the manner in which each completed course requirement has been satisfied, i.e., completed at MSU, waived, transferred, or substituted (with substituted courses identified), for verification of both MSU graduation and ADA Plan IV requirements. Irrespective of study plan (Conventional or Coordinated), course requirements for MSU graduation for dietetic majors exceed and include all of the academic requirements for ADA Plan IV. Furthermore, at any desired time, a single search of the information on deposit in the data bank will provide all of the data needed to quickly and accurately monitor a student's academic progress in relation to his/her completion of both the ADA Plan IV requirements and the MSU graduation requirements for a Bachelor of Science Degree in Dietetics.

To test the processing capability of this part of the software program to verify the completion or deficiency status of courses to meet MSU graduation and ADA Plan IV requirements, a computer print-out of the course completion status for each of the 50 student academic record sets deposited in the data bank, was compared with the course data listed on each student's manually prepared Student Academic Record Data Tabulation Form. In every instance, the data on the computer print-outs corresponded with the data on the Student Academic Record Data Tabulation Forms, assuring this functional capability of the software program.

Selective Search

The dietetic major has grown during the past 10 years from an enrollment of 75 students in 1969 to 274 in 1978, and this has greatly increased the following administrative problems for the FSHN Department:

1. Projecting enrollment needs for required courses with limited enrollment capacity; i.e., HNF 300 (Experimental Foods), HNF 320 (Food Service Systems), FSC 310 or 440 (Food Microbiology).
2. Scheduling departmental courses with respect to number of sections needed per term offered, the times of offering for a given term and the sizes and types of classrooms needed.
3. Determining priority needs of students for redlining (a university process controlling class enrollees), i.e., senior class level, Coordinated Study Plan, prerequisite needs, etc.
4. Identifying students needing required courses where known course conflicts exist, i.e., graduating seniors requiring

two or more conflicting required courses in a given term or students who must complete prerequisites for required courses.

Presently, data collection for handling the above problems, involves manual review of individual student academic record sets, which is inefficient and very time consuming. In addition, it is often difficult or even impossible to accurately collect the necessary data within the time constraints which may be imposed. For example, pre-enrollment class lists sent from the Registrar's Office may be received by the department with as little as four hours allowed for department adjustments and return of the lists to the Registrar's Office. Under such circumstances, the present manual system of review is totally inadequate.

The software program designed for this study will simultaneously search for information regarding student course enrollment needs for a maximum of four courses for any one of the four class levels. Based on this test sample of 50 students, approximately six minutes are required for the search of one course at any one class level. Additional time is required for multiple course searches or for single searches involving an increased number of student academic record sets deposited in the data bank. The microcomputer-assisted program is not only much faster and more accurate than the manual system but also frees faculty time for other work while student record data retrieval is in progress.

The processing capability to selectively search for course information included in the design of this program was tested systematically, progressing through each class level with increasing numbers of courses, i.e., searching for one, two, three, and then four courses for each class level (freshman, sophomore, junior, and senior). This technique was repeated five times, including different groups of courses for each testing. Comparative results showed that the microcomputer-assisted program as designed could accurately and simultaneously search for up to a maximum of four courses at any of the four class levels.

Data Bank Security and Shutdown System

In order to protect and ensure the confidentiality of all student academic data stored in the data bank, a security clearance code in the form of passwords was inserted as a sub-routine programming function. The "Primary" password is available to personnel who are authorized to review, but not alter, student academic data. A second password, "Master," allows complete access to the data bank for persons authorized to change and/or update student academic record data on deposit. If data processing is in progress, and it becomes necessary to leave the microcomputer console, the operator can change from the "Master" password back to the "Primary" password, leaving the data on deposit accessible but not able to be altered. Re-entry of the "Master" password will once again allow necessary alterations of student academic record data. Also, if the operator desires to leave the data bank neither accessible nor ready for alterations, but does not want to shut the system down, an invalid security clearance codeword other than the "Master" or "Primary" passwords can be entered. Reactivation of the program is then possible only by re-entry of the "Primary" password. Upon complete shut down of the microcomputer system, access to the data bank is only possible by entry of the appropriate passwords of the security clearance code.

The security of the student academic record data stored in the data bank was repeatedly tested during the verification of the other processing capabilities. In all cases, access to the student academic record data bank was possible only when the "Primary" password was entered and alteration of these data only when the "Master" password was entered.

Four sub-routines, inserted into the software program to provide selected data print-outs on demand, were tested and proven rapid and accurate in the production of hard copies concerning four basic areas associated with the management of student academic record data at the departmental level.

1. Individual student record retrieval;
2. Selective data recall;
3. MSU graduation and ADA Plan IV requirements; and
4. Selective searches concerning needs for particular courses.

Microcomputer System Equipment: Initial and Recurring Costs

In 1979 the acquisition of the equipment essential for this investigation (microcomputer and three types of accessories) required a total investment of approximately $4,000 as detailed below.

1 TRS-80 Microcomputer, Model I, Level II, 16 K	$ 850
1 Expansion Interface, 32 K Unit	600
2 Disk Drives	1,000
1 TRS-80 Lineprinter I	1,500
Total Cost	$4,000

Because of the ease of assembling these basic system components, no additional costs for on-site assembly services were involved. With the exception of major repair services and replacement parts not covered under the warranty, recurring operational costs are limited to the expendable print-out materials and electricity.

In addition to the space presently needed for the maintenance and storage of student academic record sets, a sturdy work area equivalent to that required for two standard office typewriters is adequate for storage and use of this microcomputer system. However, because the system components are relatively small and easily portable, it is essential that the work area and associated storage areas provided can be locked to prevent unauthorized access to the equipment and the data bank.

Pro-rated over a five-year period, the initial equipment investment of $4,000 represents a use investment for this computerized system of $67 per month, with minimal additional expenditure for electricity and expendable materials. Based on the current routine demands of manually maintaining approximately 275 departmental student academic record files, scheduling departmental courses, monitoring student course needs and conflicts, redlining department class enrollment lists and verifying MSU graduation and ADA Plan IV requirements, it is estimated that one full-time faculty member spends an average of eight, eight-hour days per month performing these essential departmental tasks. Assuming a modest yearly salary of $15,000 for the faculty member assigned this area of responsibility, the labor cost to accomplish these tasks approximates $65 per day or $520 per month. This alone is 7.76 times the five-year monthly pro-rated initial cost of the equipment essential for machine processing. It is apparent from these data that the initial cost of the equipment needed to change from the current manual system to the microcomputer-assisted system designed for this study to manage the departmental student academic records for dietetic majors could be recovered in one academic year by merely reducing the cost of faculty time needed to accomplish the tasks enumerated above.

Overall Test Results

As an automated system for use in dietetic student academic records management, the model designed for this investigation appears promising. The test results indicate that, as currently conceived, this microcomputer system does operate accurately, consistently, and speedily in performing the heretofore tedious manual tasks of centrally assembling and updating student academic information. Moreover, the electronic system provides the basic selected processing capabilities for information storage, retrieval, tabulation, and summarization needed to meet current routine departmental records management responsibilities for enrollees in the dietetic major.

Nevertheless, three arbitrary decisions concerning (a) the number of informational elements selected for the data bank (twenty-four), (b) the size of the test sample (academic record files of only 50 students), and (c) the use of a single software program for instructions for seven processessing capabilities may have nearly exhausted the storage capacity of the memory component of this system. Further testing is needed to determine the maximum number of student academic record sets which this particular model can handle using 24 selected informational elements with this single software program.

CHAPTER V

SUMMARY AND CONCLUSIONS

The primary purpose of this exploratory investigation was to design and test a computer-assisted student academic records management system for use with the TRS-80 Microcomputer (Model I, Level II, 16 K) with processing capabilities for (a) data storage; (b) single and multiple item recall, tabulation, and summarization; (c) item analysis within and among discrete categories; and (d) itemized and summarized print-outs.

Twenty-four types of informational elements (six for student identification and eighteen related to academic program concerns) readily available from the university student academic records accounting system were used to establish a departmental student records data bank for 50 systematically selected sets of student academic records for declared dietetic majors. This test sample of 50 approximated 18 percent of the 274 students who had been continuously enrolled as dietetic majors throughout Winter Term 1979 and retained approximately the same percentage relationships among class levels (freshman, sophomore, junior, and senior) as the parent population.

A single software program (processing instructions) was designed to include seven distinct processing capabilities:

(a) individual student record storage and retrieval; (b) the addition of new student records; (c) selective data recall; (d) student status regarding MSU graduation and ADA Plan IV requirements; (e) selective searches for the determination of student course needs; (f) measures for data bank security; and (g) complete shutdown of the system. For the most part, these selected processing capabilities represent the routine data processing demands which departmental personnel are required to satisfy manually each academic term.

As devised and tested for the 24 specified information elements associated with each of the 50 academic record files selected for study, the single software program developed for the TRS-80 Microcomputer, Model I, Level II System does adequately provide memory storage for both informational items and processing instructions for all of the capabilities enumerated above. It is recognized, however, that if the number of information elements and/or the number of student record files to be processed were increased (above 24 and/or 50, respectively), it is very likely that the storage capacity of the memory component of this particular system would soon become operationally restrictive.

Although somewhat limited in scope, findings from this exploratory study clearly indicate that a microcomputer-assisted system for dietetic student academic record management is feasible at the department level of accountability. Despite the initial investment for equipment and the attendant operational costs, implementation of a relatively simple automated system could provide a cost-effective, labor-saving departmental means to assemble and centrally maintain accurate, current, and readily accessible student academic record information. Furthermore, it is likely such a system could greatly improve the efficiency of student academic progress evaluation to provide support for the departmental administrative responsibilities of individualized student academic advisement and record validation, current and projected needs assessments associated with course offerings, and development of an accurate internal accountability system for handling an array of recurring related academic matters at the department level.

The results of this initial investigation do not indicate with certainty, however, that the TRS-80, Model I, Level II Microcomputer System used in this study would adequately service the departmental academic records management needs for the 274 students currently enrolled as dietetic majors. Several fundamental questions remain which are in need of further study.

1. What is the most serviceable ratio of data bank entries to program processing entries in relation to the maximum storage capacity of the memory component of the TRS-80 Microcomputer, Model I, Level II System?
2. Would it be feasible to subdivide the single software program for the seven processing capabilities into a series of smaller programs, so that each processing capability becomes a separate program for disk storage, in order to increase the memory storage space available for the deposit of student academic record information?

3. Would it be more logical to divide the total number of student record sets to be managed alphabetically by surname (i.e., A-D, E-H, I-L, M-P, Q-T, U-Z) to establish a series of separate data banks for handling the 24 informational data elements with a single software program of processing instructions?
4. Are there other essential processing capabilities which could be added to the software program to improve and/or expand the usefulness of this microcomputer-assisted system of academic records management at the department level?
5. Would the TRS-80 Microcomputer, Model II System (with greater access capabilities) provide a better and more efficient system of academic records management in relation to departmental needs than is possible with the TRS-80 Microcomputer, Model I, Level II System?

APPENDICES

APPENDIX A

A.1 MICHIGAN STATE UNIVERSITY REPORT OF STANDINGS--Internal report, issued at the end of each academic term a student is enrolled in the University.

A.2 MICHIGAN STATE UNIVERSITY CREDIT EVALUATION--Evaluated by the MSU Admission's Office upon receipt of an official transfer transcript.

A.3 MICHIGAN STATE UNIVERSITY ADMINISTRATIVE ACTION FORM--Initiated by a course instructor, a department chairperson, or a college Dean to request a change in an officially recorded course grade or a change in course enrollment status.

A.4 MICHIGAN STATE UNIVERSITY TRANSCRIPT--An itemized listing of all courses undertaken by the student at MSU, detailed according to academic term, course credit value, course grade earned, and points earned.

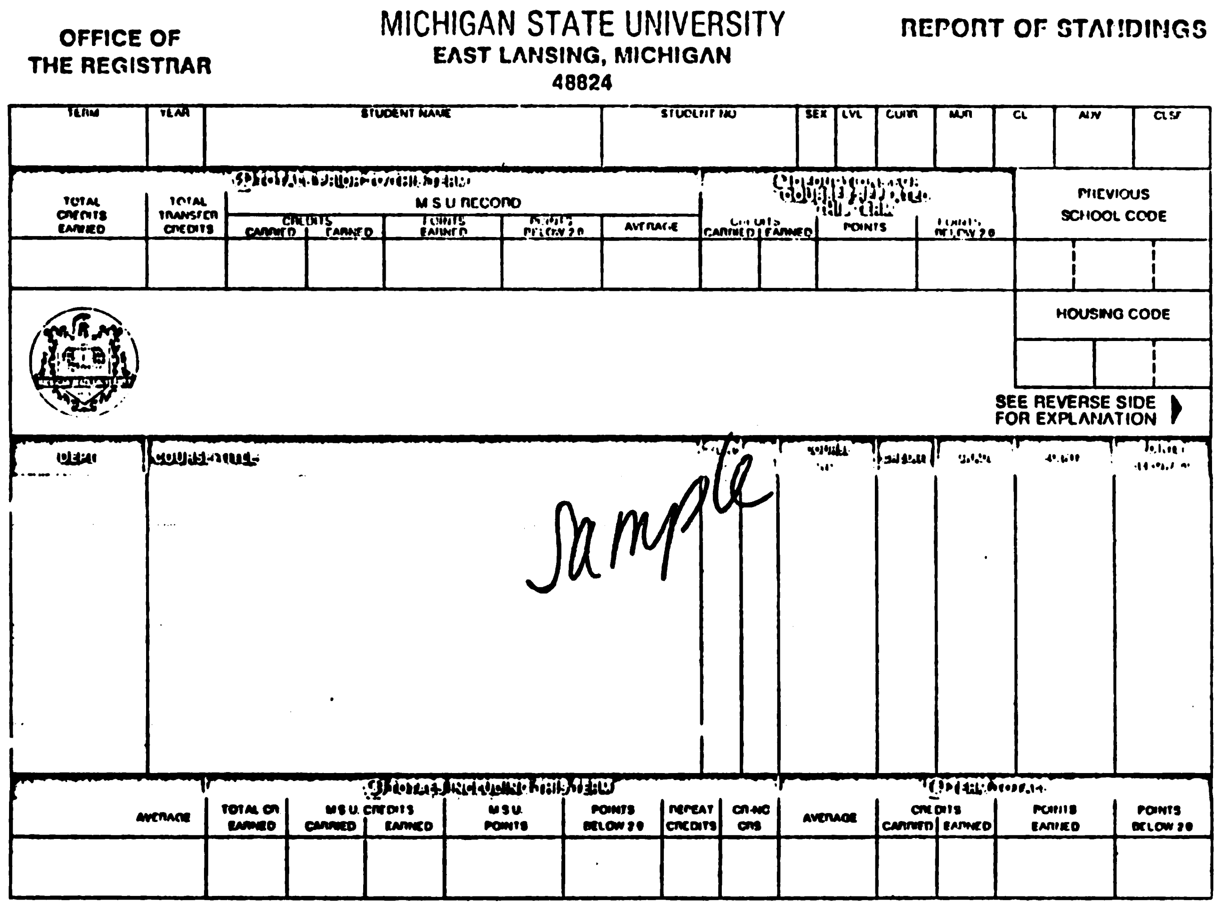
A.5 MICHIGAN STATE UNIVERSITY-UNIVERSITY COLLEGE INDEPENDENT STUDY EXAMINATION REPORT--Issued by University College to validate credit by examination for courses acceptable toward fulfillment of the University undergraduate general education requirements for graduation.

A.6 COLLEGE OF HUMAN ECOLOGY APPROVED ACADEMIC PROGRAM ADJUSTMENT--Initiated by a departmental academic advisor or the Office of the Assistant Dean and approved by the Assistant Dean who validates permissible substitutes or waivers for required courses in the dietetic major.

A.7 COORDINATED STUDY PLAN ADMISSIONS--Form letter to students admitted to the Coordinated Study Plan of the General Dietetic Option and the ordered list of alternates resulting from the computer-assisted randomized selection process for eligible applicants.

APPENDIX A.1

MICHIGAN STATE UNIVERSITY REPORT OF STANDINGS



OFFICE OF THE REGISTRAR

MICHIGAN STATE UNIVERSITY
EAST LANSING, MICHIGAN
48824

REPORT OF STANDINGS

TERM	YEAR	STUDENT NAME	STUDENT NO	SEX	LVL	CURR	MJR	CL	ADV	CLSF

TOTAL CREDITS EARNED	TOTAL TRANSFER CREDITS	M S U RECORD: CREDITS CARRIED	CREDITS EARNED	POINTS EARNED	POINTS BELOW 2.0	AVERAGE	CREDITS CARRIED	CREDITS EARNED	POINTS	POINTS BELOW 2.0	PREVIOUS SCHOOL CODE

HOUSING CODE

SEE REVERSE SIDE FOR EXPLANATION

DEPT	COURSE-TITLE							

Sample

AVERAGE	TOTAL CR EARNED	M S U CREDITS CARRIED	M S U CREDITS EARNED	M S U POINTS	POINTS BELOW 2.0	REPEAT CREDITS	CR-NC CRS	AVERAGE	CREDITS CARRIED	CREDITS EARNED	POINTS EARNED	POINTS BELOW 2.0

APPENDIX A.2

MICHIGAN STATE UNIVERSITY CREDIT EVALUATION

This is the MSU equivalent of courses for which you have been granted credit in transfer. Your degree granting college will determine what is acceptable for your major.

Name
Address

Student Number ____________
College ____________
Major ____________
Entered ____________

Credit from ____________
Credits accepted in transfer ____________ Evaluated by ____________ Date ____________ 250 Administration Building

Sample

		Course Credit	General Credit	Total Credit
ADV	advertising			
AFA	acctg & finance			
AST	astronomy			
ANP	anthropology			
ANT	anatomy			
ASC	aud & sph sci			
ATL	am thought & lang			
BOA	bus law & adm			
BOT	botany			
B S	biological sci			
CEM	chemistry			
C J	crim justice			
COM	communication			
CPS	computer sci			
EC	economics			
ED	education			
EGR	engineering			
ENG	english			
FCS	fam & child sci			
GEO	geography			
GLG	geology			
H A	history of art			
HED	hum environ & design			
HNF	hum nutr & foods			
HPR	health, phys ed & rec			
HST	history			

		Course Credit	General Credit	Total Credit
HUM	humanities			
IDC	interdiscip			
JRN	journalism			
MGT	management			
MMM	metal, mech & mater sci			
MPH	microbiology			
MTA	marketing & transp			
MTH	mathematics			
MUS	music			
N S	natural science			
PHL	philosophy			
PHS	physical science			
PHY	physics			
PLS	political science			
PSL	physiology			
PSY	psychology			
REL	religion			
SOC	sociology			
S S	social science			
STT	statistics			
STA	studio art			
THR	theatre			
ZOL	zoology			
General credit				
TOTALS (THIS EVALUATION)				
TOTALS (ALL EVALUATIONS TO DATE)				

☐ General Education requirements completed by MACRAO Agreement ☐ No credit applicable to General Education requirements.

O-11632

The area(s) checked below designate your remaining General Education requirement(s).
If there is not a check in any box, the requirement(s) has been completed.

☐ American Thought & Language ____________
☐ Natural Science ____________
☐ A Natural Science course or a lab course in physical science i.e. astron, chem, geol, phys., or earth sci or biological science, i.e. micro, bio sci, bot, ent, physiol or zool.
*Courses used to substitute ____________
*Courses accepted as substitutes are indicated.

☐ Social Science ____________
☐ One course in Social Science or a course in anth, prin econ, econ or human geog, polit sci, prin or soc. psych or prin soc.
*Courses used to substitute ____________
☐ Humanities ____________
☐ One course in Humanities or a course in art or music history or appreciation, history, literature, philosophy, or religion.
*Courses used to substitute ____________

APPENDIX A.3

MICHIGAN STATE UNIVERSITY ADMINISTRATIVE ACTION FORM

MICHIGAN STATE UNIVERSITY
OFFICE OF THE REGISTRAR

For definitions related to the University's Grading Systems and Correction of Grades, see Schedule of Courses and Academic Handbook.

ADMINISTRATIVE ACTION FORM

NAME - LAST	FIRST	MIDDLE INITIAL	STUDENT NUMBER	CLASS	STUDENT'S COLLEGE

LOCAL ADDRESS (IF AVAILABLE)

☐ COMPLETION OF INCOMPLETE OR DEFERRED	Department	Course No.	Section No.	Credits	Term	Year	Change From	Change To	Date Student Removed Deficiency

Only Instructor's Signature Is Required To Report Completion of I-incomplete or DF-deferred.

*Instructor's Signature*______________________________ Date________________

After signing, send all copies to Office of the Registrar

☐ EXTENSION OF INCOMPLETE	Department	Course No.	Section No.	Credits	Term	Year	Extend Incomplete Through Term	Extend Incomplete Through Year

☐ GRADE CHANGE	Department	Course No.	Section No.	Credits	Term	Year	CHANGE From	CHANGE To

☐ OTHER (Be Specific)

Reason For Above Action:

Approved By	Date
Instructor	
Dept. Chairperson	
Asst. Dean College Offering Course	
Asst. Dean Student's College	

FOR REGISTRAR'S USE ONLY - DO NOT WRITE IN SPACE BELOW

CURRICULUM	MAJOR	ADVISER NO.	REMARKS

NEW CREDIT AND POINT TOTALS

TOTAL CREDITS EARNED	MSU CREDITS CARRIED	MSU CREDITS EARNED	HONOR POINTS

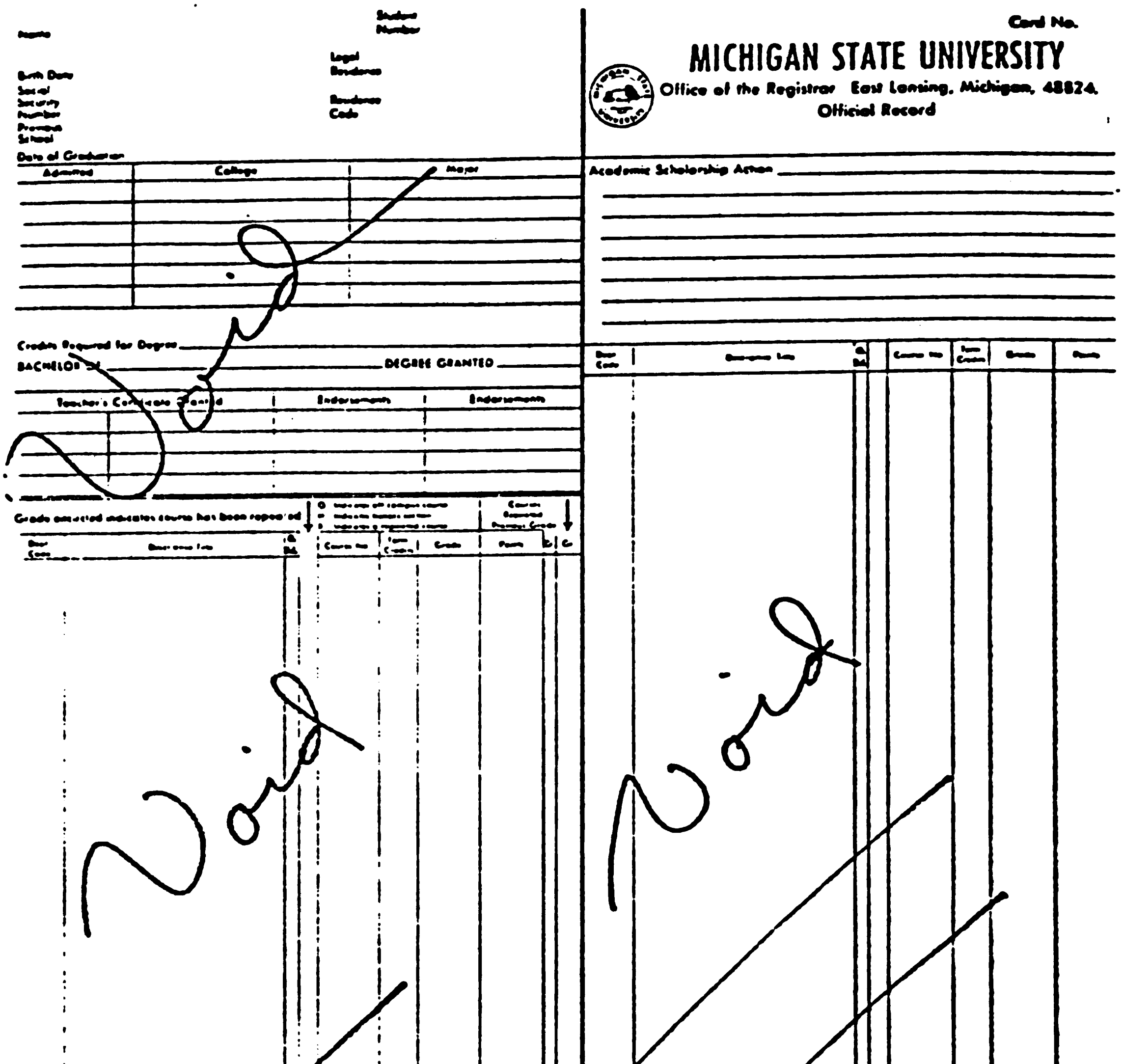
Send All Copies to OFFICE OF THE REGISTRAR

RECORDS________________ DATE________________

DISTRIBUTION
REGISTRAR - White
STUDENT - Goldenrod
ACADEMIC ADVISER - Blue
STUDENT'S DEAN - Canary
INSTRUCTOR - Pink

APPENDIX A.4

MICHIGAN STATE UNIVERSITY TRANSCRIPT



APPENDIX A.5

MICHIGAN STATE UNIVERSITY-UNIVERSITY COLLEGE INDEPENDENT STUDY EXAMINATION REPORT

STUDENT IDENTIFICATION NO.
0755111

MICHIGAN STATE UNIVERSITY
UNIVERSITY COLLEGE
INDEPENDENT STUDY EXAMINATION REPORT

3 (year in college)

TERM	YEAR	CURRICULUM	ADVISER
W	1980	N5	

SAMPLE ONLY

DOE, JOHN S.
0755111

has taken a University College Independent Study Examination with the following results:

COURSE TITLE	COURSE NUMBER	TEST SCORE	RESULTS
NS	115	077	Has satisfied course requirement V O I D V O I D V O I D

ORIGINAL-STUDENT GREEN -ACADEMIC ADVISER

APPENDIX A.6

COLLEGE OF HUMAN ECOLOGY APPROVED ACADEMIC PROGRAM ADJUSTMENT

CHE/Form A/5-74
Revised 6/77

REQUEST FOR PROGRAM ADJUSTMENT

Name____________________Student #____________Date____________

Major____________________Class____________Honors College Yes___No___

Please make the following adjustment(s) in the program requirements for the above student.

Substitute Course(s) Taken	Courses Required	Reason

Waiver or Other Adjustments	Reason

Student____________________

Academic Adviser____________________

Academic Affairs Office____________

Comments:____

____

____

cc: Academic Affairs Office
Adviser
Student (returned to Adviser)

APPENDIX A.7

COORDINATED STUDY PLAN ADMISSIONS

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FOOD SCIENCE AND HUMAN NUTRITION
HUMAN ECOLOGY BUILDING

EAST LANSING • MICHIGAN • 48824

Date____________

Proposal for 1978: Letter of Tentative Appointment

Thank you for your interest in the MSU General Dietetics Coordinated Study Plan. Your application has been reviewed by the Admissions Committee and it is our pleasure to inform you that you have been selected for a Tentative Appointment for Fall, 1978. Final appointment will be made after successful completion of the following requirements:

(Specific Classes)
(Maintenance of a 2.75 GPA)
(90 Credits)
(Return Departmental copy of Committee form-(color?)

Please indicate your acceptance or rejection of this tentative appointment by completing and signing the enclosed Commitment Forms. One copy of this signed form is for the Department and must be returned to the Coordinator for the Dietetics Curriculum no later than 5:00 p.m. on June 6, 1978. The other copy is for your files. Failure to return the Departmental form by the designated time will automatically cancel your tentative appointment.

We look forward to having you as a member of the General Dietetics Coordinated Study Plan.

Sincerely,

Burness G. Wenberg, R.D.
Associate Professor & Coordinator
Undergraduate Dietetic Curriculum

Gilbert A. Leveille, Ph.D.
Professor and Chairman

Enclosure: Commitment Form (2)

APPENDIX B

1. DIETETIC CURRICULUM
2. MSU-ADA MASTER CHECKSHEET PLAN IV--CONVENTIONAL STUDY PLAN
3. MSU-ADA MASTER CHECKSHEET PLAN IV--COORDINATED STUDY PLAN

APPENDIX B.1 DIETETIC CURRICULUM

DIETETICS*	APPROVED ACADEMIC COUNCIL
Department of Food Science and Human Nutrition	April 4, 1972
College of Human Ecology	Revised Major by
Michigan State University	CHE-UGM 6-76, 6/78

SUMMARY	CREDITS
General Education (University)	45
Human Ecology Core	9
Dietetic Base	*64-76
Professional Option	26-56
Electives	6-48
Total Credits for Graduation	180

GENERAL EDUCATION (University)

ATL	- Choice of Track	9
SS[a]	- Choice of Track	12
HUM	- Choice of Track	12
*NS	- Requirements met with Chemistry courses in Dietetic Base	12

[a]The ADA Economics requirement may be met by SS 202

HUMAN ECOLOGY CORE

_____	HEC 201	Family in its Near Environment	3
_____	HEC 301	Management and Decision Making in the Family	3
_____	HEC 401	Hm. Ecological Approaches to Contemporary Issues	3

DIETETIC BASE

_____	CEM 130	Introductory Chemistry I	4
_____	CEM 131	Introductory Chemistry II	3
_____	CEM 161	Introductory Chemistry Laboratory	1
	or		
_____	CEM 141	Organic Chemistry	4
_____	CEM 161	Introductory Chemistry Laboratory	1
_____	CEM 132	Introductory Chemistry: Carbon Compounds	3
	or		
_____	CEM 241	Organic Chemistry	4
_____	CEM 242	Organic Chemistry	4
_____	CEM 243	Organic Chemistry Laboratory	1
_____	CEM 244	Organic Chemistry Laboratory	1
_____	FE 340	Instr. in Hm. Ecology for Non-Formal Setting	3
_____	HNF 100	Elementary Food Preparation	4
_____	HNF 221	Food and the Consumer	3
_____	HNF 222	Laboratory for Food Management	2
_____	HNF 300	Experimental Foods	4
_____	HNF 320	Food Service Systems	5
_____	HNF 461	Energy Nutrients & Proteins for Hm. Nutrition	4
_____	HNF 462	Vitamins and Minerals for Human Nutrition	3
_____	HNF 463	Nutrition and Human Development	3

DIETETIC BASE Continued		Credits
_____MGT 310	Fundamentals of Personnel Administration	4
or		
_____PSY 255	Organizational and Personnel Psychology	3
_____PSY 170	Introductory Psychology: General	4
_____MPH 200	Elementary Microbiology	4
or		
_____FSC 440	Food Microbiology	5
_____MTH 108	College Algebra and Trigonometry I	5
or		
_____MTH 111	College Algebra with Trigonometry	5
_____BCH 200	Introduction to Biochemistry	5
_____One course in Sociology or Anthropology		4

PROFESSIONAL OPTIONS (Select one of the following options)

a. *General Dietetics*

Conventional Study Plan

_____HNF 102	Nutrition for Man	3
_____HNF 406	Cultural Aspects of Food	3
or		
_____HNF 407	Interactions of Culture and Nutrition	3
_____HNF 454	Readings in Foods	3
or		
_____HNF 465	Readings in Nutrition	3
_____HNF 470	Clinical Nutrition	4
_____ANT 316	General Anatomy	5
_____PSL 240	Introductory Physiology	4
_____PSL 241	Introductory Physiology	4
or		
_____PSL 431	Human Physiology	4
_____PSL 432	Human Physiology	4

Coordinated Study Plan

Courses in conventional study plan, plus the following:

_____HNF 301, 302, 303	Dynamics in Dietetics I, II, and III	6
_____HNF 480	Practice of Dietetics	24

b. *Clinical Dietetics Option*

_____HNF 102	Nutrition for Man	3
_____HNF 406	Cultural Aspects of Food	3
or		
_____HNF 407	Interactions of Culture and Nutrition	3
_____HNF 465	Readings in Nutrition	3
_____HNF 470	Clinical Nutrition	4
_____ANT 316	General Anatomy	5
_____PSL 240	Introductory Physiology	4
_____PSL 241	Introductory Physiology	4
or		
_____PSL 431	Human Physiology	4
_____PSL 432	Human Physiology	4
_____HNF 473	Clinical Chemistry in Dietetics	4

c. Community Dietetics Option		Credits
_____HNF 102	Nutrition for Man	3
_____HNF 406	Cultural Aspects of Food	3
or		
_____HNF 407	Interactions of Culture and Nutrition	3
_____HNF 409	Presentations in Foods and Nutrition	4
_____HNF 465	Readings in Nutrition	3
_____HNF 470	Clinical Nutrition	4
_____HNF 475	Community Nutrition	3
_____HNF 475P	Community Nutrition Fieldwork	1
_____ANT 316	General Anatomy	5
_____PSL 240	Introductory Physiology	4
_____PSL 241	Introductory Physiology	4
or		
_____PSL 431	Human Physiology	4
_____PSL 432	Human Physiology	4

d. Food Service Management Option

_____HNF 101	Food and Society	3
or		
_____HNF 102	Nutrition for Man	3
_____HNF 406	Cultural Aspects of Food	3
_____HNF 454	Readings in Foods	3
_____PSL 240	Introductory Physiology	4
_____PSL 241	Introductory Physiology	4
or		
_____ANT 316	General Anatomy	5
_____PSL 431	Human Physiology	4
_____PSL 432	Human Physiology	4
_____CPS 110	Introduction to Computer Programming	3
or		
_____STT 201	Statistical Methods	4
_____AFA 201	Principles of Accounting	5
_____EC 305	Industrial Relations and Trade Unionism	5
or		
_____MGT 415	Managerial Approaches to Collective Bargaining	4

APPENDIX B.2

MSU-ADA MASTER CHECKLIST PLAN IV
CONVENTIONAL STUDY PLAN

THE AMERICAN DIETETIC ASSOCIATION
430 North Michigan Avenue
Chicago, Illinois 60611

MASTER CHECKSHEET
Approved Plan IV - Education Dept.
MICHIGAN STATE UNIVERSITY
Conventional Study Plan

BASIC REQUIREMENTS AND COURSES TO FULFILL REQUIREMENTS

Chem.inorganic	CEM 130,131,161 or 141 & 161	Food	HNF 100,300
Chem. organic	CEM 132 or 241,242,243,244	Nutr.	HNF 461,462,463
Microbiology	FSC 440 or MPH 200	Mgmt theory & prin.	HEC 301, MGT 310 or PSY 255
Human Physio.	PSL 241,241 or 431 and 432	Writing	ATL 1-1, 1-2, 1-3
Soc. or Psych.	PSY 170	*Math.	MTH 108 or 111
Econ.	EC 200 or 201 or SS 202	Learn.theory	FE 340

AREA OF SPECIALIZATION IN DIETETICS

GENERAL

Biochem.	BCH 200	Nutr. in Disease	HNF 470
Anthro.orSoc.	One course in ANP or SOC	#Data processing	
Fd.serv.sys.mgmt.	HNF 320	OR	
		#Data evaluation	HNF 454 or 465

OR

MANAGEMENT

Labor econ. or rel.	MGT 415 or EC 305	Finan.mgmt.	AFA 201 or 330
Fd.serv.sys.mgmt.	HNF 320	Data process.	CPS 110 or STT 201 and HNF 454
Prin.of bus.org.	MGT 310 or PSY 255	OR	
		Data evaluation	

OR

CLINICAL

Biochem.	BCH 200	Nutrition	HNF 465
Biochem. analy.	HNF 473	Nutr.in Disease	HNF 470
#Anat.adv.physio., OR genetics	ANT 316	Data evaluation	HNF 465
Anthro. or Soc.	One course in ANP or SOC		

OR

COMMUNITY

Biochem.	BCH 200	Nutr. & Comm. Hlth	HNF 475, HNF 475P
Anthro. & Soc.	One course in ANP or SOC		
**Psych.	PSY 170	Fd.serv.sys.mgmt.	HNF 320
Nutr. in Disease	HNF 470	Data evaluation	HNF 465

*May be acquired prior to college entrance

#Recommended, not required

**If not completed in Basic Requirements

APPENDIX B.3

MSU-ADA MASTER CHECKSHEET PLAN IV
COORDINATED STUDY PLAN

THE AMERICAN DIETETIC ASSOCIATION
430 North Michigan Avenue
Chicago, Illinois 60611

MASTER CHECKSHEET

Approved Plan IV - Education Dept.

MICHIGAN STATE UNIVERSITY

Coordinated Study Plan

BASIC REQUIREMENTS AND COURSES TO FULFILL REQUIREMENTS

Chem. inorgan.	CEM 130,131,161 or 141 & 161	Food	HNF 340,314 or 100, 300
Chem. organic	CEM 132 or 241,242,243,244	Nutr.	HNF 461,462,463
Microbiology	MPH 200 or FSC 440	Mgmt.theory & prin.	HEC 301
Human Physio.	PSL 240, 241, or 431,432		MGT 310 or PSY 255
Soc. or Psych.	SS2-1, 2-3, PSY 160 or 170	Writing	ATL 1-1, 1-2, 1-3
Econ.	SS 202 or EC 200 or EC 201	*Math	MTH 108 or 111
		Learn. theory	HNF 301,302,303

AREA OF SPECIALIZATION IN DIETETICS

GENERAL

Biochem.	BCH 200	Nutr. in Disease	HNF 470
Anthro. or Soc.	ANP or SOC (4 cr.)	#Data processing	CPS 110
Fd.serv.sys.mgmt.	HNF 320, HNF 480, HNF 480	OR	
		#Data evaluation	HNF 454 or 465

OR

MANAGEMENT

Labor econ. or rel.		Financial mgmt.	
Fd.serv.sys.mgmt.		Data processing	
Prin. of bus. organ.		OR	
		Data evaluation	

OR

CLINICAL

Biochem.		Nutrition	
Biochem. analy.		Nutr. in Disease	
#Anat.,adv. physio, OR genetics		Data evaluation	
Anthro. or Soc.			

OR

COMMUNITY

Biochem.		Nutr. & Comm. Hlth.	
Anthro. & Soc.			
**Psych.		Fd.serv.sys.mgmt.	
Nutr. in Disease		Data evaluation	

*May be acquired prior to college entrance

#Recommended, not required

**If not completed in Basic Requirements

APPENDIX C

1. STUDENT ACADEMIC RECORD DATA TABULATION FORM
2. STUDENT ACADEMIC RECORD DATA ADJUSTMENT FORM

APPENDIX C.1

STUDENT ACADEMIC RECORD DATA TABULATION FORM

Michigan State University
College of Human Ecology

Dept. of FSHN
Dietetic Major

STUDENT RECORD DATA TABULATION FORM

Name ______	SOC/ANP ______	HNF 462 ______
No/St. ______	HEC 201 ______	HNF 463 ______
City, State ______	HEC 301 ______	HNF 465 ______
Zip Code ______	HEC 401 ______	HNF 470 ______
Sex ______	CEM 130 ______	HNF 473 ______
Option ______	CEM 131 ______	HNF 475 ______
Class Level ______	CEM 132 ______	HNF 475P ______
Student No. ______	CEM 141 ______	HNF 480 ______
Advisor ______	CEM 161 ______	HNF 480 ______
Study Plan (Coord) ______	CEM 241 ______	MGT 310 ______
Transfer College ______	CEM 242 ______	MGT 415 ______
Cr. Prior to This Term ______	CEM 243 ______	PSY 170 ______
Cr. Incl. This Term ______	CEM 244 ______	PSY 255 ______
Cr. Transferred ______	FE 340 ______	MPH 200 ______
Cr. Repeated ______	HNF 100 ______	FSC 310 ______
GPA Prior to This Term ______	HNF 101 ______	FSC 440 ______
GPA Incl. This Term ______	HNF 102 ______	MTH 108 ______
GPA This Term ______	HNF 221 ______	MTH 111 ______
Update ______	HNF 222 ______	BCH 200 ______
1 ATL ______	HNF 300 ______	PSL 240 ______
2 ATL ______	HNF 301 ______	PSL 241 ______
3 ATL ______	HNF 302 ______	PSL 431 ______
1 SS ______	HNF 303 ______	PSL 432 ______
2 SS ______	HNF 320 ______	ANT 316 ______
3 SS ______	HNF 406 ______	CPS 110 ______
1 HUM ______	HNF 407 ______	STT 201 ______
2 HUM ______	HNF 454 ______	AFA 330 ______
3 HUM ______	HNF 461 ______	EC 305 ______

APPENDIX C.2

STUDENT ACADEMIC RECORD DATA ADJUSTMENT FORM

Michigan State University
College of Human Ecology

Dept. of FSHN
Dietetic Major

STUDENT ACADEMIC RECORD DATA ADJUSTMENT FORM

Student Name ____
Last First Initial

Student Number ____________________ Student Academic Advisor ______________

Add New Record ____________________ Delete Record __________________________

Other Alterations:

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

OFFICIAL MICHIGAN STATE UNIVERSITY AUTHORIZATION

FOR ACCESS TO STUDENT DATA

MICHIGAN STATE UNIVERSITY

OFFICE OF INSTITUTIONAL RESEARCH
ADMINISTRATION BUILDING

EAST LANSING · MICHIGAN · 48824

April 20, 1979

MEMORANDUM

TO: Stella Cash

FROM: Paul L. Dressel, Chairman, Committee on Release of Confidential Information

From your letter it is clear that all of the individuals with whose records you will be working are a part of your official responsibility as a faculty member. There is, therefore, no problem at all with regard to the records themselves. The second part of your letter indicates use of computerization. The University Committee on Release of Confidential Information has developed a number of statements about computerization, mainly dealing with the matter of access of unauthorized individuals to information. Formerly, this was not regarded as much of a problem because student or faculty records were kept locked in files and accessible only to authorized persons. The only condition that you need be concerned about to be in conformity with University policy is that there be sufficient security procedures and that those responsible for the records can provide assurance that no unauthorized access is possible.

P.L.D.

MICHIGAN STATE UNIVERSITY

UNIVERSITY COMMITTEE ON RESEARCH INVOLVING
HUMAN SUBJECTS (UCRIHS)
238 ADMINISTRATION BUILDING
(517) 355-2186

EAST LANSING • MICHIGAN • 48824

April 20, 1979

Ms. Stella Cash
Education Specialist
Department of Food Science
and Human Nutrition
Human Ecology Building

Dear Ms. Cash:

In reply to your letter of April 18 regarding the proposed study of "A Computer-based Model for Student Academic Records Management," I do not believe the planned project involves the use of human subjects. Consequently, you do not need to obtain approval of the Committee. Because it does involve the use of student records you should bring the project to the attention of the Office of Institutional Research.

Thank you for giving us the opportunity to review your proposed research and best wishes for a successful outcome.

Sincerely,

Henry E. Bredeck
Chairman, UCRIHS

HEB/jms

MICHIGAN STATE UNIVERSITY

COLLEGE OF HUMAN ECOLOGY · OFFICE OF THE DEAN
HUMAN ECOLOGY BUILDING

EAST LANSING · MICHIGAN · 48824

July 18, 1979

TO: Whom It May Concern

FROM: Dr. Norma Bobbitt, Assistant Dean *Norma Bobbitt*

RE: Access to Student Records

Stella Cash has been delegated the authority to have access to student records of the dietetics majors for purposes of accessing information to use as a part of dissertation activities. It is understood that the utilization of information from these records will not invade the privacy of these students.

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