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Integrating Nutrition Education in Culinary Curricula: A Narrative Review from Puerto Rico

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Abstract

Objective: To synthesize recent evidence on whether integrating nutrition education into culinary curricula is associated with improved diet quality and related competencies among culinary arts students in Puerto Rico, and to identify theory-based mediators, barriers, and research gaps.

Design: Narrative review with transparent search and screening procedures aligned with PRISMA 2020 guidance. Databases: PubMed, Scopus and Web of Science (January–September 2025). Inclusion focused on studies (2020–2025) involving culinary/gastronomy students and outcomes related to nutrition knowledge, diet quality, food security, or hands-on education; contextually relevant pre-2020 Puerto Rican work was retained.

Results: Nine studies/reports met inclusion criteria. Experiential approaches were consistently associated with increased cooking self-efficacy and nutrition knowledge [1,3–6,8]. However, gains did not uniformly translate into healthier dietary patterns in the presence of food insecurity, time/cost constraints, and limited healthy food availability [2,4,6]. Puerto Rican cohorts exhibited comparatively high financial strain and food insecurity despite high culinary confidence [2,6]. Effects appear to be mediated by capability, opportunity, and motivation (COM-B), perceived behavioral control and intentions (TPB), and self-efficacy (SCT) [10–12].

Conclusions: Integrating nutrition content with behavior-change strategies and student-centered supports is more promising than technical skill training alone. Future research should evaluate longitudinal dietary outcomes, validate theory-driven mediators, and test multicomponent interventions pairing curriculum redesign with institutional supports.

Keywords: Culinary nutrition; Gastronomy education; Behavior change; COM-B; Social Cognitive Theory; Theory of Planned Behavior; Puerto Rico; diet quality; Food insecurity; Higher education

Introduction

Culinary arts programs can influence public health by shaping how future chefs design, prepare, and communicate about food. Integrating nutrition education into chef training enhances graduates' ability to collaborate with health professionals and develop culturally resonant, health-promoting menus. Experiential pedagogies are associated with improvements in cooking self-efficacy and nutrition knowledge among students [1,5], yet studies also indicate that knowledge and skills are often necessary but insufficient for sustained dietary change where structural and financial constraints persist [2,4]. In Puerto Rico, recent campus needs assessments document high rates

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of food insecurity and economic hardship among university students [2,6], conditions that plausibly attenuate the impact of skills-based curricula on real-world diet quality. This review critically examines recent literature to clarify what works, for whom, and under what conditions, and to identify theory-driven mechanisms that can inform curriculum innovation in Puerto Rican culinary education.

Materials and Methods

Study Design and Search Strategy

A narrative review approach was used due to heterogeneity in study designs and outcomes and the limited number of peer-reviewed studies specifically targeting Puerto Rican culinary students. We searched PubMed, Scopus, and Web of Science for English- or Spanish-language records published between January 1, 2020 and September 30, 2025, using combinations of the terms: "culinary arts students," "gastronomy students," "nutrition education," "culinary nutrition," "diet quality," "Puerto Rico," "food insecurity," and "student eating habits." Boolean operators (AND/OR) were applied, and citation tracking identified additional records. Foundational Puerto Rican studies prior to 2020 were retained where conceptually essential [7]. Two reviewers (conceptually) screened titles and abstracts against inclusion criteria; disagreements were resolved by discussion.

Eligibility Criteria

Included records examined culinary/gastronomy students (or closely related higher-education cohorts) and reported at least one of the following: nutrition knowledge, diet quality, food security, culinary skills/self-efficacy, or outcomes from hands-on/experiential teaching. Exclusions were: non-tertiary populations, absence of relevant outcomes, or non-empirical commentaries.

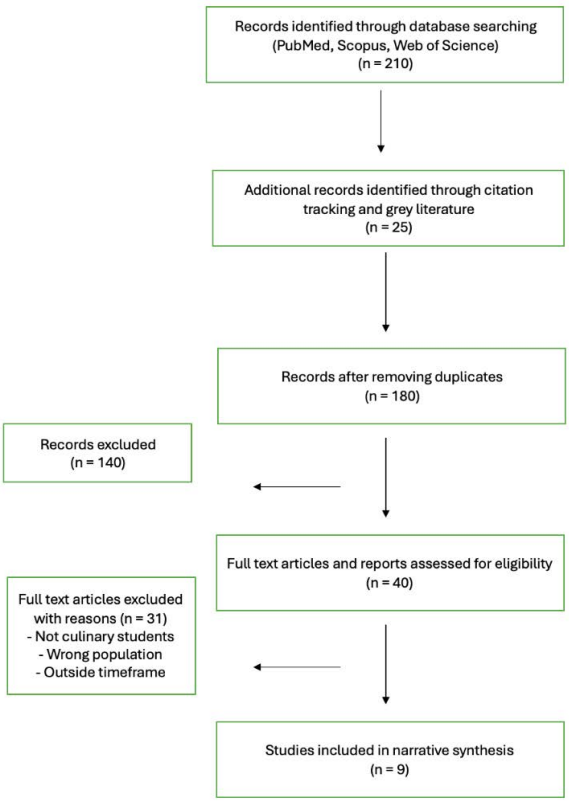
Data Extraction and Appraisal

We extracted setting, sample, design, measures, and key findings, then synthesized results thematically. Given methodological heterogeneity, meta-analysis was not attempted. To enhance rigor, we qualitatively appraised clarity and bias domains aligned with JBI and STROBE considerations, noting where reliance on self-reported outcomes and absence of longitudinal follow-up limited causal inference.

PRISMA 2020

The selection process is summarized in Figure 1, which follows PRISMA 2020 guidance [9]. Counts reflect the specified search window and screening rules.

Selection process for included studies; counts reflect January–September 2025 searches. Diagram adapted from PRISMA 2020 guidance [9].



Adapted from: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71.

Figure 1: PRISMA 2020 Flow Diagram

Results

Five cross-cutting themes emerged: (1) eating habits and nutrition knowledge; (2) barriers to healthy eating; (3) food insecurity among Puerto Rican students; (4) culinary and nutrition education interventions; and (5) sustainability and food systems integration. Experiential instruction was associated with improved cooking confidence and nutrition knowledge in multiple contexts (e.g., healthcare-student pilots and apprentice-chef interventions) [1,5]. However, knowledge increases were not uniformly accompanied by measurable improvements in diet quality among university students, particularly where financial strain and limited access to nutritious foods persisted [2,4]. Puerto Rican cohorts demonstrated comparatively high food insecurity and economic hardship [2,6], which likely attenuate the translation of skills and knowledge into behavior.

Discussion

A theory-driven synthesis clarifies plausible mechanisms. Within Social Cognitive Theory (SCT), self-efficacy mediates the effect of hands-on learning on adoption of healthier cooking and eating practices [11]. The Theory of Planned

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Behavior (TPB) emphasizes the roles of attitudes, subjective norms, and perceived behavioral control in shaping intentions to select and prepare healthier foods [10]. The COM-B model situates these processes within broader capability (nutrition knowledge, culinary competence), opportunity (time, cost, availability), and motivation (reflective and automatic) constructs [12], explaining why student-centered supports (food pantries, low-cost meal plans) may be necessary for sustained change. Compared with European and North American cohorts, Puerto Rican students face a more severe confluence of financial constraints and food access barriers while reporting relatively high culinary confidence [2,6], supporting the interpretation that technical skills are insufficient without concurrent environmental and economic supports. Interventions pairing experiential learning with institutional supports and behavior-change techniques are the most defensible approach for this context.

Limitations of the Evidence Base

Most studies relied on cross-sectional or short-term pre–post designs with self-reported measures, limiting causal inference and external validity. Few examined longitudinal diet quality or objective biomarkers, and mediation by theory constructs was rarely tested explicitly. Future research should incorporate longitudinal designs, validated diet quality indices, and formal mediator analyses (e.g., self-efficacy, perceived control, motivation).

Conclusion

Culinary skill training alone rarely yields durable improvements in diet quality among university students. In Puerto Rico, the combination of financial strain and food insecurity constrains behavior change despite high culinary confidence. Evidence and theory converge on the need for multicomponent approaches that integrate nutrition education with behavioral strategies and student-centered supports. Future trials should be theory-driven, longitudinal, and context-sensitive to the Puerto Rican higher-education environment.

Practical Implications

- **Curriculum design:** Integrate nutrition science, behavior change techniques (goal setting, action planning), and sustainability with technical culinary instruction.
- **Assessment:** Use validated instruments for nutrition knowledge, self-efficacy, and diet quality, with longitudinal follow-up.
- **Student supports:** Expand food pantries, emergency aid, and affordable healthy meal plans to address opportunity barriers.
- **Partnerships:** Foster interprofessional collaboration among chefs, nutritionists, and behavioral scientists.
- **Policy:** Align institutional investment and accreditation standards with evidence-based, health-promoting culinary education.

Declarations

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