MENU PLANNING UNIT OUTLINE FOR INSTITUTIONAL MANAGEMENT STUDENTS

by 1264

ALICE SIDNA LUCUS

B. S., Mississippi State College for Women, 1965

A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Institutional Management

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1970

Approved by:

Grace D. Shugart
Major Professor

TABLE OF CONTENTS

INTRODUCTION

A basic function of food service management is planning the menu. Equipment, layout, production, service, and employee schedules are planned around the menu. It is in the planning stage that managerial problems can be anticipated and avoided.

With the introduction of electronic data processing to food service management, a new approach to menu planning is developing. Speed and accuracy of computer evaluation of management data and its subsequent value in minimizing food costs have led to research and application of electronic data processing to menu planning. Development of applications are slow because there is a need to organize, identify, standardize, and put assumptions in writing in the food service industry. Advantages of automatic machine calculations are accuracy, saving in professional time, ease of operation, standardization, and availability of detailed information. Despite these advantages there is no single ideal solution to all food service problems. Computers will only increase the availability of information necessary to solve these problems.

Menu planning requires an assimilation of a variety of factors related to a food service operation into a set of criteria for determining what items can feasibly be produced by the food service. The routine of menu planning has concealed many of the factors actually affecting the menu planning process. For example, the manager who is concerned with production problems may overlook the influence of color and texture on total menu acceptability. Computer research has made a scientific approach to manual menu planning possible.

It is essential that prospective food service management personnel become acquainted with the value of computers and data processing in the food industry. This study was designed to develop a teaching unit for college students on institutional menu planning to include: menu planning factors and procedures, criteria for evaluation, and an introduction to the use of electronic data processing as a solution to the menu planning problem.

REVIEW OF LITERATURE

Definition of Terms

A definition of terms is necessary to establish a basis for communication. Terms like meal planning, menu planning, and menu writing often are used interchangeably, but to avoid confusion a distinction is made here. A meal is "the portion of food taken at one time to satisfy appetites" (Webster, 1959, p. 520). Menu planning (from the Latin word meaning "small") is concerned with the interrelationship of details comprising a meal plan. Selecting the items to appear on the menu is the first step in planning a menu according to Kotschevar (1966, p. 13). The final step in meal planning is menu writing. Merchandising and advertising are key considerations in menu writing. Meal planning is a general term of which menu planning and menu writing are parts. For the purposes of this study, attention is focused on menu planning factors and procedures, criteria for menu evaluation, and computer solutions to the problem.

Kotschevar (1966, p. 13) regards the menu as a work order which authorizes the production of certain items. West et al. (1966, p. 31) went a step further in stating that it is basic to food purchasing, personnel and equipment needs, scheduling, supervision, and pre-costing of food to be served. The aims of the menu planner as stated by Treat and Richards (1966, p. 4) are "to give pleasure to his guests, to maintain happy relations with those who prepare and serve his menu, (and) to satisfy the office where the whole process is reduced to the black and white of profit or loss." Fowler et al. (1961, p. 333) noted that the interests of two groups of people affect the menu--the guests and food service management.

Menu Planning Factors

Specific factors affecting the menu planning process are nutritive value, cost, preferences, and equipment and labor limitations. Emphasis placed on each factor varies with the purpose and organizational policies of the food service. Restaurant and commercial food service menus, oriented to sales and profit, are based primarily on consumer demand while menus for health care facilities and school lunch programs are planned to include a specific nutrient content (Wenzel, 1964, pp. 8-37; Fowler et al., 1961, pp. 341-343, 350-351; USDA Publication PA-719, 1966, pp. 2-3). Planned for nutritional adequacy at moderate cost, university residence hall and cafeteria menus incorporate a variety of menu planning principles (Fowler et al., 1961, pp. 345-349).

Outside the home meals are eaten in restaurants, hospitals, school and industrial cafeterias, and camps (Fowler et al., 1961, p. 333). In each type of food service the needs of the consumer and the managerial functions are unique. Menu planning demands careful consideration of the problems of management and the needs of the consumer.

Production Capabilities. Equipment and layout determine the types of foods to be produced. Conversely, as Kotschevar (1966, p. 13) stated, production requirements are established by the written menu. It is the menu that determines "what is to be produced and how much, type of preparation and service, cost, and selling price." Location of equipment and supplies available for production and service and the personnel available in each unit allows for preparation of a variety of menu items. Oven capacity, refrigeration facilities, size and number of steamers, and the capacity of available mixers should be given consideration in menu planning according to Fowler et al. (1961, p. 335). Beckwith (1963) stated that it is important to know what staples are available, which must be ordered, and how long delivery will take. Fowler et al. (1961, p. 336) pointed out the advantage in both quality and cost of using seasonal foods.

In a Diet and Menu Guide prepared for the American Hospital Association (1961, p. 8) the following questions are listed as a guide to evaluating the production requirements of the menu:

1. Has one person or one work area been overloaded with preparation?

2. Is there too much hand preparation of food?

3. Do these menus require more skill than the present employees possess?

4. Will there be adequate time for preparation of all items or should provision be made for working ahead?

5. Is today's menu simple and easy to prepare and tomorrow's very difficult?

6. Are there adequate facilities, dishes, and employees to serve this kind of menu?

7. Do these menus require 'all over' or 'all top of the range' preparation?

8. Could the efficiency of the employees and the equipment be increased by the use of ready-prepared foods, mixes or other convenience products?

Availability of personnel and their skills and abilities limit or extend the variety of items to be included on the menu. Careful distribution of work contributes to employee morale and makes it possible to meet time schedules. A balance should be obtained between items requiring time-consuming preparation and those which can be prepared in a minimum of time. The stress of large crowds or special meals can be reduced by careful planning to include easy-to-prepare dishes. More complicated dishes may be served on low-volume days. Recipes should be selected from standardized files to assure a top quality product (Fowler et al., 1961, p. 337).

Palatability Factors. Kotschevar (1966, p. 14) listed a knowledge of the sales market as one of the first rules to observe in menu planning. "Food habits are influenced by many things: religion, myths, experience, economics, education, health, work and play habits, profits, competition, and no doubt

a dozen other things" stated Stare and Trulson (1966, p. 225). Successful menus observe traditional food patterns while offering a limited number of new foods for variety (Kotschevar, 1966, p. 14).

The questions asked by many food scientists are: What qualitative factors contribute to an acceptable food regimen and how can these be measured quantitatively to provide scientific data for meal planning? Much of what has been accomplished in seeking answers to these questions was summarized by a symposium on "Food and Civilization" at the University of California San Francisco Medical Center in May 1964 (Farber et al., 1966).

Kotschevar (1966, p. 22) noted that color, texture, flavor, form, and temperature were among the properties important to the consumer. However, as Amerine (1966, p. 108) stated, an adequate definition of quality in relation to these properties has not been formulated. For example, is quality to be defined on the basis of the consumer or on the basis of some inherent quality property of the product? Amerine continued by describing the complexity of the problem in the area of flavor. Pleasantness and unpleasantness are a function of concentration with the primary tastes of sweet, sour, salt, and bitter. Beyond a certain point, as the concentration increases pleasantness decreases. It is the influence of one taste on another that has not been clearly defined. The more complex combinations of flavors are considered superior. However, little information is available as to why one food flavor is more acceptable than another. The influence of color and texture on flavor acceptability were noted

in this study also. An appreciation of flavor must be learned just as one learns to appreciate art or music.

Cultural patterns create food prejudices and are seen in the United States in persons from varying geographical regions and of different nationalities. According to Mitchell et al. (1968, p. 144) persons from the South prefer hot breads and vegetables cooked for long periods. Beans and highly seasoned foods are characteristic of the Southwest. In the Far West the oriental influence of a short cooking time and the availability of locally grown citrus fruits can be seen. Baked beans, fish chowder, and turkey are characteristic of New England. Similar regional preferences are reported by Kotschevar (1966) and West et al. (1966). As culture changes food patterns change. Today increased national advertising and travel have reduced the "regionality" of foods and cultural eating habits (Mitchell, 1968, p. 144).

Economy exerts an undeniable influence on food selection. Food is a basic need for maintaining life regardless of the economic development of a nation. According to Engle's law, as quoted by Brandt (1966, p. 21), as income increases a decreasing proportion of that income is spent on food. Although food habits learned during a period of low income are difficult to change, some change has been noted as income increases. Brandt (1966, p. 21) also cited Dr. Merrill K. Bennett's formula that as the average per capita income increases, the proportion of calories derived from starchy foodstuffs decreases. Technological development has greatly reduced per capita caloric requirements

and a shift in demand to low-calorie, high-vitamin foods (fruits and vegetables) is taking place (Brandt, 1966, p. 23).

Preferences rate high on the list of factors leading to greater customer satisfaction. The USDA Publication PA-719 (1966, p. 7) suggested that junior and senior high school students may be given a choice of menus or a choice of foods within each food group on the Type A school lunch. Selective menus, such as these, can be advantageous to the dietitian. For example, if an expensive entree is listed on the menu, the American Hospital Association Menu Guide (1961) suggests that it be paired with a less expensive entree to reduce the total food cost for the meal.

Physical Needs of the Consumer. Nutrition standards developed by the Food and Nutrition Board of the National Research Council provide a scientific basis for adequate dietary patterns for persons in the United States. These Recommended Dietary Allowances, revised in 1968, list minimum requirements for nine nutrients and total caloric intake for persons of all ages and of various heights and weights.

Minimum requirement, according to Pike and Brown (1967, p. 449), "represents basic physiological need and is compatible with the smallest amount of a nutrient that will prevent deficiency symptoms or support a well-defined physiological or biochemical response." A more accurate description is provided by the term "allowances" chosen by the National Research Council, which implies the "addition of an amount above the estimated

requirement to cover both the variation among individuals and the lack of precision inherent in the estimated requirement" stated Pike and Brown (1967, p. 450). Other standards determined by the Food and Agriculture Organization, the Canadian Council on Nutrition, and the British Medical Association vary only slightly from the Recommended Dietary Allowances now receiving international acceptance. A comparison of dietary standards in selected countries was computed by Wilson et al. (1965).

Dietary standards are useful in planning and evaluating population group diets (Pike and Brown, 1967, p. 450). They have been used in the development of food plans like the Basic Four, specifically adapted to American dietary patterns by the Institute of Home Economics (West et al., 1966, p. 32). The four food groups: 1) milk group, 2) meat group, 3) vegetable and fruit group, and 4) bread-cereal-potato-legume group, serve as a gross guide for home and institutional menu planning. The four food groups are described by Turner (1959, pp. 8-9) and a sample menu pattern and meal plan are illustrated. A similar pattern is given in the American Hospital Association's Food Service Manual (1966, pp. 46-49) and in the Diet and Menu Guide (1961, pp. 9-10). The United States Department of Agriculture (Publication PA-719, 1966, pp. 8-9) has published a list of foods grouped according to nutritive value for use in planning school lunch menus. Food groups correspond to the Type A lunch menu pattern.

Cost Factors. One aim of menu planning as given by Treat and Richards (1966, p. 4) is "to satisfy the office where the

whole process is reduced to the black and white of profit or loss." The purpose of cost control, according to West et al. (1966, p. 398) is "to assist in obtaining the highest possible gross profit consistent with the operating policies of the organization." Cost control exerts a constant pressure on management to maintain high standards of production efficiency.

The amount of money available for the food service budget may depend on the plan of payment adopted by the organization. When meals and lodging are sold at one price, this is called the American plan. The American plan is followed by most hospitals, university residence halls, and boarding schools in the United States. The European plan calls for meals and lodging to be sold separately. Hotels and other commercial food and lodging operations follow the European plan. When the American plan of payment is chosen, the food service is often non-profit and follows closely a pre-determined budget, usually a percentage of the total income. Profit organizations follow the European plan and changes in the menu and service may occur at any time that profits permit.

Food and labor costs are the major expense items. The menu planner should know how much money is allotted for these items and what is the actual cost of the menu served (Fowler et al., 1961, p. 335). Both food and labor costs can be controlled to a large degree in the planning process of deciding what items are to appear on the menu. Use of cycle menus and limiting the number of items to appear on a selective menu are two common methods of cost control. Detailed bid specifications, proper

storage, close supervision of food preparation, and portion control are other means of maintaining quality service on a relatively constant budget.

Labor costs, once considered a fixed expense, today are as unstable as food costs (West et al., 1966, p. 414). Menu pattern, physical facilities, employee selection, training and supervision, production and service standards, and fringe benefits determine labor costs. Purchasing partially prepared foods is one method that has been used to reduce in-plant labor costs. Cost comparison studies are necessary to determine the relative value of this policy for various foods.

Menu Planning Procedures

All menu planning should "proceed from the premise that the primary purpose of any food organization is to plan, prepare, and serve attractive, flavorful, and nourishing meals at a cost consistent with the policy of the operation" according to West et al. (1966, p. 43). Freedom from prejudice and food dislikes is an important characteristic of the menu planner. Kotschever (1966, p. 13) suggested that it may be advisable to have more than one staff member plan the menu. Menu planning should be approached as an opportunity for creative expression through the inclusion of new foods and food combinations. It is an opportunity to present food that is "beautiful to look at, nutritionally sound, and delightful to taste" (Fowler et al., 1961, p. 337). Menu planning is critical enough to demand the attention of top management, according to Treat and Richards (1966, p. 3).

The American Hospital Association suggests this responsibility may be delegated to the dietitian, food manager, food service supervisor, or cook (Food Service Manual, 1966, p. 56).

Menu Planning Area. A quiet area where the dietitian can be free from interruptions is recommended by Fowler et al. (1966, p. 337) as a desirable place for menu planning. Menu forms, standardized recipes, cook books, journals, trade magazines, and an idea file of pictures clipped from magazines along with menu suggestion lists should all be a part of the menu planning center. Charts and files containing information about the consumer, market trends and data, and previous menus should be readily available. Ideas may come from competitors' menus and from locally traditional and seasonal foods. Several authors offered lists of menu planning suggestions to give variety to the meal plan (Fowler et al., 1961, pp. 359-366; American Hospital Association's Food Service Manual, 1966, pp. 66-73; Treat and Richards, 1966, pp. 65-124; USDA Publication PA-719, 1966, pp. 8-9).

Types of Menus. Early in the planning process the decision must be made as to the type of menu to be planned. A brief review of the various types of menus will reduce the number of questions that may arise. West et al. (1966, p. 44) described two types of menus. A set menu lists only one item for each course. An example is the Type A menu for elementary school lunches. When a choice of two or more items is listed for each course the menu is termed selective. Hospital and commercial

food services use the selective menu extensively. Raleigh (1963) noted that consumers are better off when made to feel that they are not "captive." Such a goal is more readily accomplished with the selective menu. Selective menus should be planned so that the guest can select a nutritionally adequate diet (Kotschevar, 1966, p. 16). Cycle menus are planned for a specified period, usually three to six weeks, and "rotated according to a definite pattern" (Hubbard et al., 1961). A single combination of menu items should not be repeated within the cycle. Menus may be both selective and served as a menu cycle.

Restaurant menus are of two types. On one type foods are listed and sold separately as an a la carte menu. "A table d'hote menu," stated Kotschevar (1966, p. 14), "has a fixed price for an entire meal or group of foods." Many restaurant menus are a combination of the two types.

Menu Pattern. The menu pattern is a list of food items that comprise the meal plan (West et al., 1966, p. 44). It may be used to insure built-in nutrition as in Type A school lunch menus. For example, the entree is a high-protein dish selected from the meat group of the Basic Four; the salad is chosen from the vegetable group, a meat accompaniment from the bread group, and a dessert from the fruit group.

A menu pattern should be established from one of the previously described types of menus or combination of menu types. It should be suited to the needs of the consumer and workable in relation to equipment and staff. The type of service and the occasion will dictate the menu pattern (Kotschevar, 1966, p. 18).

Pre-planning Analysis. A vast amount of information about the food service is necessary before successful menu planning can begin. Current market prices, market trends, seasonal availability of foods, new products, food and labor budget, labor costs for preparation of a variety of food items, number of persons to be served, and high- and low-volume days are all related to menu planning cost control (West et al., 1966, pp. 40-41). Kotschevar (1966, p. 16) suggested setting guidelines as to what is to be spent for various foods as an aid to staying within the budget. Type of food service (cafeteria, restaurant, drive-in), basic menu content, menu format, and menu pattern are a part of the pre-planning analysis. In addition the menu planner should have a comprehensive knowledge of the consumer (Kotschevar, 1966, p. 14). What is his age, sex, health status, degree of physical activity, ethnic and religious background, and his personal preference for food (West et al., 1966, pp. 32-37)? Physical factors that affect the menu are equipment, supplies, and personnel available for food preparation and service. Location of equipment and supplies may place further restrictions on the menu or may allow for greater freedom in planning (West et al., 1966, pp. 37-40). Kotschevar (1966, p. 18) suggested that "lists of equipment capacities and production times" and a knowledge of workers' skills and abilities may reduce errors in planning.

Selection of Menu Items. Upon completion of the pre-planning analysis the menu pattern can be selected and actual planning can begin. Planning menus is the selection of a pleasing

combination of food items which can be prepared and served by the available personnel within the limitations of time, money, and equipment (West et al., 1966, pp. 31-43).

As the main item around which the other items are planned, entrees for the dinner meals are selected first. Cost may be controlled by first choosing the entrees, the most expensive item on the menu (West et al., 1966, p. 46). Entrees should be selected to avoid repetition of items, types of foods, and methods of preparation. Planning entrees for a given period as one week, four weeks, or an entire cycle aids in achieving variety (Fowler et al., 1961, p. 338). Treat and Richards (1966, pp. 41-43) outlined the selection of entrees for commercial menus as follows: roasts first, then "solid" entrees, chicken dishes, fish or meat substitutes, and ground, stewed or "made" dishes last. Finally, entrees should be checked for preparation scheduling, equipment load, variety of form, texture, and color, and cost balance (Treat and Richards, 1966, pp. 43-45). Luncheon or supper entrees should be selected from a list of less expensive meats, meat alternates, or meat extenders to balance the day's menu cost (American Hospital Association's Food Service Manual, 1966, p. 58). These should be checked by the same criteria as the dinner menus.

Vegetables, soup, and potatoes are selected in that order to complement the main dish for both the noon and the night meal. Consideration of color, texture, flavor, and form are all a part of the decision to select certain combinations of entree, potato and vegetable (American Hospital Association's Food Service

Manual, 1966, p. 58). West et al. (1966, p. 48) suggested that variety can be obtained with the addition of seasonal fruit or vegetable salads. Gelatin or protein salads add variety to the selective menu (Treat and Richards, 1966, p. 51). Heartier salads should be served on the selective luncheon menu in a commercial food service since many customers prefer a salad-sandwich type of luncheon (Treat and Richards, 1966, p. 53).

Dessert is the final touch to a delightfully satisfying meal. A light dessert will complement a rich meal and a tart dessert will make a bland meal more enjoyable (American Hospital Association's Food Service Manual, 1966, p. 58). Desserts may be selected, stated West et al. (1966, p. 48), from the following groups: "fruits, hot or cold puddings, ice creams, sherbets, gelatins, cakes, pies, and cheeses." Of first importance in dessert selection, according to Treat and Richards (1966, p. 55), is a balance of equipment usage and preparation load.

Appetizers of soup or juice are selected last and may become a pleasing addition to the regular menu pattern. Bread and beverage often are standard. However, new items may be added for occasional variety or to enhance a festive spirit for holidays (American Hospital Association's Food Service Manual, 1966, p. 58). These items are considered so much a part of the menu that other authors make little mention of them.

School lunch menu planning follows the same planning procedure with protein-rich foods chosen first, followed by the selection of fruits and vegetables, bread, butter, milk, and other foods (USDA Publication PA-719, 1966, pp. 12-13).

The menu pattern for Type A lunches also specifies food quantities.

In most institutions breakfast is the same from day to day. There is little variation in the juice, cereal, egg, toast, beverage routine. Some variety may be obtained by adding stewed fruit, serving a variety of hot and cold cereals, varying the method of preparation of the egg, and adding a quick bread (American Hospital Association's Food Service Manual, 1966, pp. 58-59; West et al., 1966, p. 49).

Menus should be put aside until the next day when they can be evaluated by one or more staff members (American Hospital Association's Food Service Manual, 1966, p. 59; Kotschevar, 1966, p. 13). The following questions are listed for use in evaluating menus by West et al. (1966, p. 49):

1. Does it meet basic 4 for nutritional adequacy?
2. Are the foods offered in season, available, and within price range?
3. What foods in each menu offer contrasts of color? texture? flavor? consistency? shape or form? type of preparation? temperature?
4. Can these foods be prepared with the personnel and equipment available?
5. Are the work loads balanced for personnel and equipment?
6. Is any one food item or flavor repeated too frequently during this menu period?
7. Are the meals made attractive with suitable garnishes and accompaniments?
8. Do the combinations make a pleasing whole, and will they be acceptable to the clientele?

Questions from the American Hospital Association's Diet and Menu Guide are enumerated in the section entitled "Production Capabilities." Questions published by the American Hospital Association in the Food Service Manual (1966, p. 59) for menu evaluation are the following:

1. Are the menus nutritionally adequate?
2. Do the day's menus have contrasts in flavor, color, temperature, texture, form and method of preparation?
3. Is there repetition of any particular food, such as tomatoes in the soup and in the sauce for spaghetti?
4. Are there adequate facilities, dishes, and employees to serve these menus?
5. Does a particular menu require "all oven" or "all top-of-the-range" preparation? If so, what items can be prepared ahead of the serving time?
6. Has one person or one work area been overloaded with preparation? How can this preparation be distributed more evenly?
7. Is there too much prepreparation of food? What prepared foods, ready-mixes, or other time-saving products could be used?

Menu Planning by Computer

Menu planning as defined by a mathematician is the "problem of finding the optimum combination of menu items in a given structure such that a predetermined set of objectives are met for a sequence of days" (Balintfy, 1965). With the advent of computers and electronic data processing, automatic menu planning is being developed to increase efficiency in food service operations by allowing more accurate advance menu requirement forecasting.

Several applications of the computer to menu planning have been reported.

At Tulane University research was at first concerned largely with planning non-selective menus. A study by Balintfy and Blackburn (1964) was planned "to obtain maximum nutrition for least cost, consistent with patient acceptance." Once the objective was defined the computer selected the maximum or minimum number of menus allowable under the terms of the objective. Two types of input data were used for this experiment: 1) recipes, prices, and nutrients from the institution's files, and 2) production feasibility and popularity data which had to be collected. Menus selected with this program showed a 30 per cent savings in cost when compared with a regular cycle for the same period. "While the man-made hospital menu showed deficiency in some nutrients (calories and B-vitamins) in 6 out of 14 cases, the machine-made menu always met nutritive requirements," according to Balintfy and Blackburn (1964).

In another study reported by Balintfy and Nebel (1965), 16 dietitians were asked to plan economical, non-selective menus for seven consecutive days unassisted except for form (Method I). Then they were asked to plan menus using the computer (Method II). A random menu using only the IBM 1410 and taking into consideration economy and nutritive value was planned for comparison (Method III). To evaluate a computer assisted menu planning technique was the goal of Balintfy and Nebel's research. Results showed essentially no difference in the mean cost for Method I and Method III. The mean cost for Method II was

significantly lower (18.7 per cent). It was concluded that computer-assisted menu planning could produce menus at low cost that were acceptable to patients.

Mathematical programming of the digital computer to plan selective menus was the aim of research at the University of Florida reported by Gue (1965). Parameters were the same as those used in the Tulane study except that the menus were to be selective. All parameters in the selective menu planning problems were random variables. Theoretically it is possible "to enumerate all possible combinations of patient selections from a given daily selective menu and subsequently check the nutrient content and cost of each selection," according to Gue (1965). This is feasible, however, from a practical standpoint. The selection with the lowest possible combination of nutrients was calculated. Almost all of the possible combinations provided nutrients above the minimum daily requirements. Interviews with patients served computer-planned menus for a two-week period showed no adverse reactions. Projected savings of computer-planned menus were approximately six to eight cents per patient day. Reduced savings, as compared to the Tulane study, may have been the result of an inability to predict patient choices.

In a study by Brown (1966) at Kansas State University, random techniques were used to plan menus by computer for residence halls. Selected menu items from previous menus, raw food costs, frequency ratings, and menu classification ratings comprised the input. Menu item codes related to texture, flavor, color, shape, and method of preparation with restrictions on the

number of times each characteristic could appear in one day were developed. Selections of entree, starch, vegetable, salad, and dessert were made for lunch and dinner meals for 21 days. Dietitians compared seven of these menus with two residence hall menus having the same entree resulting in preference for computer-planned menus in five out of fourteen cases. It was concluded that use of palatability codes, cost factors, frequency and random selection techniques were feasible for computer menu planning.

Another project designed to simulate the dietitian's judgment processes in selecting dinner menu items was conducted by Eckstein (1966) at the University of Washington. The palatability factors on which selections were based were color, texture, shape, flavor, calories (as a measure of satiety), and variety. Linear programming was used to optimize one factor and minimize another. Acceptable menus were produced according to the criteria used for their selection, but it may continue to be necessary for the dietitian to make adjustments in the menu because of economic factors involved in programming.

Four years of research have demonstrated that computers can be used to plan menus for large and small hospitals. Balintfy (1968) continued by stating that "the major problem is to convince dietitians and food service directors that they should use this scientific approach--and upgrade their own vocations in the process." Daily food costs per patient were reduced by 12.63 per cent, 16.44 per cent, and 19 per cent in three institutions. Telephone lines link terminals at Sara Mayo Hospital, West

Jefferson General Hospital, and St. Mary's Dominican College with the Tulane computer. Terminals within the institution make it possible for dietitians to make immediate modifications in the menu and in the data stored in the computer's files for each menu item. A major hindrance to the use of computers for menu planning has been the collection of data basic to program utilization in each institution. Programs now are available to handle a major part of the coding.

A modification of the latest Tulane system is in operation at Research Hospital and Medical Center in Kansas City. Bowman and Lawrence (1968) reported a raw food savings of 24.8 per cent. Professional man-hours required for preparation of a three-week cycle of menus were reduced by 95 per cent. An 8 per cent production labor cost savings was obtained through recipe standardization and portion control. Menus are prepared by the dietitian on an IBM 1050 terminal connected by telephone to an IBM 360-30 computer where food items, nutritional composition of foods, and recipes are on file. From instructions given by the dietitian at the terminal, a menu is printed with alternate selections. The authors predict that this system could be installed in a hospital in six months.

PROCEDURE

Menu Planning Criteria

Factors considered in planning and evaluating menus as given in the literature were listed and grouped according to Table 1.

Table 1. Comparison of Menu Planning Criteria.

	Fowler et al.	Harris & Wood	West et al.	Smith	Payne	Beckwith	Kotschevar
Psychological Acceptability							
Variety		x	x		x		
Appearance	x	x	x				
Flavor	x	x	x		x		
Shape	x	x	x				x
Color	x	x	x		x		x
Temperature							x
Texture	x	x	x				x
Preferences		x	x	x	x		x
Ethnic groups		x		x			
Holidays		x		x			
Production Capabilities							
Method of preparation	x	x	x	x			
Type of service	x	x		x			x
Service facilities			x	x			
Equipment	x	x	x	x	x	x	x
Time available		x		x		x	x
Personnel capabilities	x	x	x	x	x	x	x
Physical Needs of Consumer							
Nutritive value of food		x	x	x	x	x	x
Age	x	x		x			
Activity	x	x		x			
Budgetary Limitations							
Number of persons	x						x
Budget	x	x	x	x			x
Markets				x			
Season	x	x	x	x			

Production and service factors included: variety in methods of preparation, type of service, service facilities, equipment, work load distribution, time available for preparation, and personnel limitations. Elements relating to palatability were: appearance

of food on the plate, flavor or taste, and variety of shape, color, temperature, and texture. Patron preferences, ethnic groups, holidays, frequency of service, season, and frequency rating of the dietitian were listed under frequency and preferences. Factors affecting nutritional needs included nutritive requirements of individuals based on age, sex, and activity. Under budgetary limitations were food budget, labor budget, number of persons served, local markets, and the season at which food is available.

Menu Planning Survey

To evaluate their relative importance to menu planning, the criteria were compiled into a survey form (Appendix A). Six faculty members were asked to rate each factor on a five-point scale based on its relative importance to the final menu. Factors were rated as (1) unnecessary, (2) may be considered but relatively unimportant, (3) undecided, (4) important but could be given less consideration, or (5) essential to effective menu planning. A more detailed analysis was obtained by asking for the first five factors that should be checked in evaluating menus. For comparison, from a list of ten factors the five most important criteria in computer menu planning was requested. Since nutritive value is not calculated exactly in residence halls, an opinion of its importance in computer menu planning was sought. Additional space was allotted for questions pertaining to terminology and for additions to the list of factors.

The panel, selected on the basis of training and experience in food service operations and experience in teaching dietetic students specifically in the area of menu planning, also was asked to serve as resource persons for menu planning procedures. Questionnaires asking for an evaluation of the menu planning factors with a cover letter requesting their return within ten days were mailed to panelists.

In an interview the six were asked what procedures they follow in planning menus beginning with the first step and continuing until the menu is ready for printing. Period of time for which menus were planned and procedures followed were of primary concern in the interview. Panelists were asked if they thought a criteria checklist would be helpful in planning or checking menus.

Criteria for Menu Evaluation

Criteria for evaluating menus planned for use in university residence halls and for hospitals were developed from the menu planning criteria recorded in the literature (Appendix B). These were written in the form of questions to which the correct answer is "Yes." The pattern followed was developed by the United States Department of Agriculture for evaluating Type A school lunch menus with the most important factors being evaluated first (Appendix B).

Menu Planning Unit Outline

Review of literature and survey of menu planning criteria revealed a need for increased emphasis on menu planning at the

university level from the standpoint of practical application of principles. This led to the development of a teaching unit on institutional menu planning for college junior and senior students in institutional management. The concept-generalization method of teaching was selected because it allows flexibility of presentation and learning may be applied readily to a variety of situations.

From the concept of institutional menu planning, material relating to this subject seemed to fall into two broad areas, one relating to factors considered in menu planning and the other relating to how these factors are considered. The generalizations were: (1) acceptability, nutritional requirements, production and cost affect menu planning for food services; (2) consideration of menu planning factors proceeds in accordance with the philosophy of the organization.

Supporting generalizations provided the unit outline. Learning experiences were selected to lead the students to an understanding of the generalized statement. Evaluation was made through written projects and oral reports. Discussion and review of generalizations provided reinforcement of the learning experiences.

DISCUSSION

Menu Planning Survey

A summary sheet was compiled from the menu planning survey forms returned from the panelists (Appendix C). Of the

production and service factors listed in Table 2, five of the six panelists rated "variety in methods of preparation" and "available equipment" as essential. Three panelists considered "distribution of work load" essential and two rated it as important to menu planning. "Type of service" and "service facilities" were considered important but not essential to menu planning. Factors relating to personnel were rated as important to essential by half of the panelists. Three were undecided or considered personnel factors as unimportant.

Table 2. Summary of production and service factors survey.

	Panelists' scores*				
	1	2	3	4	5
Variety in methods of preparation			1		5
Type of service	1	1		3	1
Service facilities		3		2	1
Equipment			1		5
Distribution of work load			1	2	3
Time available	1		2	1	2
Personnel limitations	2		1	2	1

*1. Unnecessary.
2. May be considered but relatively unimportant.
3. Undecided.
4. Important but could be given less consideration.
5. Essential.

Palatability Factors. Appearance of food on the plate was rated as essential to menu planning by five panelists (Table 3) although this is primarily determined by standardized recipes and food production control. To obtain an acceptable appearance rating food combinations must be pleasing as noted by half of the panelists who rated the other palatability factors "essential."

Table 3. Summary of palatability factors survey.

	Panelists' scores*				
	1	2	3	4	5
Appearance of food				1	5
Flavor		1	1	1	3
Variety of shape			1	2	3
Variety of color		1	1	1	3
Variety of temperature			2	1	3
Variety of texture			1	2	3

*1. Unnecessary.
2. May be considered but relatively unimportant.
3. Undecided.
4. Important but could be given less consideration.
5. Essential.

Frequency with which items appear on the menu was considered by four panelists as essential (Table 4). Factors such as patron preferences, ethnic groups, season, and holidays, relating to frequency were important to essential to menu planning for a majority of the panel. Frequency ratings of dietitians were less important.

Table 4. Summary of frequency and preferences.

	Panelists' scores*				
	1	2	3	4	5
Patron preferences		1		2	3
Ethnic groups		2		1	3
Holidays			1	2	3
Frequency of service			1	1	4
Season			1	3	2
Frequency rating of dietitian		2	2	1	1

*1. Unnecessary.
2. May be considered but relatively unimportant.
3. Undecided.
4. Important but could be given less consideration.
5. Essential.

For university residence hall menus, a majority of the panel was undecided as to the importance of nutritive requirements. Interviews revealed that several of the persons questioned believed that menus planned for residence halls would be nutritionally adequate without special consideration to this factor. This variation in the importance of nutritional requirements was the result of varied experience backgrounds. It points out the fact that nutritional needs can be determined only in relation to the nature of the food service. Commercial food services, for example, may offer specialty items with little concern for total nutritive value while hospitals and schools spend a great deal of time in optimizing nutrition. Nutrition, although not of lesser importance, may be a subconscious factor in menu planning for residence halls. For computer menu planning, calculation of specific nutritive value for residence hall menus was not important to four of the six panel members. The selective nature of most residence hall menus and concern for population group diets rather than those for individuals seemed to indicate that a menu guide or meal pattern would result in nutritionally adequate menus.

Of the panelists surveyed, not one considered food and labor budget less than essential, a fact which emphasizes the universality of concern for cost in all food service operations. Factors relating to food cost and quantitative requirements (number of persons served, local markets, and season availability of foods) were considered important by half or more of the persons surveyed.

In menu evaluation, pleasing food combinations with special consideration to color, flavor, and texture were listed as most important. These factors are difficult to control in the original planning although they should be considered. The captive clientele of university residence halls, perhaps more than in any other institution, demand foods that are pleasing. Food acceptance affects the nutrition of students, cost control, and to a limited extent, production. For these reasons, acceptability factors should be considered first in evaluating residence hall menus.

Frequency also relates to menu acceptability. Some food items may be acceptable to students when served infrequently but would be unacceptable when served weekly. Other items would be desirable on a more frequent basis.

Equipment usage and distribution of work load were listed as factors in menu evaluation by five of the panelists. Food cost was another factor in evaluation of menus according to three panelists. Four persons listed food budget important in computer menu planning. It is assumed that cost control is a part of the original planning; however, of the faculty members interviewed only two mentioned cost as a factor in menu planning. One person commented that distribution of work load and time available for preparation were similar and hinge on labor budget for computer menu planning.

Menu Evaluation Guide

As a detailed study was made of menu planning factors and procedures it became increasingly evident that for menus to be successful a systematic evaluation was necessary before the menus were used. Although specific factors were considered in planning according to a prescribed procedure, the process was not complete until it had been evaluated and corrections made. The checklist for evaluating school lunch menus developed by the United States Department of Agriculture was used as a guide for setting up evaluation sheets for hospital menus and for college residence hall menus. These guides were set up for general application and therefore may not represent the most important menu planning factors for a specific organization. It will be noted that the arrangement of questions varies among the evaluation guides. The purpose was to consider the most important factors for each type of menu first. This will vary with the philosophy of the organization concerning food quality and the relation between profit and food and labor costs. Once the use of this type of evaluation guide has been adopted it will be necessary for the dietitian to be alert to ways it can be more more applicable to the operation with which she is concerned. It is recognized that these guides do not have universal applicability but are of some value in achieving better menus.

MENU PLANNING UNIT

The unit outline was designed for college junior and senior students in institutional management with a previous course in basic nutrition principles. Other prerequisite courses are a general psychology course and a basic sociology course. An introduction to quantity food service equipment and production problems should be included either as a prerequisite course or as an earlier unit in the course of which the menu planning unit is a part. This is essential for an understanding of the inter-relationships of the factors involved in the total menu planning concept for food service operations.

Learning experiences were designed to give the instructor flexibility in planning for 6 to 15 class sessions. In the outline learning experiences designated by the letter "a" are basic and should be included in the unit. Those labeled "b" are optional and may be included as time and facilities permit. As an introduction to the unit, the relationship between types of food services, meal service, and menus should be discussed. Limitations of the unit in terms of non-commercial food services should be defined. For students of restaurant management a section on menu writing and merchandising should be added.

Menu Planning Unit Outline

Concept: Menu Planning for Quantity Food Services

Objective: To gain an understanding and application of menu planning principles for quantity food services.

Broad Generalizations:

Acceptability, nutritional requirements, production, and cost effect menu planning for food services.

Consideration of menu planning factors proceeds in accordance with the philosophy of the organization.

Supporting Generalizations	Learning Experiences
Nutrition principles for planning menus for large groups are the same as those followed in family menu planning.	a. Review menu planning principles. In class discussion note factors affecting nutritional requirements. Note ways nutritional requirements are met in menu planning. b. Evaluate a menu for one day for nutritional adequacy.
Menu acceptability is influenced by certain sociological and psychological factors.	a. Read selected articles on food habits and their sources, immediate influences on food acceptability, and age differences in food acceptability. Discuss content of articles in class. b. Select a region or ethnic group to study food habits. Write a report to include: meal pattern, menu for one day, types of foods characteristic of region, and an explanation of the reasons for these preferences, such as climate, industrialization, etc. Present a 15-minute oral report to class.
A knowledge of layout, equipment, quantity food preparation methods and problems is needed to plan menus that can be produced in a quantity food service.	a. Read or review selected articles on equipment, layout, quantity food preparation methods, and production problems. Discuss in class the relationship of these factors to menu planning.

Supporting Generalizations	Learning Experiences
	b. Visit two types of food services. List menu being prepared, equipment in use, other equipment, storage facilities, and layout. Discuss other uses for equipment observed and specific menu planning limitations.
One means of cost control in food services is the menu.	a. Read selected articles on budget and cost control. Discuss ways to use the menu as a cost control mechanism. b. Collect data and determine the cost of one day's menu for 500 persons.
How menus are planned relates to the type of food service.	a. Referring to the literature, review procedures for planning menus for different types of food services. Select and describe a food service, including only the factors pertinent to menu planning. Plan menus for one week for this food service.
Electronic data processing provide increased accuracy and reduced time spent by dietitians in planning.	a. Abstract four articles on computer menu planning. Discuss specific application of electronic data processing to menu planning and point out the advantages and disadvantages of its use. b. Visit an electronic data processing center where an engineering professor introduces the concept of electronic data processing--what it is, types of machines, and how they can be used to aid food service management. Visit a food service to observe computer menu planning.

Supporting Organizations	Learning Experiences
Menus are evaluated according to criteria developed for acceptability, nutritional adequacy, cost, and production standards.	a. Review menu planning factors and procedures. Discuss procedures for evaluating menus. Locate in the literature, or develop with the instructor's assistance, criteria for evaluating menus for the type of food service for which menus for one week were planned. Using this criteria evaluate the previously planned set of menus and make suggestions for improvement.

Reading Lists

Nutrition

A Guide to Nutrition and Food Service for Nursing Homes and Homes for the Aged. 1965. Public Health Service Publication No. 1309. United States Department of Health, Education, and Welfare. Washington, D. C.

Cronan, M. L. 1962. The School Lunch. Chas. A. Bennett Co., Inc. Peoria, Ill.

Food and Nutrition Board, National Research Council. 1968. Recommended Daily Dietary Allowances. National Academy of Sciences. Washington, D. C.

Fowler, S. F., B. B. West, and G. S. Shugart. 1961. Food for Fifty. 4th ed. John Wiley and Sons. New York.

Grover, M. E., and A. M. Burgoin. 1962. Factors in school lunch menu planning. School Lunch Journal. 16, 17.

Stokes, J. W. 1960. Food Service in Industry and Institutions. Wm. C. Brown Company. Dubuque, Iowa.

Watt, B. K., and A. L. Merrill. 1950. Composition of Foods - Raw, Processed, Prepared. U. S. D. A. Handbook No. 8. Washington, D. C.

West, B. B., L. Wood, and V. F. Harger. 1966. Food Service in Institutions. John Wiley and Sons. New York.

Wilson, E. D., K. H. Fisher, and M. E. Fuqua. 1965. Principles of Nutrition. John Wiley and Sons. New York.

Sociological and Psychological Factors

Anonymous. 1964. Children's menus - they can help you produce man-sized profits from family business. Hospitality. December. P. 35.

Anonymous. 1964. You can boost check averages with better printed menus. Hospitality. May. P. 126.

Beyer, C. E., M. E. Ericson, and J. J. Wanderstock. 1961. How to plan menus that please patients. The Modern Hospital. 97, 108.

Eindhoven, J., and O. R. Peryan. 1959. Measure of preferences for food combinations. Food Technology. 13, 379.

Fowler, S. F., B. B. West, and G. S. Shugart. 1961. Food for Fifty. 4th ed. John Wiley and Sons. New York.

Hartman, J., and M. Zickefoose. 1962. How to get variety on your menu. Professional Nursing Home. 4, 34.

Kamen, J. M. 1962. Reasons for non-consumption of food in the Army. Journal of the American Dietetic Association. 41(5), 437.

Kamen, J. M., and O. R. Peryam. 1961. Acceptability of repetitive diets. Food Technology. 15, 173.

McCune, E. 1960. Food preference survey: guide to better menus. Hospitals. 34, 70.

West, B. B., L. Wood, and V. F. Harger. 1966. Food Service in Institutions. John Wiley and Sons. New York.

Wilson, E. D., K. H. Fisher, and M. E. Fuqua. 1965. Principles of Nutrition. John Wiley and Sons. New York.

Production Factors

A Guide to Nutrition and Food Service for Nursing Homes and Homes for the Aged. 1965. Public Health Service Publication No. 1309. United States Department of Health, Education, and Welfare. Washington, D. C.

Anonymous. 1962. Portion planning manual no. 2: Menu planning. Volume Feeding Management. 18, 23.

Dukas, P., and D. E. Lundberg. 1960. How to Operate a Restaurant. Ahrens Publishing Company, Inc. New York.

Production Factors (Cont.)

Fowler, S. F., B. B. West, and G. S. Shugart. 1961. Food for Fifty. 4th ed. John Wiley and Sons. New York.

Kotschevar, L. H., and M. E. Terrell. 1961. Food Service Layout and Equipment Planning. John Wiley and Sons. New York.

Stokes, J. W. 1960. Food Service in Industry and Institutions. Wm. C. Brown Company. Dubuque, Iowa.

Stokes, J. W. 1967. How to Manage a Restaurant or Institutional Food Service. Wm. C. Brown Company. Dubuque, Iowa.

Watt, B. K., and R. K. Picot. 1956. Food yields summarized by different states of preparation. U. S. D. A. Handbook No. 102.

West, B. B., L. Wood, and V. F. Harger. 1966. Food Service in Institutions. John Wiley and Sons. New York.

Cost Factors

Anonymous. 1960. Charting your food purchases. Volume Feeding Management. 14, 18.

Anonymous. 1962. Cost balancing the menu. Restaurant Management. 90, 38.

Blackburne, C. E. 1964. Correct menu pricing for profit. Food and Lodging Hospitality. 3, 111.

Dukas, P., and D. E. Lundberg. 1960. How to Operate a Restaurant. Ahrens Publishing Company, Inc. New York.

Fowler, S. F., B. B. West, and G. S. Shugart. 1961. Food for Fifty. 4th ed. John Wiley and Sons. New York.

Rogers, B. A. 1960. Reduce food costs. Hospital Management. 90, 76.

Stewart, D. W. 1960. Score your menu for pinpoint profit control. Food Service Magazine. 22, 35.

Welch, J. M. 1963. Anatomy of profit. Food Service Magazine. 25, 55.

West, B. B., L. Wood, and V. F. Harger. 1966. Food Service in Institutions. John Wiley and Sons. New York.

Procedures

Fowler, S. F., B. B. West, and G. S. Shugart. 1961. Food for Fifty. 4th ed. John Wiley and Sons. New York.

Harris, K. W., and M. A. Wood. 1942. Meals for Many. New York State College of Agriculture. Bulletin No. 477. Ithaca.

Kotschevar, L. H. 1962. Quantity Food Production. Restaurant Management. 90, 56.

Payne, E. C. 1963. Cycle menus for school lunch. School Lunch Journal. 17, 49.

Smith, E. E. 1955. A Handbook on Quantity Food Management. Burgess Publishing Company. Minneapolis.

West, B. B., L. Wood, and V. F. Harger. 1966. Food Service in Institutions. John Wiley and Sons. New York.

Electronic Data Processing

Amacker, J. R. 1966. Computer provides cost control recipe. College and University Business. 41, 82.

Anonymous. 1963. EDP - when and how to install it. Institutions. 53, 61.

Anonymous. 1964. Computer evaluation. Institutions. 55, 57.

Anonymous. 1964. Data processing . . . do you need it? Volume Feeding Management. 22, 27.

Anonymous. 1965. Developing a comprehensive computer system. The Modern Hospital. 104, 118.

Anonymous. 1966. Medical dietetic students plan menus with computer assistance. Hospitals. 40, 96.

Anonymous. 1967. How hospitals share computers. Hospital and Nursing Home Food Management. 3, 30.

Balintfy, J. L., and C. R. Blackburn. 1964. Computer applications for scientific menu planning. Institutions. July.

Balintfy, J. L., and C. R. Blackburn. 1964. A significant advance in hospital menu planning by computer. Institutions. 55(1), 54.

Balintfy, J. L., and E. W. Vetter. 1964. Computer writes menus. Hospital Topics. 42, 49.

Electronic Data Processing (Cont.)

Brisbane, H. M. 1964. Computing menu nutrients by data processing. Journal of the American Dietetic Association. 44, 6.

Carncross, R. E. 1966. EDP works full time at many levels. Volume Feeding Management. 26, 51.

Caspergue, J. P. et al. 1965. Proceedings of the First Conference on Computer Applications in Nutrition and Food Service Management. Ohio State University.

Caster, W. O. 1962. Use of a digital computer in the study of eating habit patterns. American Journal of Clinical Nutrition. 10, 98.

Eckstein, E. 1969. The computer and the school lunch program. School Lunch Journal. December. 23, 28.

Fellers, J. D. 1965. This system was designed for computers. The Modern Hospital. 105, 168.

Hartman, J. 1964. Computers can cut menu planning costs. The Modern Hospital. 102, 134.

Hills, L. L. 1965. Nutrient intake calculations by computer. Journal of the Dietetic Association of Victoria. 16, 4.

Pellett, P. L. 1965. Computers and nutritional calculations. Nutrition. 19, 115.

Taylor, C. G. 1965. Utilization of data processing in food service. Hospitals. 39, 81.

ACKNOWLEDGMENTS

The writer wishes to express her sincere appreciation to Mrs. Grace Shugart, Major Adviser and Head, Department of Institutional Management, for her patience and valuable guidance in preparation of the manuscript; to Mrs. Raymona Middleton, Assistant Professor of Institutional Management, and to Mr. Jacob Smaltz, Professor of Engineering, for their suggestions as committee members; to Mrs. Merna Zeigler, Associate Professor of Institutional Management, for serving on the committee; to Mrs. Faith Roach, Instructor of Institutional Management, for her suggestions and encouragement; and to the panel members for their cooperation.

A special note of thanks to friends and family for their prayers and encouragement.

LITERATURE CITED

A Menu Planning Guide for Type A School Lunches. 1966. Consumer Marketing Service. United States Department of Agriculture. Publication PA-719.

Amerine, M. A. 1966. Flavor as a Value. In Food and Civilization: A Symposium. Charles C. Thomas. Springfield, Ill. P. 108.

Balintfy, J. L., and C. R. Blackburn. 1964. From New Orleans - Hospital menu planning by computer. Institutions. 55, 54.

Balintfy, J. L. 1965. The Mathematical Foundations of Menu Planning. Unpublished manuscript.

Balintfy, J. L., and E. C. Nebel III. 1965. Experiments with computer assisted menu planning. Research Paper No. 10. Unpublished. Tulane University. New Orleans.

Balintfy, J. L. 1968. Key to Better Menu Planning: Automation. Food Management. July. Pp. 26-29.

Beckwith, A. 1963. Put the menu to work for better food service. The Modern Hospital. 100, 120.

Brandt, K. 1966. Food in the Marketplace. In Food and Civilization: A Symposium. Charles C. Thomas. Springfield, Ill. P. 21.

Bowman, J., and D. Lawrence. 1968. Computerized Menu Planning. Modern Hospital. November.

Brown, R. M. 1966. Automated Manu Planning. Master's thesis. Kansas State University. Manhattan. Unpublished.

Diet and Menu Guide. 1961. American Hospital Association. Chicago.

Ekstein, E. F. 1966. Programmed Menu Planning. Master's thesis. University of Washington. Unpublished.

Farber, S. M., N. L. Wilson, and R. H. L. Wilson, eds. 1966. Food and Civilization: A Symposium. Charles C. Thomas. Springfield, Ill.

Food Service Manual for Health Care Institutions. 1966. American Hospital Association. Chicago.

Fowler, S. F., B. B. West, and G. S. Shugart. 1961. Food for Fifty. 4th edition. John Wiley and Sons. New York.

Gue, R. L. 1965. Selective menu planning by computer. Proceedings of the Society for the Advancement of Food Service Research. Cornell University. Ithaca, N. Y.

Harris, K. W., and M. A. Wood. 1942. Meals for Many. New York State College of Agriculture. Bulletin No. 477. Ithaca.

Hubbard, R. M. I., J. L. Sharp, and L. M. Grant. 1961. Pros and Cons of Cycle Menus. Journal of the American Dietetic Association. 39, 339.

Kotschevar, L. H. 1962. Quantity Food Production. Restaurant Management. 90, 56.

Kotschevar, L. H. 1966. Standards, Principles, and Techniques in Quantity Food Production. McCutchan Publishing Corporation. Berkeley, Calif.

Mitchell, H. S., H. J. Rynbergen, L. Anderson, and M. V. Dibble. 1968. Cooper's Nutrition in Health and Disease. J. B. Lippincott Co. Philadelphia.

Payne, E. C. 1963. Cycle menus for school lunch. School Lunch Journal. 17, 49.

Pike, R. L., and M. L. Brown, 1967. Nutrition: An Integrated Approach. John Wiley and Sons. New York.

Raleigh, W. A., Jr. 1963. The magic of masterful menu planning. Implant Food Management. 10, 30.

Recommended Daily Dietary Allowances. 1964. 7th edition. National Academy of Sciences, National Research Council. Washington, D. C.

Smith, E. E. 1955. A Handbook on Quantity Food Management. Burgess Publishing Company. Minneapolis. Pp. 5-6.

Stare, F. J., and M. F. Trulson. 1966. The Implantation of Preference. In Food and Civilization: A Symposium. Charles C. Thomas. Springfield, Ill. P. 224.

Treat, N., and L. Richards. 1966. Quantity Cookery. 4th edition. Little, Brown and Company. Boston. Pp. 3-124.

Turner, D. 1959. Handbook of Diet Therapy. The University of Chicago Press. Chicago, Ill. Pp. 8-9.

Webster's New Collegiate Dictionary. 1959. G. C. Merriam Company. Springfield, Mass. P. 520.

Wenzel, G. L., Sr. 1964. Wenzel's 1964 Menu Maker. The Steck Company. U. S. A.

West, B. B., L. Wood, and V. F. Harger. 1966. Food Service in Institutions. 4th edition. John Wiley and Sons. New York.

Wilson, E. D., K. H. Fisher, and M. E. Fuqua. 1965. Principles of Nutrition. John Wiley and Sons. New York.

APPENDIX A

February 1, 1967

C
O
P
Y

Mrs. Grace M. Shugart
Department of
Institutional Management
College of Home Economics
UNIVERSITY

Dear Mrs. Shugart:

As part of my research for a Master's thesis, I am attempting to develop criteria for computer menu planning. The objective of the project is to provide a basis for evaluating these menus.

Enclosed is a list of the criteria given by various authors for planning menus manually. Would you please rate these factors from 1 to 5, according to the degree to which they affect the final menu? On the last two sheets are a series of questions that have arisen in compiling this list. Please answer these questions as carefully as possible.

Would it be possible for you to return this information to the Department of Institutional Management by February 10? Your assistance in evaluating the criteria and your suggestions for improvement will be appreciated.

Sincerely,

Alice S. Lucus

SURVEY FORM FOR MENU PLANNING CRITERIA

On the following list, please indicate the degree of importance that you would place on the factors given as a part of menu planning. The numbers at the top of the columns correspond to the following scale: 1. Unnecessary; 2. May be considered but relatively unimportant; 3. Undecided; 4. Important but could be given less consideration; and 5. essential. For example, if you consider "distribution of work load" essential, it would be given a rating of 5.

CRITERIA FOR UNIVERSITY RESIDENCE HALL MENU PLANNING

	1	2	3	4	5
PRODUCTION AND SERVICE FACTORS					
Variety in METHODS OF PREPARATION: baked, steamed, fried, etc.					
TYPE OF SERVICE: seated, cafeteria, family style.					
SERVICE FACILITIES: size and arrangement of steam table and cold service tables.					
EQUIPMENT: size and kinds available for food preparation					
Distribution of WORK LOAD: balance of early and late preparation, and area loads.					
TIME AVAILABLE for preparation: employees available x hours worked/employee.					
PERSONNEL LIMITATIONS: the number of trained and experienced employees.					

	1	2	3	4	5
PALATABILITY FACTORS					
APPEARANCE of the food on the plate.					
FLAVOR or taste of the food.					
VARIETY of: SHAPE					
COLOR					
TEMPERATURE					
TEXTURE					
FREQUENCY AND PREFERENCES					
Patron PREFERENCES					
ETHNIC GROUPS					
HOLIDAYS, such as Christmas, Labor Day, etc.					
FREQUENCY OF SERVICE					
SEASON in which food is preferred, i.e., chili in cold weather.					
FREQUENCY rating of dietitians.					

	1	2	3	4	5
NUTRITIONAL NEEDS					
NUTRITIVE REQUIREMENTS of individual, based on:					
AGE of patron.					
SEX of patron.					
Amount of ACTIVITY of patron.					
BUDGETARY LIMITATIONS					
FOOD BUDGET					
LABOR BUDGET					
NUMBER of persons SERVED					
Local MARKETS					
SEASON at which food is available.					

What additional factors should be included in this list?

What changes or modifications in the explanations would you suggest?

We are interested in knowing what procedure you would use in evaluating menus. List the first five factors that you would check if you were evaluating two weeks' menus for residence halls.

Is figuring the exact nutritive value of the menu important in computer planning for residence halls? _____ Why, or why not?

In computer menu planning it is sometimes necessary to limit the number of restrictions. From the following list check the five (5) factors that you would consider most important in computer menu planning.

_____ Time Available for Preparation

_____ Flavor

_____ Nutritive Requirements of Individual

_____ Frequency Rating of Dietitian

_____ Labor Budget

_____ Distribution of Work Load

_____ Variety of Color

_____ Patron Preferences

_____ Food Budget

_____ Variety of Texture

APPENDIX B

CRITERIA FOR MENU EVALUATION

Residence Halls

Are these foods and food combinations acceptable to students on this campus?

Based on student preference ratings, is there at least one item on the menu for each meal which is liked by more than 75% of the students?

Is there no more than one item on the menu for each meal which is liked by less than 25% of the students?

Is there a pleasing combination of shapes, colors, textures, flavors, and temperatures in each meal?

Do the foods vary in consistency? No more than one creamed item and/or item served with gravy at each meal?

Is consideration given to local racial, religious, and cultural food habits?

Are seasonal food preferences included in the menu pattern?

Is special attention given to menus for holidays and festivals?

Are the menus free from repetition of foods and flavors within each meal?

Are the menus planned within the limitations of the food budget?

What are the budget restrictions?

How much menu flexibility is allowed by the budget?

Does the menu call for use of foods on hand?

Are high- and low-cost foods and menus balanced?

Are foods being used in season?

Can these menus be produced in this food service . . .

. . . by the employees we have?

Can employees successfully prepare and serve these menus in the time available?

Is the work load balanced among employees from day to day?

Has provision been made for preparing foods ahead for days when the work load is heavy?

Are there no more than two items requiring last minute preparation?

Are the present employees experienced enough to prepare the items listed on the menu?

. . . with the equipment available?

Can the menus be produced with the kinds and sizes of equipment available?

Are the methods of preparation varied?

Is equipment work load balanced?

Are area work loads balanced?

. . . and served under the present conditions?

Are the menus suited to the type of service?

Are there enough dishes to serve this menu?

Do the foods fit the dishes available?

Do these menus meet basic nutritional requirements?

Are these menus planned around the Basic 4 menu pattern?

Do they meet the minimum requirements of the Recommended Daily Dietary Allowances?

Is consideration given to age and activity needs?

CRITERIA FOR MENU EVALUATION

Hospitals

Are the menus planned to meet the basic nutritional requirements of the Recommended Daily Dietary Allowances?

Do the house menus offer a minimum of 65 grams of protein per day?

Does the menu include:
2 servings of meat, fish, or poultry?
1 egg
1 pint of milk?

Are adequate vitamins and minerals provided?

Does the menu include:
3 servings of fruit?
4 servings of bread, cereals, or potatoes?
3 servings of vegetables?
Butter or margarine?

Does the menu meet the minimum caloric requirements as stated by the Recommended Daily Dietary Allowances?

Is provision made for meeting the requirements of special quantitative and qualitative diet orders?

Do the menus meet minimum acceptability standards?

Has consideration been given to patients' ethnic, religious, and national food customs?

Do the menus represent a variety of color, texture, shape, and flavor of foods?

Is there a balance of hot and cold foods?

Are seasonal foods included on the menu?

Are special menus planned for holidays?

Are the kinds and forms of foods varied from day to day and from week to week?

Are new foods and/or recipes included in each set of menus?

Are the menus planned within prescribed cost limitations?

Has the expected hospital census been taken into consideration?

Have high- and low-cost menus been planned with daily and seasonal census variations in mind?

Does the budget allow for flexible menu planning? How much?

Does the menu allow for the use of foods on hand?

Are seasonal price differences considered in planning the menu?

Can these menus be produced . . .

. . . by the employees we have?

Can employees successfully prepare and serve these menus in the time available?

Is the work load balanced among employees from day to day?

Has provision been made for preparing foods ahead for days when the work load is heavy?

Are there no more than two items requiring last minute preparation?

Are the present employees experienced enough to prepare the items listed on the menu?

Has scheduling included the preparation of items for special diets?

. . . with the equipment available?

Can the menus be produced with the kinds and sizes of equipment available?

Are the methods of preparation varied?

Is equipment work load balanced?

Are area work loads balanced?

. . . and served under the present conditions?

Are the menus suited to the type of service?

Are there enough dishes to serve this menu?

Do the foods fit the dishes available?

CRITERIA FOR MENU EVALUATION

School Lunch*

Do Lunches meet Type A requirements?

Are all five components of the lunch included?

Are serving sizes sufficient to provide each child at least

2 ounces of a protein-rich food or the equivalent as specified in the Type A pattern?

3/4 cup serving consisting of two or more vegetables or fruits or both?

1 portion of enriched or whole-grain bread?

2 teaspoons of butter or fortified margarine?

½ pint fluid whole milk as a beverage?

Do lunches meet the nutritional goal?

Is a vitamin C food included each day?

Is a vitamin A food included twice a week?

Are several foods for iron included each day?

Are larger or second servings of Type A foods planned and other foods included to meet nutritional needs of children and satisfy their appetites?

Are the combinations of foods pleasing and acceptable to children?

Do lunches include a good balance of:

Color--in the foods themselves or as a garnish?

Texture--soft and crisp or firm textured foods?
--starchy and other type foods?

Shape--different sized pieces and shapes of foods.

---

* From USDA Bulletin PA-719.

Flavor--bland and tart or mild and strong flavored foods?

Temperature--hot and cold foods?

Are most of the foods and food combinations ones children have learned to eat?

Have children's racial, religious and cultural food habits been considered?

Is a popular food or dish planned for a lunch which includes a "new" or less popular food?

Are festive foods included for holidays, birthdays, school affairs?

Are foods varied from day to day? Week to week?

Are different kinds or forms of foods (fresh, canned, frozen, dried) included?

Are seasonal foods included?

Have "new" foods or new methods of preparation been included occasionally?

Can lunches be prepared and served successfully by employees in the time available?

Are lunches planned so that some preparation can be done ahead?

Is work load balanced among employees from day to day?

Can lunches be prepared and served with facilities and equipment available?

Is oven, surface-cooking or steam-cooking space adequate for items planned for each lunch?

Are proper sized cooking and serving utensils available?

Can foods planned for each lunch be easily served?

Will foods "fit" on dishes available?

Has cost of lunches been considered?

Have USDA-donated foods been used to best advantage?

Have "plentiful" foods been included as often as practicable?

Have foods in inventory been used to the extent possible?

Do high- and low-cost foods and lunches balance?

APPENDIX C

SUMMARY OF MENU PLANNING SURVEY

	Panelists' scores				
	1	2	3	4	5
Production and Service Factors					
Variety of Preparation			1		5
Type of Service	1	1		3	1
Service Facilities		3		2	1
Equipment			1		5
Work Load Distribution			1	2	3
Time Available	1		2	1	2
Personnel Limitations	2		1	2	1
Palatability Factors					
Appearance				1	5
Flavor		1	1	1	3
Variety of Shape			1	2	3
Variety of Color		1	1	1	3
Variety of Temperature			2	1	3
Variety of Texture			1	2	3
Frequency and Preferences					
Patron Preferences		1		2	3
Ethnic Groups		2		1	3
Holidays			1	2	3
Frequency of Service			1	1	4
Season			1	3	2
Frequency rating of Dietitian		2	2	1	1
Nutritional Needs					
Nutritive Requirements			4		2
Age		1	1	2	2
Sex		2	2	2	
Activity	1	1		3	1
Budgetary Limitations					
Food Budget					6
Labor Budget					6
Number Served		1		4	1
Local Markets	1	1	1	2	1
Season	1	1	1	3	

SUMMARY (Cont.)

Factors to be checked in evaluating two weeks' menus for residence halls.

Equipment usage.
Color, flavor, texture.
Food budget.
Pleasing food combinations.
Recipe availability.
Variety of selection.
Variety of ingredients within a meal.
Cost of food.
Nutritive value of food.
Distribution of work load.
Entree distribution.
Duplication of food within a day and on consecutive days.
Conformity to meal pattern.
Patron preferences.
Careful scientific preparation.
Repetition of foods.
Nutritional evaluation; age, sex, etc.

Is exact nutritive value important in computer menu planning for residence halls? Yes - 2. No - 4.

Why? "I feel that one must have food they will eat - preference list, but, with a captive clientele one has a further obligation to make the essential nutrients available."

Why not? "Requirements are not the same. Each person does not eat everything on the menus. They may miss meals."

"Use a guide or meal pattern - less time-consuming and should be adequate for residence hall planning. Some type of check should perhaps be made, but it would not need to be calculation of all nutrients."

"Figuring the nutritive value does not necessarily say they will take the items. By college age they should have formed a pattern of nutrition. If all the evaluation of other items is taken into account and with a choice, nutritional value will usually meet the requirements, repeating: if the student would take the menu the computer has figured. A person has no control over the trays. Consequently, nutrition does not seem important."

SUMMARY (Concl.)

Check the five most important factors in computer menu planning.

0 - Time Available for Preparation
1 - Flavor
3 - Nutritive Requirements of Individual
1 - Frequency Rating of Dietitian
2 - Labor Budget
2 - Distribution of Work Load
4 - Variety of Color
3 - Patron Preferences
4 - Food Budget
2 - Variety of Texture

MENU PLANNING UNIT OUTLINE FOR INSTITUTIONAL MANAGEMENT STUDENTS

by

ALICE SIDNA LUCUS

B. S., Mississippi State College for Women, 1965

AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Institutional Management

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1970

Menu planning is a complex process which demands that consideration be given to a variety of otherwise unrelated factors. The object of this study was to develop a teaching unit on institutional menu planning for college junior and senior students. Included were menu planning factors and procedures, criteria for evaluation, and an introduction to the use of electronic data processing for menu planning. The non-human factors of cost control, nutritional requirements, and production capabilities must be included with the interests of two different human groups, the customer and the employee. Procedures by which these factors are considered vary with the type of food service. Menu items are chosen according to a menu pattern to provide an acceptable variety of foods within specified restrictions. Color, texture, production feasibility, cost, and nutritional specifications are specific criteria by which menus are evaluated. Electronic data processing has been introduced as a means of increasing the exactness with which factors can be considered and reducing the total man-hours. Computer menu planning can provide a basis for improved manual techniques.

From the literature, a comparison was made of the criteria for menu planning with actual factors considered by a group of experienced dietitians. Criteria for evaluation and a menu planning unit outline were developed for this study. The teaching unit covers a variety of factors involved in menu planning and offers an opportunity for the student to see how these factors are related.