Exploring Preservice Teacher Food Practices in the Context of Teaching Food Science Topics

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Introduction

Teacher beliefs and practices are pivotal in shaping classroom practices (Gess-Newsome, 2015). Teacher beliefs affect science teaching in general (Alt, 2018; Lotter et al., 2018), and beliefs coupled with personal food practices may affect food science teaching specifically because beliefs surrounding food manifest in daily practices and food choices (Clark et al., 2022). Because food practices tend to elicit defensive behaviors (Hinrichs et al., 2022), the inclusion of food practices represents the unique beliefs and values of an individual teacher of food science. It is important to examine this aspect of food science teachers to determine how agriculture teacher preparation programs might enhance preservice teachers' (PSTs) content knowledge and self-efficacy in food science to ensure effective teaching. Tennessee's (TN) introduction of the Food Science program of study within the Agriculture, Food, & Natural Resources (AFNR) career cluster created a pathway to food science education through courses like Food Science and Safety and Advance Food Science (Tennessee Department of Education, 2021). Food science education is critical as the industry grows, necessitating that secondary food science teachers are well-prepared to confidently address a variety of topics. Therefore, this study aims to describe TN agriculture PSTs' food practices as potential factors that might influence classroom instruction, perceived importance and ability to teach food science topics, and differences between importance and ability based on food practices.

Conceptual Framework

The conceptual framework for this study adopts Gess-Newsome's (2015) model of teacher professional knowledge and skill, inclusive of Pedagogical Content Knowledge (PCK), to explain the processes through which teacher beliefs and practices influence classroom instruction. Central to this model is the notion of amplifiers and filters – personal attributes unique to each teacher – that mediate the impact of professional development on classroom practices. The researchers characterize perceived importance of food science topics, perceived ability to teach those food science topics, and food practices as potential amplifiers or filters that might influence classroom instruction. Because food practices tend to elicit defensive behaviors, (Hinrichs et al., 2022), the inclusion of food practices as an amplifier or filter is based on the understanding that these practices represent the unique beliefs and values of an individual teacher of food science. This recognition underscores the nuanced manner in which individual beliefs and values, particularly those related to food, can serve as significant determinants of the extent to which professional development influences classroom practices.

Methodology

This study employed a researcher-developed survey based on standards from TN AFNR Food Science courses. The survey had three sections: food practices, perception of importance, and perception of teaching ability. The food practices section asked about typical dietary practices. Face and content validity were evaluated by a panel of thirteen experts in food science and agriculture, similar to the approach used by Duncan et al. (2006). The Cronbach's alpha reliability coefficient for perceived importance was 0.85, and for perceived ability was 0.79. The target population consisted of ninety-two undergraduate PSTs enrolled in an agricultural education course across all five universities in TN offering agriculture teacher preparation

programs. Census sampling, where researchers attempt to survey all members of a population (Lodico et al., 2006) was used. University AFNR education faculty distributed the survey to their students; a total of 32 PSTs (35%) completed the survey. Most respondents were upperclassmen (68%), 18-21 years old (90%), White (93%) female (81%), and took agricultural courses in high school (81%). Data were analyzed using standard descriptive statistics. The research questions were: (RQ1) what are the food practices of food science PSTs; (RQ2) what is the perceived importance of food science PSTs teaching food science topics; (RQ3) what is the perceived ability of food science PSTs regarding teaching food science topics; and (RQ4) what differences exist, if any, in perceived importance and perceived ability of PSTs based on dietary restrictions?

Results

RQ1. Of the participants, 90% (n = 29) reported following a typical American diet, 50% (n = 16) reported at least one allergy (or intolerance) to specific foods; dairy accounted for 50% (n = 8) of all reported allergies and 40% (n = 13) reported avoidance of milk. Further, 19% (n = 6) reported avoidance of whole eggs and 25% (n = 8) preferred purchasing organic produce instead of conventionally-grown produce.

RQ2. On a 5-point Likert-type scale (1 = not important; 5 = very important), PSTs perceived *understanding general safety guidelines for meat, poultry, and eggs* as the most important topic (M = 4.57; SD = 0.68) and *understanding chemical processes and interactions of food components in baked goods* as the least important topic (M = 3.90; SD = 0.92). The grand mean for importance was 4.33 (SD = 0.73); on average, PSTs perceived most topics to be important.

RQ3. On a 5-point Likert-type scale (1 = strongly disagree; 5 = strongly agree), PSTs perceived their strongest ability in teaching *general safety guidelines for meat, poultry, and eggs* (M =3.52; SD = 1.18); teaching *chemical processes and interactions of food components in baked goods* was rated lowest (M = 2.83; SD = 1.39). The grand mean ability was 3.29 (SD = 1.28), suggesting, on average, PSTs were not very confident teaching food science topics.

RQ4. PSTs with restrictive food practices reported lower perceived importance on all topics (grand mean = 4.19, SD = 0.21) than those with no restrictions (grand mean = 4.61, SD = 0.23). PSTs with restrictive food practices reported higher perceived ability to teach all topics (grand mean = 3.31, SD = 0.30) compared to those with no restrictions (grand mean = 3.06, SD = 0.31), except the topic regarding baked goods.

Conclusions and Implications

PSTs reported food science topics were important but were not overly confident in their ability to teach food science topics. The study found a high prevalence of restrictive food practices among participants, with 50% reporting food allergies, significantly higher than the general U.S. population. Specifically, 25% claimed dairy allergies, compared to only 1.9% in the general population (Gupta et al., 2019), suggesting potential overestimation. Further research is needed to determine the reasons for such prevalence as dairy-related misconceptions are common (Redding et al., 2021), and such food practices could challenge teaching dairy-related standards. Addressing possible misconceptions and determining the extent to which restrictive practices affect teaching is essential for enhancing knowledge and self-efficacy in food science education. Further research could also focus on in-service teachers to compare results for similarities.

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