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**COMPUTER SKILLS NEEDED BY
ENTRY-LEVEL CLINICAL MANAGEMENT AND
FOODSERVICE SYSTEMS MANAGEMENT DIETITIANS**

A THESIS

**SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF SCIENCE
IN THE GRADUATE SCHOOL OF THE
TEXAS WOMAN'S UNIVERSITY**

**DEPARTMENT OF NUTRITION AND FOOD SCIENCES
COLLEGE OF HEALTH SCIENCES**

BY

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Special recognition goes to my parents, Nyka Waldrop and the late Ernest Waldrop: Thank you for your love and support throughout the years, and for raising me in a Christian home.

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ABSTRACT

Computer skills needed by entry-level clinical and foodservice systems management dietitians. O'Hearn, Deana. Master of Science, Department of Nutrition and Food Science, Texas Woman's University, May 1998.

The purpose of this study was to determine current computer use, perceived skill levels and computer education and training of clinical and foodservice system management dietitians. A questionnaire was developed concerning type of computer education and training received and degree of skill level with various computer applications. After pilot testing, the questionnaire was mailed to random samples of 200 dietitians from the Management in Health Care Systems practice group and 200 dietitians from the Clinical Nutrition Management practice group of The American Dietetic Association. One hundred eighty-one usable surveys were received for a 45% return rate. The majority of respondents had a graduate degree (52%), obtained their registration through a dietetic internship (74%), were both licensed and registered (59%), practiced in management (62%) and had worked 20+ years (72%). Eighty percent indicated use of a computer at home. The most frequent reason limiting computer applications at work were lack of time to learn on the job (67%) and cost (39%). Spearman Rho statistical analysis indicated that perceived skill levels of dietitians for selected computer applications was positively correlated to home computer use ($r_s=0.91$) and number of years worked ($r_s=0.82$). There was also a positive correlation ($r_s=0.81$) between number of beds at acute care facilities and the importance rating that dietitians attached to clinical nutrition

software. These dietitians recommended required college classes and on the job training as the best methods for improving computer skills of current dietetic students.

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CHAPTER I

INTRODUCTION

Computer applications are important in the fields of human nutrition and foodservice systems. The uses and benefits of computer systems in dietetics have been demonstrated for over 30 years (1).

Clinical dietitians use computer software for purposes of nutritional assessment, dietary analysis, and management of patient records (2,3). Improvement of computer skills would enable clinical dietitians to process patients records more efficiently and identify patients who need immediate consultation. Clinical management dietitians are expected to report productivity. Computer software programs can allow managers to quantify dietetic activity in a simple, cost-effective manner by monitoring trends and outcomes (4).

Foodservice systems management dietitians use computer software to manage food inventory, purchase food, produce recipes, analyze menus for nutritional content and control costs so that better quality food can be produced for consumers in today's cost cutting atmosphere. Management professionals for foodservice organizations increasingly rely on computer technology to process information and provide timely reports that can assist with decision making and improve cost control and productivity (2,3).

Dietitians who use more technology reported higher productivity than those who used less (5).

Graduates of dietetic programs need to have the computer skills and experience required for entry-level dietitian positions. There appears to be wide variation in the type and amount of computer education and training provided to dietetic students at various didactic and supervised practice programs (6). Knowledge of the type of education or training considered most useful by professionals in the field would enable educators to design appropriate courses and educational experiences to help students gain the computer skills necessary to perform as competent dietitians.

Purpose of the Study

The purpose of this study was to determine current computer use and computer education and training of clinical management dietitians and foodservice systems management dietitians in order to make recommendations for computer education and training for dietetic students.

Objectives

Objectives of this study were to:

1. Determine availability and importance of computer applications used by clinical management and foodservice systems management dietitians.

2. Determine what types of experience and training were most useful in improving computer skills of dietitians currently working in clinical management and foodservice systems management.
3. Determine dietitians' perceived computer skill level for selected types of software applications.
4. Summarize recommendations for types of computer education, experience and training needed to adequately prepare dietetic students for careers as clinical management or foodservice systems management dietitians.

Null hypothesis were as follows:

1. There will be no relationship between education of dietitians and perceived skill levels for selected software applications.
2. There will be no relationship between registration of dietitians and perceived skill levels for selected software applications.
3. There will be no relationship between years of work experience of dietitians and perceived skill levels for selected software applications.
4. There will be no relationship between computer use at home of dietitians and perceived skill levels for selected software applications.
5. There will be no relationship between type of facility where dietitians are employed and perceived importance levels for foodservice management and clinical nutrition management applications.
6. There will be no relationship between census where dietitians are employed and perceived importance levels for foodservice management and clinical nutrition management applications.
7. There will be no relationship between dietitians' type of employment and perceived importance levels for foodservice management and clinical management applications.
8. There will be no relationship between type of facility where dietitians are employed and availability of selected software applications.

9. **There will be no relationship between census at facility where dietitians are employed and availability of selected software applications.**
10. **There will be no relationship between dietitians' type of employment and availability of selected software applications.**

CHAPTER II

REVIEW OF LITERATURE

Background of Computer in Dietetics

Virtually all areas of dietetic practice now involve the use of computers. The uses and benefits of computer systems in dietetics have been demonstrated for over 30 years. Researchers at Tulane University pioneered a study in 1962 to implement computer use for foodservice management. The program, Computer Assisted Menu Planning (CAMP), was designed to plan the lowest cost menus that met the criteria established for nutritive values, menu patterns and the frequency of offering (1).

Before 1986, few hospitals and food services used computers. Prior to this time, there were many disadvantages in using computer software for foodservice management. According to Waller (2), the disadvantages include: 1. There were no commercial vendors of nutritional management systems. 2. No large company provided the more traditional software applications such as financial systems geared toward foodservice operations. 3. The failure rate for specialized vendors was high. 4. The amount of information that had to be collected, encoded, entered, verified, and kept updated was enormous. 5. Many foodservice managers believed that computerization of foodservice would create morale problems and destroy creativity in cooking. 6. Foodservice directors had not been required to account for their resources by hospital administration. 7. No one computer system satisfied an institution's every need.

An advantage in using computer software is that information technology brings order to the chaos of uncontrolled and unorganized information, giving value to data that would otherwise be useless. Conceptual skills are important skills for successful administrators. In dietetics, the benefits of computer applications must be recognized because the computer is permeating the world in which dietitians work (3).

Computer Use in Dietetics

According to Gregoire (4), the use of computers for decision making can vary from a basic use to an advanced/expert use. Dietitians who make basic use of computers may perform tasks that include computation, summarization, and organization of information. Examples of basic use of computers include forecasting, menu planning, productivity assessment, employee scheduling, production scheduling and equipment use, nutrient analysis and nutrition assessment. The intermediate use of computers includes simulation of alternatives for such tasks as calculating entree serving time, menu planning, production scheduling, customer flow and dining room seating. Advanced computer use involves “intelligent” computer systems artificial intelligence. Forecasting is an application that dietitians use with advanced use/expert systems.

Clinical management and foodservice systems management dietitians using information systems can survive shifts in organizational structure, succeed in providing resources to conflicting divisions within an organization and chart a course through rough

and unknown organizational waters. Hofman (5) described three actions that can lead organizations toward active information systems use:

1. Updating the information system division reporting relationship.
2. Involving information systems management in the planning process.
3. Developing corporate information systems strategies and standards.

Igbaria (6), describes behavioral and normative beliefs as two factors contributing to computer acceptance. Behavioral beliefs are determined by perceived usefulness and social norms. Perceived usefulness is defined as “the degree to which a person believes that using a particular system would enhance his or her job performance”. Normative beliefs are the perceived expectations of specific individuals or groups, and the motivation to comply with these expectations. Dietitians are more likely to use a computer if they believe the system will increase their performance and productivity and if they feel social pressure to use the computer from individuals from whom they are motivated. Perceived usefulness and computer anxiety have a direct effect on attitudes. Organizational usage and support have a direct effect on normative beliefs. A 1995 survey of 200 Louisiana dietitians indicated that dietitians who use more technology reported higher productivity than those who used less. The most regularly used technology included phone answering machines, computers, word processing programs, facsimile machines and pagers. Dietitians not working indicated more computer anxiety than those who worked full-time (7). Graduates of master’s degree programs in foodservice management at five universities identified computer applications as important in their professional work in

foodservice management. Computer competencies, however, were more likely gained from other sources rather than educational preparation (8).

In 1986, results of questionnaires mailed to 2,064 persons associated with the management of institutional foodservice indicated that large educational institutions used computers (primarily internal mainframe systems) significantly more than did healthcare facilities. Computers were primarily used for management functions. Managers with six or more courses in business administration were most likely to use computers. Managers who understood and applied systems management concepts to their managerial tasks were more likely to use computers (9). There are many factors involved in successful use of a computer system. An important factor affecting the productivity of implementing computer systems has been identified. Purchasing a computer system is only the beginning, representing about 20% of the total implementation effort. The 80% portion involves preparing the people in the organization to use the system (10).

Computer Use in Foodservice Management

There are many benefits for foodservice system management dietitians who use computers. Porta (11) identified four ways that computers can assist foodservice system management dietitians for better management performance:

1. Providing realistic, quantitative criteria for evaluating management performance.

2. Improving employee productivity both by helping management schedule employees based on more accurate forecasting and establishing productivity indices for comparison.
3. Improving cost control and evaluation by monitoring and comparing predicted or actual cost.
4. Allowing for better use of management time by freeing managers from routine and time-consuming daily functions.

Computers can be used in foodservice to improve budget and control food costs, plan purchasing, minimize inventory, forecast usage more precisely, standardize recipes, and scale recipes exactly, reducing waste from over production. An important benefit of installing a computer system is the organizing effort undertaken before the system is installed. The data collection, standardization process, recordkeeping, and discipline required may provide the greatest savings (12, 13).

Bednar and Pangan (14) surveyed foodservice directors at 42 small Texas hospitals concerning current computer software use and future needs. The most frequently used applications were ordering food/supplies, patient status/diet orders and nutrient analysis. Nutrient analysis and patient status/diet orders were the software applications the directors rated most important.

Finley and Kim (15) surveyed 200 directors of foodservice systems concerning the frequency of use of 17 management science techniques. The most frequently used techniques were a perpetual inventory system, mathematical forecasting, and line

balancing. Other techniques were used either infrequently or not at all. Problems with the use of management science techniques were lack of computer resources; lack of manager expertise in computer applications; lack of emphasis on management of resources; and lack of sophistication in system design, operation management, and financial management .

Computer systems pose a challenge in the evaluation of computer program design, systems development and implementation, and user satisfaction. Decision support systems are computerized management information systems designed to assist managers in semi-structured decision making. The intent is to apply technology to make the manager plus the system more effective than either could be alone (16).

Data management programs have been used for a wide variety of jobs including calculation of estimated income for schools compared to the actual income received, calculation of the average daily participation of all schools, calculation of the monthly milk count, balancing of the receipt book of reimbursement report category, and assessment of the popularity of various menu items. Word processing programs were used for writing reports and articles, memos for employees or other personnel and revision of bylaws. The use of microcomputers in the foodservice office has decreased the time required and improved the accuracy of many of the tedious tasks of managers (17).

Many foodservice directors and dietitians have accepted the computer with enthusiasm; others have accepted it begrudgingly. The potential for cost savings and productivity improvement is undeniable, and the range of possible contributions to be gained from computerization is almost endless. Computer software has already trimmed

expensive inventory, streamlined purchasing, facilitated employee scheduling, predicted costs, tracked trends and estimated customer preferences (18).

White et al reported dietitians involved in the management of school foodservice systems will be faced with change as technology becomes more available. In the future, technology will remove traditional barriers in areas such as equipment design, food processing and program expansion, enabling schools to achieve unprecedented performance goals. Management along with the use of new computer resources will become an area of specialization for the foodservice professional. Foodservice personnel will need extensive orientation and training for effective use of new resources. Information technology will enable school food services to become a competitive, precisely managed nutrition delivery system focused to meet specific needs of the facility (19). The development of information technology and new advances in communication will greatly improve the daily decision-making process. Information technology will continue to change rapidly.

Computer Use in Clinical Nutrition Management

A clinical nutrition manager is defined as the position responsible for managing resources related to nutrition care of patients, which may or may not include foodservice. Chief clinical dietitian, head clinical dietitian, supervising clinical dietitian, coordinator of clinical dietetics and assistant director of clinical dietetics are other selected job titles which also fit this definition (20). Clinical nutrition managers are expected to report

productivity. By using a personal computer and software program, managers can quantify dietetic activity in a simple cost-effective manner. Monitoring ongoing, continuous activity is most effective. Collecting data over time affords managers the opportunity to monitor trends and changes in the clinical setting (21). The Clinical Dietetics Management System (CDMS), developed in 1982, was designed to support and facilitate the nutrition care of patients at the University of Missouri-Columbia Hospital and Clinics (UMCHC). The CDMS functions include diet order processing, inquiry, nutritional intake analysis, communications, data base maintenance and management reporting. One benefit of this system is access to information on a real-time basis. Automatic routing of messages from administration and nursing to the appropriate dietetic work station has been shown to reduce interruptions and decrease the number of telephone calls by 50%. More applications are envisioned which will utilize more fully the real-time computing environment (22).

Barbusca (23) felt that dietitians could participate in improving productivity by identifying repetitive tasks and searching for ways to automate them. The most common use of mainframe computers in dietetics was the process of ordering dietary changes. Computer charting at the bedside, database searches for nutrition screening, and laboratory databases are other examples of tasks that may be automated. Improvement of computer skills would enable clinical dietitians to process patient records more efficiently and identify patients who need immediate consultation. Barbusca felt that "the potential for computer applications is limited only by the creativity of the users".

In 1983, Hoover (24) recognized the need to develop more sophistication in marketing, systems design, operations management, and financial management. She identified skills and characteristics essential to managerial effectiveness including marketing orientation, systems design skill, quantitative operations management techniques, financial expertise and leadership. She specified curriculum enhancement and continuing education as two strategies for improving managerial competency in the dietetic profession. To assure the viability of the dietetic profession, she felt the emphasis on management should be more comprehensive and rigorous.

Computer Use and the Internet

The Internet is providing a new paradigm for how dietetic professionals communicate. The accessibility and availability of timely information about food and nutrition on the Internet is endless. Dietetic professionals must determine how to use the Internet effectively and how to effectively train students to use this resource. Miller and Achterberg (25) have offered the following recommendations on how to effectively use the Internet:

1. Get connected to the Internet.
2. Attend workshops, seminars, or demonstrations about the Internet.
3. Browse the Web sites on food and nutrition.
4. Create your own listserv to conduct research via the Internet.
5. Teach students information literacy and computer literacy.

6. Teach students values and principles that surround professional information exchange as well as technical “how to’s”.
7. Communicate to colleagues via the Internet.

Recently the opportunity for dietetic professionals to utilize distance learning for continuing education has become available. The Internet can provide distance learning programs for continuing education suitable to individual needs, schedules, and learning styles (26).

Computer Use in Education

A 1983 survey of the perceptions of importance of management aspects of dietetic practice was sent to dietetic students and educators at the University of Minnesota and North Dakota State University and practitioners from Minnesota and North Dakota. Completed questionnaires were obtained from 172 dietetic students, 35 educators, and 137 practitioners. Undergraduate dietetic majors tend to perceive management related tasks as less important than clinical-nutrition related tasks. Administrative dietitians rated management tasks as much more important than did clinical dietitians. No one rated management tasks as unimportant. Undergraduate majors and clinical dietitians do not perceive the area of management as equally important to the profession. This is of particular concern if the growth of the profession is to be in management areas (27).

Computers are the future of education in schools and are of current interest to many educators. Computer literacy is a growing need among educators today. Most educators feel that computers should be used to enhance the learning process, not to

replace the educator. Educators, themselves, may be an obstacle. Educators today may not be trained in current technology and, for those interested in learning, the time involved becomes a barrier (28).

In 1987, a survey of 21 institutional foodservice users of computer software indicated that entry-level foodservice systems managers require substantial background in hands-on use of computer hardware and software, the foodservice software market, software installation and use, and employee training (29). There appears to be wide variation in the kind and amount of computer education and training provided to dietetic students at various community colleges, universities, and internship programs. A survey of computer technology in foodservice management education included the following categories: menu planning, costing, production, forecasting, scheduling, purchasing, and storage. Eighty-five percent of the programs surveyed used computers as a teaching tool. Computer assistance was most often used with menu analysis (56%), recipe costing (51%), recipe analysis (48%), recipe adjustment (47%) and food cost accounting and inventory reports (42%). Ninety-two percent of the respondents indicated a need for foodservice management educators to have additional training in using computers as a management tool; ninety-four percent responded that there was a need for increased use of the computer as a management tool. Limiting factors included cost (50%) and lack of software (46%) (30). Stand alone programs have been used more widely than on-line applications in nutrition education. The time has arrived for educators to consider how computer technology can best be used in the classroom (31).

Bednar and Krueger (32) surveyed 151 foodservice systems management educators regarding current teaching experiences and attitudes toward computer-assisted instruction, and availability of computer hardware and software to undergraduate students. Junior/senior undergraduates were only skilled users with word processing programs. There was no perceived difference found between educator and student skill level for nutrient analysis and the Internet. The majority of educators perceived themselves to be skilled users of word processing, spreadsheet, foodservice management applications. However, they did not feel they were skilled in presentation, graphics, or computer assisted instruction (CAI) applications. Location of computers in the educational setting could be a determining factor on the frequency of use, effecting skill level.

Piemme (33), reported that the use of computers in medical education has been available for many years; there are several reasons it has not grown in popularity with some educators. Perhaps the greatest barrier to widespread use of computers was the inability of programs written for one system to run on another computer system. The challenge to educators is to develop the potential that computers can provide. Computer-assisted learning is being used at a number of medical schools (eg, Ohio State, Illinois). Harvard Medical School has a "New Pathway" curriculum which includes a major emphasis on the use of information technology. Computers are readily accessible, and computer-based educational activities are integrated into the program. Continuing education is another area that is using technology to its fullest. Real time access to abstracts and articles is changing the traditional way physicians keep current.

Future Trends of Computers in Dietetics

The development of information technology and new advances in communications will greatly improve the decision-making processes in management. The most accurate statement that can be made regarding information technology is that it will continue to change very rapidly. Successful managers in healthcare and education will use computer technology to better serve their customers and students and improve their bottom line. They can accomplish these goals by strategic planning. In developing technology directions, management must play a key role. Watts stated (34), "Millions of dollars will be spent wisely or foolishly on foodservice, nutrition and education technology. The degree of wisdom or foolishness depends on the management".

According to Beerman (35), it appears that advances in technology will always be met with some resistance, but, as old technologies are replaced with new, acceptance is inevitable.

CHAPTER III

METHODOLOGY

The following research methods were approved by the Texas Woman's University Human Subjects Review Committee (Appendix A). Five nutritional professionals assisted the researcher in the design of a questionnaire focusing on computer skills, education, and training needed by entry-level management dietitians. The five professionals included dietitians with experience in clinical and foodservice systems management. Questions about computer skills and use, education and training, resources and software were asked of these professionals in a phone interview. The opinions of these professionals were used as background for the questionnaire. A list of questions asked in the phone interviews is included in Appendix B. The questionnaire was circulated to the five dietitians and the faculty committee and was revised based on their comments. Questions included on the questionnaire were demographics, computer education and training, barriers limiting computer use, availability of computer software and perceived skill levels for selected computer applications. Dietitians were asked to rank the use of software programs and applications. Rankings for skill level were 1 – expert user, 2 – regular user, 3 – occasional user, 4 – rarely use, and 5 – never use. Rankings for importance were 1 – very important, 2 – important, 3 – somewhat important, 4 – not very important, and 5 – not useful at all. A pilot test was conducted

with a group of 30 north Texas dietitians whose names were obtained from area dietetic directories. Nineteen dietitians returned the questionnaire. Follow-up phone calls were made ten days after the questionnaires were mailed to encourage participation. Some revisions on question wording were made following pilot testing. A sample form of the revised questionnaire is included in Appendix C.

The questionnaire was mailed to random samples of 200 of the 1600 dietitians from the Management in Health Care Systems Practice Group and 200 of the 1415 dietitians from the Clinical Nutrition Management Practice Group of the American Dietetic Association (ADA). In this study, the Management in Health Care Systems Practice Group will be referred to as foodservice and the Clinical Nutrition Management Practice Group will be referred to as clinical. The Management in Health Care Systems Practice Group's mission is to promote the dietetics professional as a leader in foodservice management and nutrition education. The name of this practice group has changed to Management in Food and Nutrition Systems for the 1998 -99 membership year of the ADA. The Clinical Nutrition Management Practice Group promotes and advances the management of clinical nutrition practice. Members include clinical nutrition management practitioners. Each dietitian received a cover letter explaining the importance of the study and a postage-paid return envelope. A follow-up reminder post card was sent to subjects three weeks after the original mailing to encourage participation. Surveys were discarded if missing a majority of the information or if respondent stated they did not feel qualified to participate in this study.

Analysis of Data

BMDP (36) statistical software was used to perform statistical analysis.

Descriptive statistics were summarized for the two practice groups and the combined total group. Chi-square analysis, tested at $p < 0.05$ level, was used to analyze questions dealing with rankings from the two group of professional dietitians. During the course of analysis, results showed the two practice groups to be similar on all variables. Data from the two groups were combined in order to assess correlation of selected variables using the Spearman Rho correlation coefficient (37,38). Variables included education, registration, years of work experience, computer use at home, current census, and type of facility where dietitians were employed.

CHAPTER IV

RESULTS

One hundred eighty one usable surveys were returned for a response rate of 45%. There were no significant differences found between the two groups of dietitians.

Table 1 contains demographic information for both practice groups in this study. The majority of respondents had a graduate degree (52%), obtained their registration through a dietetic internship (74%), were both licensed and registered (59%), practiced in management (62%) and had worked 20 + years (72%). Forty three percent of respondents worked in an acute care facility with a census range of 101 – 250. Sixty four percent of respondents were employed in a self-operated facility as shown in Table 2.

Table 3 shows which resources these dietitians considered most helpful for gaining computer skills. One hundred fifty-four dietitians cited on-the-job training, while 99 reported independent study as helpful. Required college classes were mentioned by 21 dietitians and elective college classes by 32 dietitians . Responses for the two groups were very similar.

Table 4 contains statistical data on the method of study most recommended for current dietetic students to gain computer skills. Required college classes were recommended by 133 dietitians and on the job training by 106 dietitians. Commercial workshops were recommended by 56 dietitians and professional workshops by 55 dietitians.

Table 1. Demographic characteristics of foodservice systems management and clinical nutrition management dietitians (N=181)*

	Number of Dietitians			
	Clinical	Foodservice	Total	%
Education				
Bachelor's degree	45	39	84	48
Graduate degree	42	49	91	52
Registration				
Registered only	30	25	55	39
Licensed only	2	1	3	2
Both	40	42	82	59
Route to Registration				
Dietetic Internship	75	55	130	74
AP4	4	13	17	10
Coordinated Program	3	3	6	3
Other	5	18	23	13
Years of Work Experience				
Total Years				
1 - 9	2	1	3	2
10 - 19	16	31	47	26
20 +	73	58	131	72
Predominant Area of Practice				
Clinical	38	20	58	32
Management	45	68	113	62
Community	4	1	5	3
Consultant	1	1	2	1
Other	0	3	3	2

* Number of dietitians answering each question varied. Dietitians did not answer if the question did not apply.

Table 2. Characteristics of facilities where foodservice systems management and clinical nutrition management dietitians were employed (N=181)*

	Number of Dietitians			
	Clinical	Foodservice	Total	%
Type of Facility				
1 Acute Care	40	34	74	43
2 Long-term	1	5	6	3
3 Teaching hospital	9	11	20	12
4 Rehabilitation	0	2	2	1
5 Other	13	22	35	20
6 Combination (1,2,3)	22	14	36	21
Census Range				
0 – 100	10	9	19	12
101 – 250	31	22	53	35
251 – 400	21	21	42	28
400 +	14	23	37	25
Type of Employment				
Self-operated	54	59	113	64
Contract Management Company	11	10	21	12
Managed Care Organization	3	0	3	2
Other	12	14	26	15

* Number of dietitians varied for each question as dietitians did not answer questions that did not apply (for example - currently not working).

Table 3. Resources foodservice systems management and clinical nutrition management dietitians considered most helpful in gaining computer skills (N=181) *

Resources	Number of Dietitians Rating Importance Level **				
	1	2	3	4	5
On-the-job training					
Clinical	64	8	7	-	-
Foodservice	71	11	1	-	3
Independent study					
Clinical	37	15	4	1	3
Foodservice	28	19	6	6	3
Workshops – commercial					
Clinical	17	11	6	4	4
Foodservice	13	12	11	3	11
Workshops – professional					
Clinical	10	12	10	9	6
Foodservice	8	16	14	4	7
Elective college classes					
Clinical	10	8	3	4	13
Foodservice	6	8	13	2	13
Required college classes					
Clinical	8	5	5	3	12
Foodservice	6	2	7	8	15
Other ***					
Clinical	5	2	-	-	-
Foodservice	11	3	-	-	1
Correspondence courses					
Clinical	-	-	3	4	22
Foodservice	2	-	4	5	23

* Dietitians were asked to indicate the importance of each method, but not all dietitians replied to each method.

** Dietitians rated importance from 1 (very important) to 5 (not useful at all).

*** Examples include taught by friends or children.

Table 4. Resources recommended by foodservice systems management and clinical nutrition management dietitians to assist current dietetic students in gaining computer skills* (N=181)

Method of Study	Number of Dietitians Rating Importance Levels **				
	1	2	3	4	5
Required college classes					
Clinical	60	6	5	-	-
Foodservice	61	6	4	4	3
On-the-job training					
Clinical	40	12	7	-	-
Foodservice	39	15	9	2	-
Elective college courses					
Clinical	28	11	5	-	3
Foodservice	28	23	7	1	3
Independent study					
Clinical	25	13	3	1	2
Foodservice	27	13	7	5	1
Workshops – commercial					
Clinical	19	10	8	3	2
Foodservice	13	14	14	6	5
Workshops – professional					
Clinical	15	11	12	2	1
Foodservice	10	19	15	6	3
Correspondence courses					
Clinical	1	3	3	7	13
Foodservice	1	2	10	11	15
Other					
Clinical	2	-	-	-	-
Foodservice	2	-	-	-	-

* Number of dietitians answering each question varied as some dietitians did not rate each method.

** Dietitians rated each method from 1 (very important) to 5 (not useful at all).

Table 5 contains data on barriers limiting computer use at work. The most frequently cited factor was lack of time to learn on the job (67%). Other reasons given were cost (39%), lack of computer software (33%), and inadequate/outdated computers (36%).

Tables 6 and 7 contain data on availability of selected software programs and skill level of dietitians. Respondents rated their skills on the following scale: 1- expert user, 2 – regular user, 3 – occasional user, 4 – rarely use, and 5 – never use. Word processing programs were the most available at 93%. The mean rating for skill level with word processing was 2.95 (an occasional user). Less than one-half of the dietitians had access to statistical analysis programs and the Internet, skill levels for both applications were also rated at the “occasional user” level. Although 85% of dietitians had spreadsheet applications available and nutritional analysis was available to 70%, dietitians classified their skill levels for these programs as “rarely use”.

Tables 8 and 9 contain data on availability of foodservice management software applications and the importance of each application. More than 50% of the dietitians had seven of the eight foodservice management applications available to them. Work records were not available for 53% of the respondents. The mean ratings for foodservice management applications ranged between 1 (very important) and 2 (important).

Tables 10 and 11 contain data on availability of clinical nutrition applications. Clinical nutrition applications concerning patient status/diet order (77%) and nutrient analysis (73%) were the most available applications. Menu selection by patients was the

Table 5. Barriers limiting computer use by foodservice systems management and clinical nutrition management dietitians at work (N=181)*

Barrier	Number of Dietitians			
	Clinical	Foodservice	Total	%
Lack of time to learn on the job	53	58	121	67
Cost	38	32	70	39
Inadequate/outdated computers	36	29	65	36
Lack of software	28	31	59	33
Lack of administrative support	24	16	40	22
Lack of compatible hardware	20	14	34	19
Lack of employer expertise	13	20	33	18
Location of computers	21	7	28	15
Other	9	8	17	9

* Dietitians were asked to check all barriers limiting their computer use.

Table 6. Frequency of software availability and dietitian skill level for selected software programs (N=181)*

Selected Software Programs	Availability at Work		Self-Rated Skill Level **				
	Yes	No	1	2	3	4	5
Word Processing							
Clinical	80	6	17	49	12	6	2
Foodservice	84	5	18	51	12	2	5
Spreadsheet							
Clinical	69	18	8	24	20	19	6
Foodservice	81	8	8	27	20	18	13
Electronic Mail							
Clinical	59	24	27	23	7	4	11
Foodservice	75	13	35	27	5	7	6
Nutritional Analysis							
Clinical	60	27	18	14	20	8	10
Foodservice	63	25	10	11	22	19	14
Graphics							
Clinical	53	29	6	12	18	7	20
Foodservice	70	17	13	11	17	23	17
Calendar							
Clinical	50	31	11	14	4	13	23
Foodservice	66	20	13	20	10	9	24
Presentations							
Clinical	48	32	8	13	22	7	13
Foodservice	54	31	5	14	18	14	21
Database Management							
Clinical	34	42	4	8	16	4	22
Foodservice	47	40	3	12	13	16	25
Internet							
Clinical	31	50	8	11	14	3	18
Foodservice	44	42	4	21	17	4	18
Statistical Analysis							
Clinical	31	49	3	9	8	7	30
Foodservice	36	52	3	4	16	12	30

* Number of dietitians answering each software program varied.

** Dietitians rated skill level from 1 (expert user) to 5 (never use).

Table 7. Percentage of software availability and dietitian mean skill level rating for selected software programs. (N=181)

Selected Software Programs	% of Availability	Mean Skill Level Rating*	Standard Deviation
Word processing	93	2.95	0.94
Spreadsheet	85	4.39	1.18
Electronic mail	78	2.15	1.33
Graphics	73	3.64	1.36
Nutritional analysis	70	3.93	1.32
Calendar	69	3.25	1.54
Presentations	62	3.30	1.29
Database management	50	2.15	1.30
Internet	45	3.20	1.40
Statistical analysis	40	3.25	1.26

* Dietitians rated skill level from 1 (expert user) to 5 (never use).

Table 8. Availability and importance of foodservice management software applications at facilities where dietitians were employed. (N=181)*

Foodservice Management Applications	Availability at Work		Self-Rated Importance Level **				
	Yes	No	1	2	3	4	5
Ordering food/supplies							
Clinical	62	14	50	7	1	1	4
Foodservice	69	14	57	11	2	2	5
Inventory management							
Clinical	48	27	42	13	2	-	4
Foodservice	56	27	42	17	6	2	4
Recipe scaling							
Clinical	46	30	32	15	7	2	3
Foodservice	55	25	37	18	7	3	4
Menu and recipe costing							
Clinical	47	28	33	14	8	1	3
Foodservice	54	27	35	21	5	4	5
Production scheduling							
Clinical	40	35	31	14	3	4	3
Foodservice	47	33	32	19	4	5	5
Forecasting							
Clinical	38	37	29	10	6	4	4
Foodservice	47	34	35	16	6	5	5
Menu planning							
Clinical	34	41	26	12	8	4	2
Foodservice	48	32	25	21	12	2	5
Employee records							
Clinical	35	42	28	17	6	3	1
Foodservice	39	43	26	23	9	3	3

*Number of dietitians answering each software program varied.

** Dietitians rated importance from 1 (very important) to 5 (not useful at all).

Table 9. Percentage of availability and dietitian mean importance rating for foodservice management applications. (N=181)

Foodservice Management Applications	% of Availability	Mean Importance Rating*	Standard Deviation
Ordering food/supplies	82	1.49	1.10
Inventory management	66	1.63	1.09
Recipe scaling	65	1.81	1.13
Menu and recipe costing	65	1.83	1.15
Production scheduling	56	1.88	1.22
Forecasting	54	1.94	1.28
Menu planning	53	2.01	1.17
Employee records	47	1.86	1.03

* Dietitians rated importance level from 1 (very important) to 5 (not useful at all).

Table 10. Availability and importance of clinical nutrition software applications at facilities where dietitians were employed (N=181)*

Clinical Nutrition Applications	Availability at Work		Self-Rated Importance Level **				
	Yes	No	1	2	3	4	5
Patient status/diet orders							
Clinical	68	17	67	5	-	-	4
Foodservice	59	20	59	4	1	1	3
Nutritional analysis							
Clinical	62	23	33	22	9	2	3
Foodservice	56	20	31	19	10	3	3
Nutritional assessment							
Clinical	39	45	33	14	8	3	3
Foodservice	38	37	28	14	3	5	4
Interface with accounting/ purchasing for charges							
Clinical	37	44	28	15	6	2	5
Foodservice	38	40	34	12	8	2	2
Interface with laboratory							
Clinical	53	31	40	21	5	1	3
Foodservice	32	43	27	16	6	2	4
Electronic Diet Office							
Clinical	29	50	31	5	4	2	6
Foodservice	39	39	39	11	5	3	3
Menu selection by patients							
Clinical	23	61	27	6	5	4	8
Foodservice	17	57	17	11	12	2	5

*Number of dietitians answering each software application varied.

** Dietitians rated importance from 1 (very important) to 5 (not useful at all).

Table 11. Percentage of software availability and dietitian mean importance rating for clinical nutrition applications. (N=181)

Clinical Nutrition Applications	% of Availability	Mean Importance Rating *	Standard Deviation
Patient status/ diet orders	77	1.87	0.93
Nutritional analysis	73	1.89	1.08
Nutritional assessment	48	2.45	1.21
Interface with accounting/purchasing for charges	47	1.29	1.16
Interface with laboratory	47	1.78	1.09
Electronic diet office	43	1.83	1.28
Menu selection by patients	25	1.79	1.43

* Dietitians rated importance from 1 (very important) to 5 (not useful at all).

least available application at 25%. Mean importance ratings for clinical nutrition applications ranged between 1 (very important) and 2 (important).

The Spearman Rho technique was used to assess the correlation of selected variables. Three correlations were found. Perceived skill levels of dietitians for selected computer applications was positively correlated to home computer use ($r_s = 0.91$) and number of years worked ($r_s = 0.82$) (Table 12). There was also a positive correlation ($r_s = 0.81$) between census at acute care facilities and the importance rating that dietitians attached to clinical nutrition software (Table 13). The Spearman Rho technique was used to assess correlation between type of facility and census at facility where dietitian is employed and type of employment with availability of selected software programs and foodservice management and clinical nutrition management applications, there were no significant correlations found.

Table 12. Correlation of education, registration, years of work experience and computer use at home with perceived skill levels for selected software programs. (N=181)

Software Programs	Education <i>r_s</i>	Registration <i>r_s</i>	Years of Work Experience * <i>r_s</i>	Computer Use at Home ** <i>r_s</i>
Word Processing	-.10	-.11	.85	.96
Spreadsheet	-.12	-.10	.82	.89
Electronic Mail	-.14	.03	.81	.90
Nutritional Analysis	-.09	-.13	.80	.88
Graphics	-.06	.08	.85	.94
Calendar	-.01	-.22	.82	.90
Presentations	-.19	.08	.80	.92
Database Management	-.12	-.10	.83	.89
Internet	-.19	-.01	.80	.90
Statistical Analysis	-.22	.01	.80	.89

* Mean correlation $r_s = 0.82$.

** Mean correlation $r_s = 0.91$.

Table 13. Correlation of type of facility and current census and type of employment with perceived importance levels for foodservice management and clinical nutrition applications. (N=181)

Foodservice Management Applications	Type of Facility rs	Census rs *	Type of Employment rs
Ordering food supplies	.12	-.13	-.02
Inventory management	-.10	-.34	-.14
Recipe scaling	-.10	-.38	-.34
Menu and recipe costing	-.15	-.31	-.39
Production scheduling	-.04	-.13	-.29
Forecasting	-.15	-.16	-.25
Menu planning	-.01	-.12	-.11
Employee work records	-.09	-.13	-.29
Clinical Nutrition Applications			
Patient status/diet orders	.11	.84	.01
Nutritional analysis	-.19	.81	-.17
Nutritional assessment	-.08	.81	-.03
Interface with accounting/ Purchasing for charges	-.08	.83	-.13
Interface with laboratory	-.01	.81	-.11
Electronic diet office	.06	.80	-.20
Menu selection by patients	.15	.80	-.01

* Mean correlation for clinical nutrition applications $r_s = 0.81$.

CHAPTER V

DISCUSSION AND CONCLUSIONS

DISCUSSION

This study was designed to determine current computer use and computer education and training of clinical and foodservice systems management dietitians in order to make recommendations for computer education and training for dietetic students. Results show that on-the-job training and independent study were the most useful resources in gaining computer skills, and required and elective college classes were the least helpful for practicing dietitians. This is consistent with Nettles et al (8), who found that computer skills of dietitians in foodservice management were most likely gained from sources other than educational preparation. Rhoades (7) reported that respondents who had taken computer courses were significantly more likely to use technology than those who had not taken courses. Miller (30) found that 85% of the programs surveyed used computers as a teaching tool. Menu and recipe analysis and food cost accounting techniques were the concepts most often taught. Ninety-two percent of the respondents indicated a need for educators to have additional training in using computers. Bednar and Krueger (32) found that nutrient analysis was the most frequently taught nutrition computer application by foodservice systems educators. Recipe scaling, inventory control, production planning and menus were the most frequently taught

foodservice management applications. Jasper (28), in 1995, found that computer literacy is a growing need among current educators.

Miller (30) and McCool et al (9) found cost to be the number one limiting factor regarding limitations of computer use in educational programs and institutional foodservice. Both of these studies were in the 1980's and cost may not be the main limitation now in the 1990's. This study found lack of time to learn on the job as the number one limiting factor of computer use at work, followed by cost. Bettini (10) reported that purchasing a computer system represented 20% of the total implementation effort. The 80% portion involved preparing the people in the organization to use the system. The dietitians in this study recommended on the job training as one of the best methods for improving computer skills of current dietetic students; however these same dietitians reported lack of time to learn on the job as the main limiting factor for computer use at work. Organizations need to provide appropriate training on the job to have more productive employees.

The rating of importance of selected software application of this study are consistent with those found by Bednar and Pangan (14) and Rhoades (7). Bednar and Pangan (14) reported nutritional analysis, patient status/diet orders, inventory management, menu and recipe costing, nutritional assessment and ordering food/supplies as the most important software applications in foodservice departments of small hospitals. Rhoades (7) found word processing and nutrient analysis as important software applications. The majority of dietitians in this study had access to software applications

such as word processing, spreadsheet, e-mail, graphics and nutritional analysis. Dietitians rated themselves as regular users of e-mail and occasional users of word processing. However, it is surprising that they rated themselves as rarely using spreadsheets or nutritional analysis, two applications that seem pertinent to the field of dietetics. Dietitians may currently be unaware of the many ways that spreadsheets can be used to aid management and decision-making. Dietitians may make more use of computerized nutrient analysis in the future as these programs become more user-friendly and interactive with menu planning applications.

Dietitians in this study cited on the job training and independent study as the two most useful resources in improving their computer skills. However, these same dietitians recommended required college classes and on the job training for current dietetic students to gain computer skills. Dietitians in this study probably did not have the option of computer classes as part of their education. Therefore, they had to gain their computer skills through on the job training and independent study. Current dietetic students may need to have a higher knowledge and skill level when entering the dietetics field.

Graduates of dietetic programs must have computer skills necessary to make themselves marketable in this ever-changing healthcare marketplace where multi-skilling is an asset. Dietetic programs must prepare students with skills necessary to function in a “computer world” and should consider computer education and training as a part of the core curriculum. Current entry-level dietitian education programs are required to have

graduates demonstrate the use of current information technologies (A.3.5.) and have working knowledge of information management (G.2.6.) (39). Educators need to be knowledgeable of the type of education and training considered most useful by professionals in the field. Educators should be computer literate in order to assist dietetic students in gaining the computer skills necessary to perform as competent dietitians. At a minimum, entry-level dietitians should be trained in word processing, spreadsheet and e-mail in order to be competitive in the marketplace. As dietitians are asked to take on more managerial roles, it may become a greater asset to be trained and have experience in graphics, nutritional analysis, calendar, presentation, and database management.

Lack of time to learn on the job was the number one barrier; yet on the job training was the number one resource for gaining computer skills. If this gap could be bridged, imagine the increased competency of dietitians. Employers must play a role in providing appropriate training experiences when a computer system has been purchased. Dietitians are expected to report productivity and show outcomes. As the employer spends more time with training, the result will be higher computer skill levels for dietitians with the end product of higher productivity. Dietitians may need to tell their employers how important training is and how training can affect productivity. Employers could send dietitians to training seminars and then set aside time for those dietitians to train others, or the employer could have training seminars offered on-site for dietitians. If a computer system has already been implemented, all new employees should receive training on that system as part of their orientation.

Dietitians in this study who used a computer at home reported higher perceived skill levels than those who did not. Purchasing a computer for home use would be an excellent resource to increase computer skills. Dietetic students who are planning to work in a large acute care facility need to have experience with clinical nutrition software applications in order to be marketable.

This research study had several limitations. One limitation was the age of the dietitian. The fact that 72% of the dietitians had worked 20+ years definitely influences interpretation of the results and poses the question, "Do members of practice groups tend to be dietitians who are older with more work experience?"

Conducting this research as a mail survey was another limitation. Encouraging response and participation is difficult with any type of survey that must be returned. The questionnaire could have included more questions concerning education of the dietitian, when the dietitian graduated and when the dietitian was registered. This information would have assisted in interpreting the results of this study.

CONCLUSIONS

Results of this study indicate that the most common software programs used by dietitians in healthcare organizations are word processing, spreadsheet, and electronic mail. Ordering food supplies, inventory management, recipe scaling, and menu and recipe costing were the most important foodservice applications. The most important clinical nutrition applications included patient status/diet order and nutrient analysis.

Dietetic educators should focus on these software applications when designing courses and educational experiences.

One striking finding is that both groups of dietitians in this study reported very similar computer competencies. This indicates that foodservice systems management dietitians and clinical nutrition management dietitians appear to be performing many of the same computer tasks at or near the same skill or importance levels.

A future study with younger dietitians might determine if course work currently being offered at educational institutions is effective in improving computer skills of dietitians.

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APPENDICES

APPENDIX A

████████████████████

TEXAS WOMAN'S UNIVERSITY

DENTON / DALLAS / HOUSTON

HUMAN SUBJECTS
REVIEW COMMITTEE
P.O. Box 425619
Denton, TX 76204-5619
Phone: 817/898-3377
Fax: 817/898-3416

July 15, 1997

Ms. Deana O'Hearn
224 Cove Drive
Coppell, TX 75019

Dear Ms. O'Hearn:

Social Security # 457-65-3886

Your study entitled "Computer Skills, Experience and Training Needed by Clinical Management and Foodservice Systems Management Dietitians" has been reviewed by a committee of the Human Subjects Review Committee and appears to meet our requirements in regard to protection of individuals' rights.

Be reminded that both the University and the Department of Health and Human Services (HHS) regulations typically require that agency approval letters and signatures indicating informed consent be obtained from all human subjects in your study. **These consent forms and an annual/final report (attached) are to be filed with the Human Subjects Review Committee at the completion of the study.**

This approval is valid one year from the date of this letter. Furthermore, according to HHS regulations, another review by the Committee is required if your project changes. If you have any questions, please feel free to call the Human Subjects Review Committee at the phone number listed above.

Sincerely,



Chair
Human Subjects Review Committee

cc. Graduate School
Dr. Carolyn Bednar, Department of Nutrition & Food Sciences
Dr. Betty Alford, Department of Nutrition & Food Sciences

A Comprehensive Public University Primarily for Women
An Equal Opportunity/Affirmative Action Employer

APPENDIX B

TEXAS WOMAN'S UNIVERSITY
SUBJECT CONSENT TO PARTICIPATE IN RESEARCH

Title: Computer Skills Needed by Entry-Level Clinical Management and Foodservice Systems Management Dietitians

I agree to participate in a focus group required for research being conducted by Deana O'Hearn, graduate student in Nutrition and Food Sciences, and supervised by Dr. Carolyn Bednar, assistant professor, who can be contacted at 817-898-2658.

This study includes research on the computer skills I and other clinical management and foodservice systems management dietitians consider most useful. The purpose of the research is to determine the computer skills, experience and training needed by clinical management dietitians and foodservice systems management dietitians for employment at healthcare facilities. I understand that I will be asked to participate in a focus group interview where I will share in the discussion. The focus group interview will concern what computer skills I find most useful at my facility, what I would consider as important computer skills when hiring an entry-level management dietitian, and what education and training is most useful. This focus group interview should not take more than 60 minutes. An additional 30 to 45 minutes will be required to review the survey and through phone contacts.

I understand that the information obtained will only be used for research and that my name will not be used on any reported findings. Participation in this study will give me the opportunity to share some of my thoughts and feelings about computer skills and use by dietitians in management positions. I will receive a coffee mug with the Texas Woman's University emblem and a summary of the findings for participating in this focus group.

If I have any questions about the research or about my rights as a subject, I should ask the researchers: their phone number is listed at the top of this form. If I have questions after, or wish to report a problem, I may call the researchers or the Office of Research and Grants Administration at 817-898-3377.

I understand that participation is voluntary and that I may terminate my participation at any time. If I have any questions or concerns, I can ask the researchers. I have been given a copy of a signed consent form to keep. I hereby release Texas Woman's University and the undersigned party acting under the authority of Texas Woman's University from any and all claims arising out of such taking, reproducing,

publishing, transmitting, and or exhibiting as is authorized by the Texas Woman's University.

Signature of Participant

Date

The above consent form was read, discussed and signed in my presence. In my opinion, the person signing this consent form did so freely and with full knowledge and understanding of its contents.

Representative of Texas Woman's University

Date

PHONE INTERVIEW QUESTIONS

1. What computer skills do you find most useful at your facility?
2. What computer skills would you consider most important when hiring an entry-level management dietitian?
3. What education and training were most helpful in assisting you to gain computer skills?
4. Which resources for gaining computer skills would you recommend for current dietetic students?
5. Of the selected computer software programs listed in question #10, are there any programs that should be excluded? Included?
6. Of the computer applications software listed in question #11, are there any applications that should be excluded? Included?
7. For questions 7, 10, and 11, are the rankings of importance and skill level (1-5) appropriate and easy to understand?
8. Are there any questions where the wording is confusing or misleading?
9. Are there any additional questions that would make the questionnaire more complete? Any questions to be omitted?

APPENDIX C

████████████████████

**TEXAS WOMAN'S
UNIVERSITY**
DENTON/DALLAS/HOUSTON

DEPARTMENT OF
NUTRITION AND FOOD SCIENCES
P.O. Box 425888
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Phone: 940/898-2636
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August 25, 1997

Dear ADA member:

You are invited to participate in a mail survey regarding the computer skills, needed by entry-level clinical management (foodservice systems management) dietitians. As you probably know, computer applications are important in the field of human nutrition (foodservice systems). Knowledge of the type of education and training considered most useful by professionals in the field will enable educators to design appropriate courses and educational experiences to help students gain the computer skills that they need to perform as competent dietitians.


The enclosed questionnaire will require approximately 15 to 20 minutes of your time to complete. Information from your survey will be confidential. Your name and the name of your institution will not be included in any published information.


By participating in this study, you will be able to see how your computer skills, education and training compare to other clinical management dietitians (foodservice systems management) dietitians. For results of this study, mark the appropriate space on the questionnaire with a check.

This research is being conducted by Deana O'Hearn, graduate student, and Dr. Carolyn Bednar, associate professor, at Texas Woman's University. Participation in this study is completely voluntary. Please call (972)304-0639 if you have any questions concerning this survey.

"I understand that the return of my completed questionnaire constitutes my informed consent to act as a subject in this research."

Sincerely,


Deana L. O'Hearn, B.S., R.D.
Graduate Student
Texas Woman's University


Carolyn Bednar, Ph.D., R.D.
Associate Professor
Texas Woman's University

A Comprehensive Public University Primarily for Women
An Equal Opportunity/Affirmative Action Employer

Code: _____

Computer Competencies Survey

1. Educational Background and Registration

BS MS MBA MH MEd PhD RD LD Other (Please list)

2. Route to Registration

Dietetic Internship Coordinated Program
 Approved Pre-professional Practice Program
 Other (Please specify)

3. Indicate the number of years worked in the following areas

Clinical Management Community
 Consultant Other (Please specify)

4. Indicate the type and size of facility (number of beds) in which you currently work.

<input type="checkbox"/> Acute Care	Census Range: <input type="checkbox"/> 0 - 100
<input type="checkbox"/> Long-term	<input type="checkbox"/> 101 - 250
<input type="checkbox"/> Teaching Hospital	<input type="checkbox"/> 251 - 400
<input type="checkbox"/> Rehabilitation	<input type="checkbox"/> > 401
<input type="checkbox"/> Other (Please specify)	

5. Type of Employment

Employee of self-operated facility
 Employee of contract management company
 Employee of managed care organization

Consulting dietitian

Other (Please list)

6. Do you use a computer at home? Yes No

For questions 7 and 8, please indicate the importance of each method of study according to the following scale. 1- very important, 2- important, 3- somewhat important, 4- not very important, 5- not useful at all.

7. Which resources were most helpful in assisting you to gain computer skills?

Required college classes

Elective college classes

Correspondence courses

Independent study

Workshops offered by professional organizations

Workshops offered by commercial organizations

On-the-job training

Other (please specify)

8. Which resources do you recommend for current dietetic students?

Required college classes

Elective college classes

Correspondence courses

Independent study

Workshops offered by professional organizations

Workshops offered by commercial organizations

On-the-job training

Other (please specify)

9. What barriers have limited your use of computer applications at work? Check all that apply.

Cost

Inadequate/outdated computers

Lack of software

Lack of time to learn on the job

Lack of employer expertise

Location of computers

Lack of compatible hardware Other (Please specify)
 Lack of administrative support

10. Listed below are selected computer software programs. Indicate by "Yes" or "No" whether each program is available for your use. Indicate your skill level with each program rating 1- expert user, 2- regular user, 3- occasional user, 4- rarely use, 5- never use.

	Availability		Skill Level
	Yes	No	1-5
Nutritional Analysis	___	___	___
Spreadsheet	___	___	___
Word Processing	___	___	___
Statistical Analysis	___	___	___
Database Management	___	___	___
Calendar	___	___	___
Graphics	___	___	___
Electronic Mail	___	___	___
Internet	___	___	___
Presentations	___	___	___

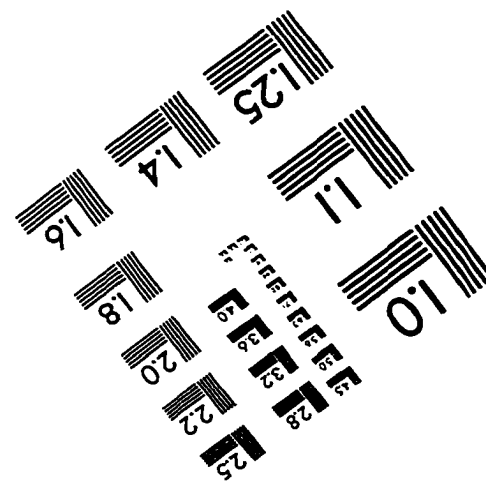
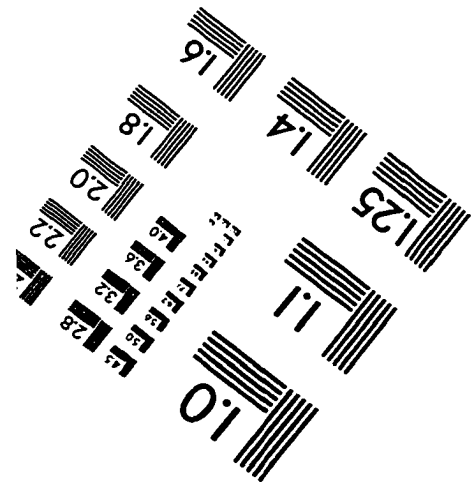
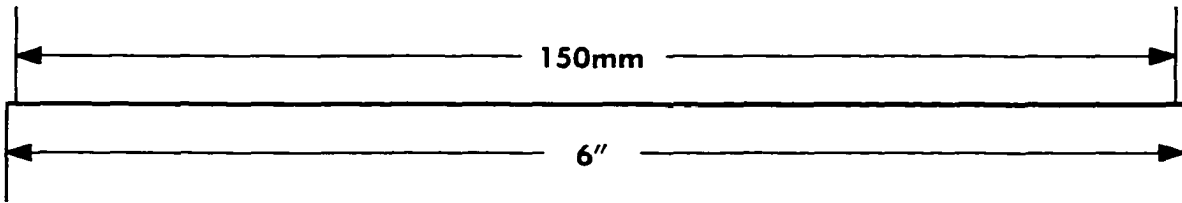
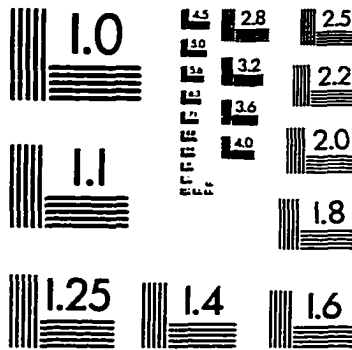
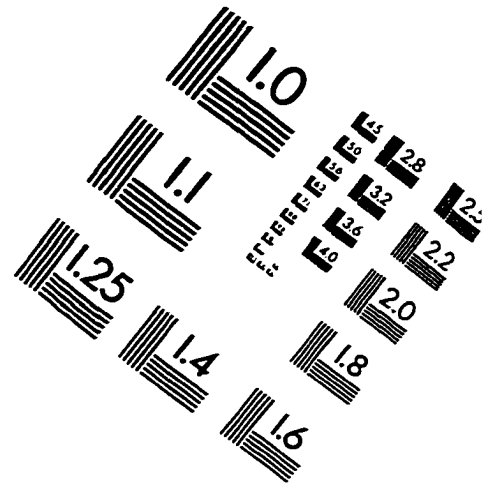
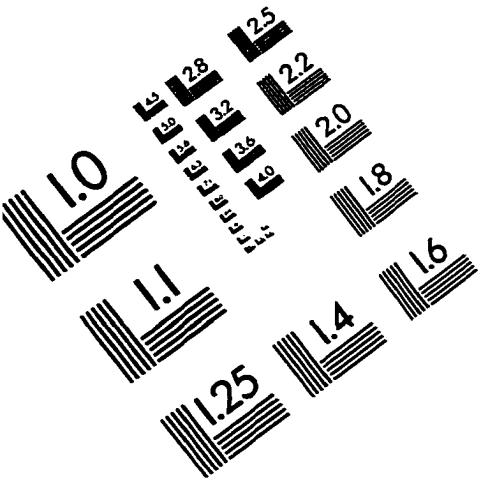
11. Listed below are examples of computer software applications used in foodservice management and clinical nutrition services. Indicate whether these applications are available by "Yes" or "No" and the importance of each application at your facility. Rating 1- very important, 2- important, 3- somewhat important, 4- not very important, 5- not useful at all. If both foodservice and clinical applications are relevant to your work, answer both sections.

	Availability		Importance
	Yes	No	1 - 5
<u>Foodservice Management</u>			
Inventory Management	___	___	___

Recipe Scaling	___	___	___
Menu and Recipe Costing	___	___	___
Menu Planning	___	___	___
Forecasting	___	___	___
Production Scheduling	___	___	___
Ordering Food/Supplies	___	___	___
Employee Records	___	___	___
<u>Clinical Nutrition Services</u>			
Nutrient Analysis	___	___	___
Nutritional Assessment	___	___	___
Patient Status/Diet Orders	___	___	___
Menu Selection by Patients	___	___	___
Interface with Laboratory	___	___	___
Interface with Accounting/ Purchasing for Charges	___	___	___
Electronic Diet Office	___	___	___

_____ Please check if you would like a copy of the results of the study.

IMAGE EVALUATION TEST TARGET (QA-3)



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