

Evaluation of the Effect of an Online Dual Enrollment Nutrition Course for College and High School Students

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Summary

This research project compared academic performance of high school students ($n = 31$) to college students ($n = 29$) who completed a fully online, undergraduate dual enrollment nutrition course. Results, based on pretest and posttest scores, indicate that nutrition knowledge increased at a similar level in high school and college students.

Introduction

Dual enrollment involves simultaneous enrollment in two or more courses at distinctly different educational levels such as secondary and tertiary.¹ Dual enrollment is a rapidly growing segment of education.² Research indicates that dual enrollment programs can facilitate the transition of high school students into post-secondary education, and may reduce attrition rates in allied health programs.³ Additionally, research indicates that nutrition courses not only benefit high school students' knowledge levels overall, but nutrition education may also positively influence their attitudes and eating behaviors.⁴ There is, however, a paucity of data for nutrition-related online education and even less with regards to dual enrollment courses. **Objective:** This project seeks to implement an undergraduate, higher-education dual enrollment nutrition course that is fully online and accessible for high school students.

Methods

Study Design, Settings & Participants: United States Department of Agriculture (USDA) and National Institute of Food and Agriculture (NIFA) grant dollars were obtained to facilitate a two-year dual enrollment collaboration between a college (C) and two high schools (HS1 and HS2). In the first year, two sections of junior-level high school students in HS1 ($n = 11$) and HS2 ($n = 20$), and one section of C ($n = 29$) completed a one-semester online, three credit hour nutrition course. The online college course introduced students to the fundamentals of normal nutrition and its relationship to the health of individuals with emphasis on the scientific, psychological, social and economic aspects of nutrition. All course material was accessed via an online learning platform where students had access to lecture guides, power point slides, videos, animations, etc. Students submitted course assignments online which included various pedagogical content such as quizzes, case studies, fad diet evaluations, discussions, and tests including pre- and posttests.

Measurable Outcome/Analysis: Pretest and posttest data were collected from students based on an identical 30-item nutrition knowledge test. The test format was multiple choice questions covering each chapter of the textbook studied throughout the semester. A paired sample t -test was performed as well as an analysis of covariance (ANCOVA) to compare pre/posttest group mean differences.

Results

Study results indicate that (Table 1) 51.6% of students in the sample were high school students. Paired sample t -test results indicate the mean difference between pretest and posttest scores ($M = 32.4$, $SD = 20.8$, $N = 54$) to be significantly greater than zero, $t(53) = 11.5$, $p < .001$, [two-tailed] providing evidence that the mode of content delivery was effective in improving posttest scores. Analysis of covariance (ANCOVA) was used to compare group mean differences. ANCOVA results indicate a significant difference between groups on posttest scores when controlling for pretest scores, $F(2, 50) = 5.8$, $p = .01$. Adjusted mean posttest score for HS1 was significantly different from mean posttest scores for HS2 and C (Fig 1). The pre- and posttest nutrition questions were analyzed by groups for percent change (Table 2). Negative change scores between pre- and posttests were only indicated for two questions for HS1 and HS2, but were revealed four times for the C students.

Group	Frequency	Percent
Dual Enrollment 1 (HS1)	11	18.3
Dual Enrollment 2 (HS2)	20	33.3
College (C)	29	48.3
Total	60	100.0

Table 1: Descriptive statistics of student groups participating in the dual enrollment and undergraduate college online nutrition course.

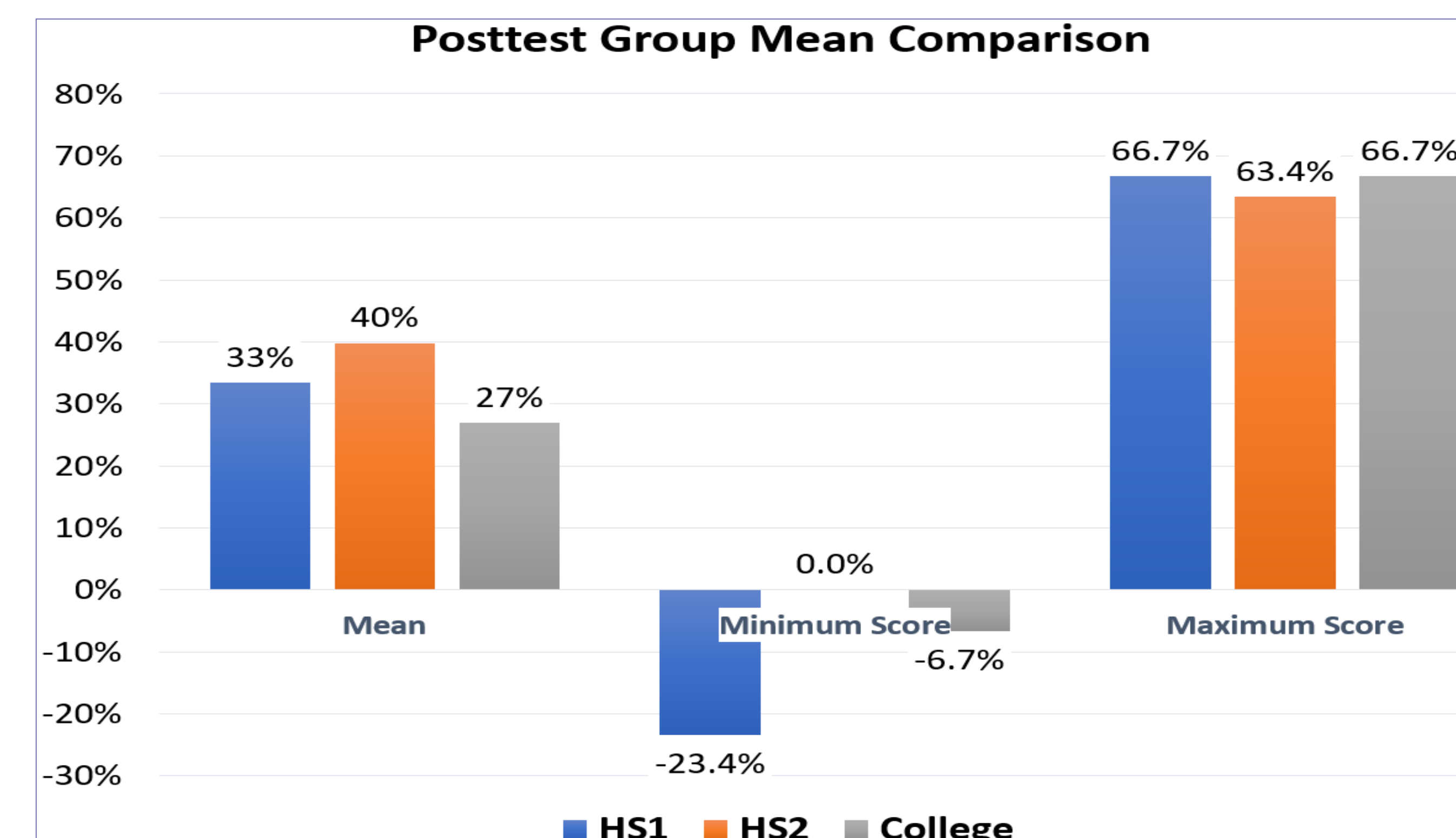


Figure 1: Minimum and maximum scores relative to the mean.

Results (Continued)

Question Topic	HS1 Scores $n = 11$			HS2 Scores $n = 20$			C Scores $n = 29$		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
Example of a macronutrient	55%	90%	35%	85%	89%	4%	79%	100%	21%
Definition of RDA	27%	90%	63%	50%	89%	39%	35%	81%	46%
Normal pH of the stomach	18%	70%	52%	35%	78%	43%	45%	58%	13%
Nitrogen balance for healthy infants	9%	80%	71%	25%	83%	58%	48%	77%	29%
Probiotics	82%	80%	-2%	95%	94%	-1%	97%	96%	-1%

Table 2: Examples of pretest (pre), posttest (post) question scores and percent change between dual enrollment (HS1, HS2) and College (C) students.

Conclusions

The results indicate that delivery of the online introductory nutrition course in the dual enrollment program was effective in significantly improving nutrition knowledge of both high school and college students. Future research should continue to evaluate the efficacy of online nutrition course delivery as well as indicators for success, both in dual enrollment secondary students and undergraduates.

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