The Teaching of Mathematical Skills

in

Indiana's Home Economics Food and Nutrition Curriculum

An Honors Thesis

by

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As the push for academic excellence in education increases by the addition of language and mathematical requirements, the competition for student enrollment among disciplines also increases. For this reason, some disciplines, such as Home Economics, must reveal to the public their curricula and prove themselves not only vocationally qualified and complete, but also academically.

Home Economics has been labeled a "dumping ground" for those students who cannot "make it" in the academic curriculum. Allegedly, in Home Economics, students "make it" because Home Economics is not academically challenging, demanding, or contributory to the overall academic world. This paper, however, will disclose that Home Economics does indeed work to develop students in the academic areas, namely mathematics.

In a study of the foods and nutrition curriculum using the Indiana Resource Guide for Food and Nutrition and its concomitant supplements, over eighty concepts were discovered to teach mathematical concepts to the high school population in the course of one semester. Each of these concepts consisted of no fewer than three mathematical concepts or skills each as they were defined by the National Council of Supervision of Mathematics and National Council of Teachers of Mathematics' Ten Basic Mathematic Skills (Arithmetic Teacher, 25, 18-22, 1977). The Ten Basic Skills are as follows:

1. Problem Solving Skills--the process of applying previously acquired knowledge to new and unfamiliar situations.

2. Applying Mathematics to Everyday Situations--to use mathematics deal with situations faced daily in an everchanging world.

3. Alertness of the Reasonableness of Results--check to see if answers to problems are "in the ball park".

4. Estimation and Approximation--estimate quantity, length, distance, weight, etc.

5. Appropriate Computational Skills--use the four basic operations with whole numbers, decimals, simple fractions, and percents.

6. Geometry--know basic properties of simple geometric figures.

7. Measurement--measure in both metric and customary systems.

8. Tables, Charts, and Graphs--read, interpret, and construct simple tables, charts, and graphs.

9. Using Mathematics to Predict--know how mathematics is used to find the likelihood of future events.

10. Computer Literacy--the many uses of computers in society and what computers can and cannot do.

Hence, comparison of the Home Economics Food and Nutrition curriculum to these Ten Basic Skills proves the invalidity of the alleged non-academic status of the Home Economics discipline.

In the Food and Nutrition Working Papers of the Indiana Resource for Food and Nutrition which focuses upon tasks related to food preparation and management, supporting nutrition knowledge, and consumer management skills, nearly seventeen concepts teaching mathematical concepts and skills were disclosed. In measurement and equivalents, for example, a student would learn problem solving strategies through applying previous knowledge of English measurements to an unfamiliar situation such as metric conversion, increasing or reducing a recipe, or converting tablespoons to cups (this would be skill #1 on the list). In addition to this, the student would be applying mathematics to everyday situations (#2), using appropriate com-

putational skills (#5), becoming familiar with measurement in general (#7), and using mathematics to predict future events (#9). The same skills would also be used in cost and nutritional comparisons of foods (F&N 20), cost and nutritional analyses of foods (F&N 35), comparing food values, computing costs per serving and calories per serving (F&N 61), comparing homemade to commercial food items (F&N 129&131), comparing nutritional and energy conservation based upon cooking techniques (F&N 50), economical contributions to family (F&N 33-45), and evaluating and reading temperatures (i.e., candy making F&N 129).

The Indiana Resource Guide for Food and Nutrition Supplement (1979) presents concepts which teach an even greater number of mathematical skills. In calorie calculation, determining reduction for weight control, and calculation of calories burning (supp. 3), a student would practice problem solving strategies by applying past knowledge to a new situation (#1--he must understand what a calories is), must apply mathematical concepts to everyday situations (#2--calories consumed daily change daily), must choose appropriate computational operations in order to determine answers needed (#5), must be able to interpret charts in order to collect necessary data for computations (#8), must understand the measurement units for calories (#7), and by these he is using mathematical knowledge in order to predict outcome (#9). These same skills would be used in caluclating percentages of carbohydrates in total intake and in comparison of same to RDA (supp. 4), classifying foods according to fat percentages (supp. 6), comparing nutrient quantities (supp. 9), and determining breakdown of foods into

fat content (margarine and butter supp. 7). Other concepts such as converting nutritional values for high protein food items into graphs (supp. 8) and computing data from surveys (supp. 17) would utilize the mathematical concept of constructing simple charts and graphs (#8). Remaining concepts such as determining food contributions to family's health (supp. 24) would only include the minimum skills of problem solving strategies (#1), applying mathematics to everyday situtations (#2), and understanding measurements (#7).

Under the concept of Management of Family Food and Nutrition, The Indiana Resource Guide itself discloses its inclusion of mathematical skills in its sub-concepts. In the areas of income in relation to food purchasing power (I-77), food prices (I-82), time availability and food preparation (I-84), time and energy comparison in convenience vs. conventional items (IV-26), comparing cooking time (i.e., flour types), calculating cost of food product in regard to its use (i.e., lower quality meats can be put into casseroles IV-72), calculating time savings and cost of meal preparation with varying meat cookery methods (IV-93), calcuating cost of milk products based upon use (i.e., non fat dry milk used in cooking vs. fluid milk-IV-117), and determining table service in relation to time availability (v-32) the main mathematical skills practiced would be problem solving (#1), applying mathematics to everyday situations (#2), and choosing the most appropriate operation in determining answers (#5).

In addition to these sub-concepts there are others such as developing nutritionally adequate meals for different incomes (I-79&83), menu/meal planning and eating on fixed time schedules

(I-86-89) and differing schedules (I-89), determining time spent and saved with equipment usage (I-91), planning and serving numbers and servings of foods (bread IV-35; fruit and vegetables IV-69, meat IV-91), determining cost, time and money of home production and store (II-41), and determining food intakes based upon nutrient needs (I-20) include the same three skills as the first (#'s 1,2,5), but use in addition the concepts of measurement (#7), mathematical skills to predict (#9), and approximation (#4). The meal service concept (I87) and the arrangement of kitchen and equipment in relation to time and energy savings (II-41) introduce the concept of geometry (#6) in that a student can learn spatial arrangements and geometric designs in setting a table or planning out a kitchen lay-out appropriately and aesthetically.

The remaining sub-concepts in the Indiana Resource Guide are nearly saturated with mathematical concepts or skills. For example, the sub-concepts of determining time and energy needed and expended in shopping (II-24), the price of meat in relation to form, grade, use, cut, etc., (IV 92), food prices in relation to availability, packaging, form, grade, specials, store type, and quantity (II-6-23), determining adjustments of meals/diet in order to meet Basic 4 (I-25), nutrient comparisons based upon age, activity level, etc., (I-26), and interpreting data from diet analyses on computer print-outs (I-21) all require the use of problem solving (#1), applying mathematics to everyday situations (#2), estimation and approximation (#4), choosing appropriate computational operations (#5), understanding measurements (#7), interpreting and using charts and/or graphs (#8), and using mathematics to predict outcomes (#9). Sub-concept (I-21),

interpreting data from computer print-outs even utilizes the understanding of the computer's uses within the curriculum which is a relatively new concept in most curricula.

From the information gathered from the Indiana Resource Guide for Food and Nutrition it appears safe to conclude that the Home Economics curriculum in Indiana does indeed provide for the needs of its students academically and vocationally. As disclosed, all of the concepts had a minimum of three mathematical concepts built-in or accompanying them and some concepts had as many as seven. With this curriculum, these concepts are repeated over and over again in the changing of units and building of additional concepts within the same year or subsequent years.

This study encompasses only one of five areas of Home Economics. It is without question that the four remaining areas of the discipline will greatly contribute to the overall academic teachings, requirements, and standards of the area which will continue to change and upgrade as the need to do so arises. For the present, however, Home Economics can proudly stand in defense of the false unacademic accusations that surround it. Home Economics has a critical role in a student's education, not only vocationally, but just as importantly academically.

RESOURCES

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