

Summative Evaluation Plan

Fall 2006 MIT 500 Course Project “Nutrition Label 101”

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Abstract

This is a summative evaluation plan for the “Nutrition Label 101” web-based, self-instructional package which was created in the UNCW MIT 500 course during the fall 2006 semester. This plan provides an overview of the instructional package and its context, including learner characteristics, instructional objectives, formative evaluation, and package implementation. The focus of the plan is summative evaluation phase, including methodology, data collection, and data analysis. The goal of this summative evaluation is to judge the effectiveness and worth of the module and to make a decision to implement it or not.

The Module can be viewed at http://windev.uncw.edu/mit/students/lanier/nutri_101.htm (broken link)

Introduction

Context

Overview of the instructional package

The Nutrition Label 101 is a self-directed instructional module. The material is web delivered via the open source LMS, Moodle and consists of over 90 separate 'pages'. There are 6 sections: Class introduction, the Nutrition label, Calories, Fat, Sodium, and Fiber. The use of the Moodle software affords us online testing and surveys, as well as integration into other CMS systems. There are two tests and a final survey, as well as many sectional assessments throughout the lesson.

With the image of a Nutrition Facts label in mind and the plan to instruct on five specific segments written on the label, it was determined that each segment would be delivered in a separate chunk, maintaining a consistent pattern to the instruction for each chunk. Each chunk provides:

- a summary introduction with key learning objectives
- images of the Nutrition Facts label
- a chart for the Recommended Dietary Allowance (RDA)
- pertinent facts that relay key information about nutritional needs
- interactive question and answer opportunities
- an example of comparing two like food items
- a concluding test item, which asks the students to compare and select the correct food item.

The learner is asked to compare two nutrition labels that are displayed side by side, much as one would do while shopping. The objective is to locate the pertinent information (e.g., serving size, servings per package and calories per serving), calculate the value for the product, compare the calculations to RDA standards, and choose the item that best fits the RDA standards for nutrition. Each of the four sections (calories, fat, sodium and fiber) replicates this format.

Worked examples with interactive tasks and questions aid the learner in *integrating* new concepts with prior knowledge. The questions take the form of transfer tests which will augment the standard retention tests. In this manner, the learner is required to apply the rule or concept in a problem context immediately after it is presented. The questions require the correct answer before the learner can move forward in the instruction. Both incorrect and correct, answer provide immediate and corrective feedback

Learner Characteristics

The intended learners are traditional undergraduate college students, meaning they enroll in college immediately following graduation from high school. They have limited experience grocery shopping and making nutrition based food choices because most lived with parents who made decision regarding meals. Most are aware of the Nutrition Facts label and are knowledgeable about health and its relationship to eating. There is a negative undertone associated with the Nutrition Facts label, namely that applying this information will eliminate foods they prefer. Overall, however, they are interested in making healthy choices and preventing the “Freshman 15” (weight gain of 15 pounds during the freshman year of college).

Instructional Objectives

Students will demonstrate applying principles and procedures of selecting healthy food by reading nutrition labels on foods.

Summary of formative evaluation procedure

The formative evaluation consisted of a one-on-one evaluation, a connoisseur evaluation, and a small group evaluation. The objective was to find errors in the module before final implementation.

Three students volunteered to participate in the one-on-one evaluation. All were familiar with online courses and were comfortable with this medium. Each student was asked to classify themselves as high achiever, average or low achiever in academic standings. Student A is a UNCW junior who classifies herself as a high achiever. Student B is a UNCW freshman who classifies himself as average. Student C is a UNCW freshman who classifies himself as a low achiever. None of the students felt they were knowledgeable about the Nutrition Label; however, Student A stated she knew a little about nutrition.

Each student was provided with a laptop connected to the internet in a library study room with observation by one of the instructors. All completed the pretest and had difficulty with multiplication of whole numbers and integers (needed paper and pencil to calculate) although they were able to calculate the correct answer. In Section 2, all had difficulty with questions 1 and 2 which required the student to know what information would be needed to calculate values for foods consumed. Student A answered correctly but stated she guessed rather than knew the answer for certain. This response was anticipated. All students were able to move through the module with ease and answered the questions correctly.

A connoisseur evaluation was completed with the Subject Matter Expert (SME) and her responses to the open-ended questions are highlighted in the qualitative data.

Implementation Site Description

The instructional module is designed to be used by students at UNCW who are interested in nutritional food selection. The Health Promotion Department at UNCW provides a link for the instruction on their website. The only equipment required is a computer with access to the Internet, which are abundant on the campus of UNCW through various computer labs. The module is self-instructional and does not require any type of supervision or instructor support.

Summative Evaluation Objectives

The objective of the summative evaluation plan is measure the worth of the program and to make a decision about if and how it should be used by the client.

Using Kirkpatrick's four levels of evaluating training programs as a guide, the summative evaluation will examine the learner reactions and learning. Transfer and Results are not measured in the existing evaluation plan. These last two levels could be measured in a confirmative evaluation yet to be implemented.

1. Reaction: measure learner's reaction to the training module through surveys. The survey is designed to determine the feelings, attitudes and reactions about the experience of using the module. The focus of the survey was formative in nature and should be revised.
2. Learning: measure learning by establishing the change in knowledge and skills through use of pre- and post-tests.
3. Transfer: measure whether or not the learner put newly gained skills to use in the performance environment.
4. Results: measure long term effects of the new knowledge and skills through scheduled surveys over time. Results are not assessed in this plan, but could be included in a confirmative plan to be implemented at a later date.

Process

Methodology

Design Approach

Kirkpatrick's model has been selected for the summative evaluation plan. Two of the four levels will be implemented: Reaction and Learning. The other two, Transfer and Results, may be conducted at a later date as a part of a confirmative evaluation.

- Reaction evaluation is conducted through an attitude survey provided at the completion of the instructional module. It will focus on the user's feelings about the module. Open ended questions were used to allow for expressive responses.
- Learning evaluation is conducted to determine whether or not the learner has increased knowledge and skills will be ascertained by analyzing the data obtained through the pre- and post-tests contained within the instructional module.
- Transfer evaluation will be conducted to determine whether or not the learner is able to use the knowledge and skills in a practical setting will be obtained through a survey sent to students who completed the instructional module.
- Results evaluation will not be conducted for this instructional module since undergraduate students leave the university setting over time and contact information will not be available. As such, a results evaluation is out of the scope of the project.

Implementation Plan Description

The instructional module is delivered by logging in to Moodle through a link on the Health Promotion Department's website. All relevant data are stored within Moodle including the pre- and post-test as well as the attitudinal survey. This data will be reviewed and analyzed. To determine the impact of the instructional module, an email will be sent to each student that completed the module asking them to log back in to Moodle to complete a survey eliciting their feedback on the long term benefit of the instructional module.

Data Collection Plan

To collect data for the reaction level, a survey of 7 open-ended questions (Appendix D) will be implemented immediately after the learner finishes the module. The survey will be deployed within Moodle to ensure 100% participation, and accurate data collection.

To collect data for the learning level, a pre and post test will be deployed within the instructional content of the module. The assessment plan (Appendix A) shows the learning objectives of the module and their corresponding learning outcome, type of assessment and assessment strategy. The testing instruments (Appendix C) are closely aligned with the assessment plan and a 'Number of Assessment Items' chart shows that each objective is adequately covered in the pre – and post-tests.

To ensure data validity and reliability, the learning objectives and assessment strategies are aligned and reviewed by a multiple content and evaluation experts.

Data Analysis Plan

Concerning the reaction level, the qualitative data will be analyzed using a cross-case method. The responses from each question will be analyzed for patterns from which to make a generalization about the question objective.

Concerning the learning level, the quantitative data generated by the Moodle pre and post tests will be calculated for percentage increase to show the module's learning effectiveness. This will be done for individual learning and averaged for all learners in order to show overall learning effectiveness for the module.

Conclusion

At the conclusion of all data collection, analysis, and interpretation, a report will be written and submitted to the UNCW Health Promotion Department. The report will present information and recommendations with which the Health Promotion officials can make a decision concerning the module.

Appendix A

Assessment Plan

Objective	Types of Learning Outcomes	Types of Assessment	Assessment Strategy
1 Given a Nutrition Fact label, students will identify important information on the labels by identifying the location for serving size, calories, fat, sodium and fiber.	Concrete Concept	Formal Selection Matching	There are several important pieces of information on a Nutrition Facts label. Match serving size, calories, fat, sodium and fiber with the correction location on the Nutrition Fact label.
2 Students will choose the healthier item based on calories by comparing the calculation of total calories in the package for each of two like food items with the standards set by the RDA.	Rule		
2.1 Given the values calculated for calories, students will demonstrate comparing calories in packages of two like food items with the calorie standards set by the RDA, choosing the food item with fewer calories by clicking on the radio button for that item.	Rule	Formal Selection Multiple choice	Using the calculation for calories consumed and the RDA standards, which item would be the healthier choice based on calories?
2.2 Given the formula (servings x calories per serving = calories consumed), the student will demonstrate the procedure for calculating the amount of calories consumed by typing the correct values into the formula provided.	Rule	Formal Supply Fill in the blank	How many calories are in one can of Clam Chowder? How many calories are in one can of Savory Vegetable soup?
2.3 Given Nutrition Facts labels,	Concrete Concept	Formal Supply Fill in the blank	How many servings are in one can of Clam Chowder?

students will identify the number of servings and calories by looking at the label and typing the correct value into the box provided.			How many calories are in one serving of Clam Chowder? How many servings are in one can of Savory Vegetable soup? How many calories are in one serving of Savory Vegetable soup?
3 Students will choose the healthier item based on fat by comparing the calculation of total fat for each of two like food items with the standards set by the RDA.	Rule		
3.1 Given the values calculated for total fat, students will compare total fat in the package for two like food items with the fat standards set up by the RDA, choosing the correct item by clicking the radio button for that item.	Rule	Formal Selection Multiple choice	Compare the fat grams in potato chips and pretzels using the formula. Which item would be the healthier choice based on fat?
3.2 Given the formula (servings x fat per serving = fat consumed), the student will demonstrate the procedure for calculating the amount of fat consumed by typing the correct values into the formula provided.	Rule	Formal Supply Fill in the blank	Complete the formula by typing in the values from the Nutrition Fact labels.
3.3 Given Nutrition Facts labels, students will identify the number of servings and fat by looking at the label and typing the correct value into the box provided.	Concrete Concept	Formal Supply Fill in the blank	How many servings are in one package of potato chips? How many fat grams are in one serving of potato chips? How many servings are in one package of pretzels? How many fat grams are in one package of pretzels?
4 Demonstrate choosing the healthier item based on sodium by comparing the calculation of	Rule		

total sodium in the package for two like food items with the standards set by the RDA.			
4.1 Given the values calculated for total fat, students will compare total fat in the package for two like food items with the fat standards set up by the RDA, choosing the correct item by clicking the radio button for that item.	Rule	Formal Selection Multiple choice	Based on sodium, which package of nuts (almonds or cashews) is the healthier choice?
4.2 Given the formula (servings x sodium per serving = sodium consumed), the student will demonstrate the procedure for calculating the amount of sodium consumed by typing the correct values into the formula provided.	Rule	Formal Supply Fill in the blank	Complete the formula by typing in the values from the Nutrition Fact label.
4.3 Given Nutrition Facts labels, students will identify the number of servings and sodium by looking at the label and typing the correct value into the box provided.	Concrete Concept	Formal Supply Fill in the blank	How many servings are in one package of almonds? How many grams of sodium are in one serving of almonds? How many servings are in one package of cashews? How many grams of sodium are in one package of cashews?
5 Demonstrate choosing the healthier item based on fiber by comparing the calculation of fiber in the package for two like food items with the standards set by the RDA.	Rule		
5.1 Given the values calculated for total fiber, students will compare total fiber in the package for two like food items with the fat standards set up by the RDA, choosing the correct item by clicking the radio button for that item.	Rule	Formal Selection Multiple choice	Based on fiber, which breakfast item is the healthier choice, PopTarts or the Quaker Breakfast Cookie?

<p>5.2 Given the formula (servings x fiber per serving = fiber consumed), the student will demonstrate the procedure for calculating the amount of fiber consumed by typing the correct values into the formula provided.</p>	<p>Rule</p>	<p>Formal Supply Fill in the blank</p>	<p>Complete the formula by typing in the values from the Nutrition Fact label.</p>
<p>5.3 Given Nutrition Facts labels, students will identify the number of servings and fiber by looking at the label and typing the correct value into the box provided.</p>	<p>Concrete Concept</p>	<p>Formal Supply Fill in the blank</p>	<p>How many servings are in one package of PopTarts? How many grams of fiber are in one serving of PopTarts? How many servings are in one package of Quaker Breakfast Cookies? How many grams of fiber are in one package of Quaker Breakfast Cookies?</p>

Appendix B

Data Assessment Plan – Number of Assessment Items

Domain Objective #	Verbal Information	Intellectual Skills				Cognitive Strategy	Motor Skill	Attitude	Total
		Discrim	Concepts	Rules	Problem Solving				
1.0			4						4
2.0				2					2
2.1				1					1
2.2				2					2
2.3			4						4
3.0				2					2
3.1				1					1
3.2				2					2
3.3			4						4
4.0				2					2
4.1				1					1
4.2				2					2
4.3			4						4
5.0				2					2
5.1				1					1
5.2				2					2
5.3			4						4
% of test	0%	0%	20 (50%)	20 (50%)	0%	0%	0%	0%	40 (100%)

Appendix C

Pre-Test

Section 1: Entry Level Behaviors							
1. Addition of three-digit numbers	$130 + 265 = ?$						
2. Subtraction of three and four-digit numbers	$200 - 520 = ?$						
3. Multiplication of whole numbers and integers	$130 \times 2.5 = ?$						
4. Identification of abbreviations for units of measure (match the abbreviation with the correct word)	<table border="1"> <tbody> <tr> <td>g</td> <td>milligrams</td> </tr> <tr> <td>mg</td> <td>cup</td> </tr> <tr> <td>c</td> <td>grams</td> </tr> </tbody> </table>	g	milligrams	mg	cup	c	grams
g	milligrams						
mg	cup						
c	grams						
Section 2: Determining nutritional elements from the label and RDA recommendations							
1. Eight students shared a 2-liter bottle of soft drink equally. What information would you need to determine how many calories were consumed by each person?	Answer						
2. How would you determine how much sodium you ate if you consumed an entire bag of peanuts?	Answer						
3. The Recommended Daily Allowance (RDA) established by the Food & Drug Administration state there are certain nutrients you should limit. What are those nutrients?	Check all that apply: Serving size Calories Fat Sodium Dietary Fiber						
4. There are four different types of fats. Which fats are healthy and should be incorporated into your diet?	Check all that apply: Saturated fat Polyunsaturated fat Monounsaturated fat Transfat						

5. How much fiber do you need each day?

Answer

Section 3: Choice of food item

Using the Nutrition Facts labels provided, which food item would be the healthier choice?

Velveta Shells & Cheese

Nutrition Facts	
Serving Size 1 cup	
Serving Size Per Container 3	
Amount Per Serving	
Calories 360	Calories from Fat
% Daily Value*	
Total Fat 12 g	
Saturated Fat	
Trans Fat	
Sodium 930 mg	
Fiber 2 g	
<small>*percent Daily Values based on a 2,000 calorie diet.</small>	

Ramen Noodles

Nutrition Facts	
Serving Size 1/2 package	
Serving Size Per Container 2	
Amount Per Serving	
Calories 190	Calories from Fat
% Daily Value*	
Total Fat 7 g	
Saturated Fat	
Trans Fat	
Sodium 930 mg	
Fiber 1 g	
<small>*percent Daily Values based on a 2,000 calorie diet.</small>	

Post-Test

Section 1: Determining nutritional elements from the label and RDA recommendations																													
1. Eight students shared a 2-liter bottle of soft drink equally. What information would you need to determine how many calories were consumed by each person?	Answer																												
2. How would you determine how much sodium you ate if you consumed an entire bag of peanuts?	Answer																												
3. The Recommended Daily Allowance (RDA) established by the Food & Drug Administration state there are certain nutrients you should limit. What are those nutrients?	Check all that apply: Serving size Calories Fat Sodium Dietary Fiber																												
4. There are four different types of fats. Which fats are healthy and should be incorporated into your diet?	Check all that apply: Saturated fat Polyunsaturated fat Monounsaturated fat Transfat																												
5. How much fat should you eat each day?	Answer																												
Section 3: Choice of food item																													
Using the Nutrition Facts labels provided, which food item would be the healthier choice?																													
Velveta Shells & Cheese	Ramen Noodles																												
<div style="text-align: center; font-weight: bold; font-size: 1.2em;">Nutrition Facts</div> <p>Serving Size 1 cup Serving Size Per Container 3</p> <hr/> <p>Amount Per Serving</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Calories 360</td> <td style="width: 50%; text-align: right;">Calories from Fat</td> </tr> <tr> <td colspan="2" style="text-align: right;">% Daily Value*</td> </tr> <tr> <td>Total Fat 12 g</td> <td></td> </tr> <tr> <td>Saturated Fat</td> <td></td> </tr> <tr> <td>Trans Fat</td> <td></td> </tr> <tr> <td>Sodium 930 mg</td> <td></td> </tr> <tr> <td>Fiber 2 g</td> <td></td> </tr> </table> <p><small>*percent Daily Values based on a 2,000 calorie diet.</small></p>	Calories 360	Calories from Fat	% Daily Value*		Total Fat 12 g		Saturated Fat		Trans Fat		Sodium 930 mg		Fiber 2 g		<div style="text-align: center; font-weight: bold; font-size: 1.2em;">Nutrition Facts</div> <p>Serving Size 1/2 package Serving Size Per Container 2</p> <hr/> <p>Amount Per Serving</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Calories 190</td> <td style="width: 50%; text-align: right;">Calories from Fat</td> </tr> <tr> <td colspan="2" style="text-align: right;">% Daily Value*</td> </tr> <tr> <td>Total Fat 7 g</td> <td></td> </tr> <tr> <td>Saturated Fat</td> <td></td> </tr> <tr> <td>Trans Fat</td> <td></td> </tr> <tr> <td>Sodium 930 mg</td> <td></td> </tr> <tr> <td>Fiber 1 g</td> <td></td> </tr> </table> <p><small>*percent Daily Values based on a 2,000 calorie diet.</small></p>	Calories 190	Calories from Fat	% Daily Value*		Total Fat 7 g		Saturated Fat		Trans Fat		Sodium 930 mg		Fiber 1 g	
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Appendix D

Survey

The survey includes results of the formative evaluation. This instrument will be used for both formative and summative evaluation. The SME's comments are denoted.

What part of the module did you like the best?

- Having the nutrition labels available
- Consistency with the nutrition label
- (SME) The analysis of two products
- (SME) The stories used to describe why a person would choose to eat more than one serving.

Was there anything you did not like?

- Font size – questions were hard to read

Are there any changes you would recommend?

- The first few slides were confusing
- Some of the information was out of sequence.
- Some of the buttons did not work correctly.
- Combine some of the slides; the information is very similar sometimes.
- There were a couple of spelling errors.

Were the directions clear and easy to understand?

- Sometimes there were questions asked and it wasn't clear whether or not there should be an answer.
- There were no directions for the calculator function on some of the slides.
- (SME) The pretest was not clearly identified as such.

Did you have enough time to complete the module?

- Yes

Did you receive enough feedback on the practice exercises?

- Yes. The responses to correct and incorrect were great.

Are there any other comments you would like to make?

- (SME) Would like to see the module polished so it could be incorporated into her departmental website.

