



Blended Learning: Use of Instructional Videos in an Undergraduate Food Preparation Lab

Georgia Jones, Associate Professor (*University of Nebraska*) and Lauren Rathman, MS Student (*Dept. of Nutrition & Health Sciences*)

Abstract

Objective

The goal of this research study was to determine if supplemental online, instructional videos would be beneficial in teaching scientific concepts and preparation procedures in a sophomore level introductory foods class.

Use of Theory or Research

Students no longer enter college with a basic knowledge of food and are therefore not prepared to understand the science of food. Observation from instructors and researchers support this. Knowledge of food and food preparation are essential in preparing nutrition and dietetic students to be competent in their careers. Students purchase a paper lab manual. Videos provided a second method of learning.

Target Audience

College students enrolled in an introductory foods class.

Course/Curriculum Description

Scientific Principles of Food Preparation is taught at a 4-year university. It is an introductory food preparation class and laboratory focusing on the science of food. Fifteen instructional videos focusing on the science and preparation of food were developed to help students build foundational knowledge. The videos were no more than 4 minutes in length. This study consisted of two classes. One class served as the experimental group, while the other served as the control. The experimental group viewed the videos before conducting experiments, completing pre-lab quizzes, and lab reports. The control group viewed the videos after conducting experiments, completing pre-lab quizzes, and lab reports. There were 15 students in each group.

Evaluation Methods

Students' pre-lab quizzes and lab reports were graded as usual. The averages for the pre-lab quizzes, lab reports and the final grades were compared. Data was analyzed using Analysis of Variance (ANOVA).

Results

There was a significant difference ($p < 0.05$) in the pre-lab quiz and lab report, and final class grades between the control and experimental group. The control group scored 3.19/4.0 (or 79.8%), while the experimental group scored 3.37/4.0 (or 84.3%) on the pre-lab quiz. The control group scored 17.37/20.0 (or 86.7%), while the experimental group scored 18.36/20.0 (or 91.8%) on lab reports. The control group had a final grade of 85.4%, while the experimental group had a final grade of 90.5%.

Conclusions

As evidenced by the grades for both groups of students, the ability to view the videos before the start of lab did improve learning. Students who read the lab manual and viewed the videos were exposed to the same material twice. Developing videos may be one way to help nutrition students understand scientific concepts of food preparation.

Introduction

Food preparation knowledge and skills are essential for registered dietitians pursuing clinical, community and food-service management career paths. According to Krieger (2014), the dietetic profession is "disconnected from food". Dietetic students lack exposure to food preparation. The literature proposes that caregivers are spending less time preparing food at home and fewer home economics courses are being offered in secondary schools (Palmer, 2013 & Hartmann et al., 2013).

Dietitians provide recommendations and assist their clients with appropriate food choices. As such, a need exists to increase dietetic students' exposure and familiarity with food and food preparation.

Educators are integrating technology into classrooms to meet the needs of the iGeneration (Haythornthwaite & Andrews, 2011; Rosen, 2010). This project used blended learning to help students increase their basic understanding of food and food preparation. Students first interacted with the videos online and before attending the lab. The overall goal of this research was to determine if online demonstration videos were beneficial in teaching food preparation concepts and procedures.

Table 1. Lab and Corresponding Demonstration Video

LAB TOPICS	DEMONSTRATION VIDEOS
Lab 1: Sensory Evaluation; Knife Skills & Measurement*	Knife Skills; Dry Measuring; Liquid Measuring
Lab 2: Food Preservation**	Canning
Lab 3: Fruits & Vegetables	Enzymatic Browning Vegetable Pigments
Lab 4: Fats, Oils & Emulsions**	Making Mayonnaise
Lab 5: Salads; Gelatin	Gelatin & Fruit Enzymes
Lab 6: Starch & Cereals, Rice, & Pasta**	Making a White Sauce Types of Oats Starch Dispersion
Lab 7: Meat**	Braising
Lab 8: Vegetable Proteins	Types of Legumes
Lab 9: Fish & Seafood	Types of Seafood
Lab 10: Milk & Cheese; Eggs, Custards, & Egg Foams	Yogurt Cheese Making a Meringue
Lab 11: Muffins, Biscuits, & Breads**	Types of Flour Muffin Method Biscuit Method
Lab 12: Cakes; Pies, Cream Puffs & Popovers	Quick Method for Making a Cake Conventional Method for Making a Cake
Lab 13: Beverages	How to Make a Variety of Beverages

*No Pre-Lab Quiz

**Has an associated lab report.

Study Design

Traditionally, students are asked to become familiar with the material before attending class. The control group received the information in the traditional format. They were asked to be familiar with the material before attending class. The instructor gave a brief introduction of the principles at the beginning of class. In addition to these components, the experimental group was asked to view demonstration videos before attending class. The control group were allowed to watch the videos after lab reports were submitted.

Measurements

Each group was given a pre-lab quiz each week at the beginning of class. The quizzes covered the same material and consisted of identical questions.

Students submitted 5 lab reports (Table 1) where they were required to discuss scientific principles, procedures and concepts as they pertained to each lab.

The final grades were collected for each student.

Results and Discussion

Students in the experimental group scored significantly better ($p < 0.05$) in all assessments than those in the control group. Final grades were reflected as an average grade of 90.45% (A) and 85.43% for the control group.

Students did find the videos helpful in understanding experiments performed by other students. Overall, the videos were well received by students and provided a supplemental learning aid in preparation for class.

All students had access to the same material. However, students in the experimental group received the information twice (once in the manual and once via the video).

Table 2. Pre-Lab Quiz Grades

GROUP	NUMBER OF STUDENTS	MEAN (%) \pm SD
Control	15	3.19 \pm 0.90 ^a
Experimental	15	3.37 \pm 0.77 ^b
Total	30	3.28 \pm 0.84

Grades are based on a scale from 0 to 4, with 4 being the highest possible grade.

Numbers in the same column with different letters are significantly different ($p < 0.05$).

Table 3. Lab Report Grades

GROUP	NUMBER OF STUDENTS	MEAN (%) \pm SD
Control	15	17.37 \pm 3.85 ^a
Experimental	15	18.36 \pm 1.37 ^b
Total	30	17.87 \pm 2.93

Grades are based on a scale from 0 to 20, with 20 being the highest possible grade.

Numbers in the same column with different letters are significantly different ($p < 0.05$).

Table 4. Final Grades

GROUP	NUMBER OF STUDENTS	MEAN (%) \pm SD
Control	15	85.43 \pm 5.78 ^a
Experimental	15	90.45 \pm 4.54 ^b
Total	30	87.94 \pm 5.77

Grades are based on a scale from 0 to 20, with 20 being the highest possible grade.

Numbers in the same column with different letters are significantly different ($p < 0.05$).

References

Haythornthwaite, C and Andrews, R. (2011) E-learning theory and practice. Sage Publications.

Krieger, E. (2014). 2013 Lenna Frances Cooper Memorial Lecture: Bringing Cooking Back: Food and Culinary Expertise as a Key to Dietitians' Future Success. Journal of the Academy of Nutrition and Dietetics, 114(2), 313-319.

Palmer, S. Get Clients Cooking!, Today's Dietitian, 15(2013):28-32.

Materials and Methods

Participants

The participants in this study were enrolled in a 200-level introductory foods class (Scientific Principles of Food Preparation). The students were divided into two groups – control (15 students) and experimental (15 students). Participation in the study was voluntary.

Video Creation

The blended design consisted of two components; online demonstration videos and a face-to-face lab. The videos were 3 to 5 minutes in length. The material selected for the videos were concepts, procedures and experiments identified as course material students find difficult. Demonstration videos (Table 1) were developed for each lab module.