

## **Exploring the Challenges of Food Science and Nutrition Education in Secondary Schools through Teacher Reflective Discourse on an E-mail Discussion Listserv**

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*This article examines the challenges faced by secondary teachers who teach Food and Nutrition (F & N), and how a professional listserv can be used to address those challenges. The purpose of this qualitative research study was to explore the challenges and solutions through the teachers' asynchronous online text conversations on a professional e-mail listserv. A total of 2,586 e-mails from a statewide e-mail listserv, with 978 emails identified as F & N-related content, were collected. The findings show that challenges lie in food lab management, budgeting, and planning. In addition, food allergies, a lack of administration support in course scheduling, limited Spanish materials, restricted or indistinct school policies for the use of teaching aids created barriers to effective classroom practice. In conclusion, the study found the listserv to be a valuable tool for secondary teachers to support one another's needs when teaching F & N.*

For the last three decades, the rate of childhood obesity in the United States has increased (Center for Disease Control and Prevention; [CDC], 2013a). The main causes of the epidemic are the consumption of excess calories and inadequate physical activity (CDC, 2013b). To address this growing problem, the CDC suggest focusing on the food and physical activity environment in the home, childcare centers, and schools. Because of the school's role in the daily lives of children, it becomes important for schools to become the "educational institutions that are committed to creating curricula, a social and physical environment, and social relationships which promote healthy life trajectories for students, families, staff, and communities" (Rugils & Freudenberg, 2010, p. 1565).

As with any school change, teachers will be expected to play a critical role in improving nutrition education in schools. *Healthy People 2010* states, "Nutrition course work should be part of the core curriculum for the professional preparation of teachers of all grades and should be emphasized in continuing education activities for teachers" (U.S. Department of Health and Human Services [HHS], 2000, p. 19-6). Unfortunately, there has not been much emphasis placed on the development of teacher education and training in nutrition topics (Cho & Nadow, 2004; Kirkpatrick, Briggs, & Zidenberg-Cherr, 2007; Murimi, Sample, Guthrie, & Landry, 2007; Pivarnik et al., 2009). This lack of attention can further weaken the state of food and nutrition (F & N) instruction in schools even as national academic standards emphasize the need to integrate food and nutrition into K-12 curriculum planning and development.

In addition to insufficient training, nutrition education researchers point out that (a) time limitations, (b) frustration about coordination and collaboration with other school staff, (c) insufficient funding, and (d) the absence of administrative recognition discourage secondary teachers from becoming competent teachers of food and nutrition (Cho & Nadow, 2004; Hazzard,

Moreno, Beall, & Zidenberg-Cherr, 2011; Kirkpatrick et al., 2007; Kubit, Lytle, Hannan, Story, & Perry, 2002; Murimi, et al., 2007; Smolak, Harris, & Levine, 2001). These factors have a significant adverse impact on teaching and outcomes. Teachers cannot easily remove these barriers without full support from schools, parents, community-based organizations, the government, and the media (Cho & Nadow, 2004).

The Internet has dramatically changed the way teachers share and engage in critical discourse. Reflection is increasingly practiced via electronic files and text instead of with paper and pen. Pennington, Wilkinson, and Vance (2004) found K-12 physical educators were willing to support each other in sharing teaching activities, resources, and instructional strategies while participating in a listserv. There is evidence to suggest teachers and professionals who have similar concerns and interests will support one another's needs by sharing best practices online, distributing knowledge electronically, and helping instructors share products through an online community (Bonk, Wisner, & Nigrelli, 2004; Hyman, 2003; Reynolds, 2002). The online community also serves as a source for professional learning by re-examining the strengths and the weakness of ideas and practices through peer review (Duncan-Howell, 2010; Guldberg, 2008). One such online community is a professional email listserv. An e-mail listserv can play a role in online communication, reflection, and support to help teachers mitigate some barriers to teaching food and nutrition.

The purpose of this study was (a) to explore the contemporary barriers and uneasy experiences of teaching food and nutrition as secondary schoolteachers reflected on the listserv discussion; and (b) to discover the ways in which teachers solved the problems or generated solutions with the support from the listserv.

### **Methodology**

Quantitative surveys used by the aforementioned studies do not lend themselves to giving teachers a voice. The teacher's voice is important to reveal the causes and check the realities of perceived barriers when teaching nutrition. A qualitative data set was needed to provide insight to understand the challenges when teaching F&N.

### **Participants**

An e-mail discussion listserv for Family and Consumer Sciences (FACS) teachers, hosted by the state department of education in a Midwest state, was selected to study. The listserv was not written for any course or training, and all conversations had concluded before the study was conducted. The researchers of this study did not participate in any of these conversations. The conversations happened spontaneously, and the administrator and subscribers did not expect to be participating in a research study while the conversations occurred.

The listserv archive was open to the public and the listserv administrator was notified with an informed consent statement via e-mail before the data collection. Data are reported in aggregate terms and all names of the subscribers and their school/workplace remain anonymous. A total of 2,586 e-mails were collected from the listserv archive from June 2006 to May 2008. Thirty-eight percent of these e-mails ( $n = 978$ ) were identified as food and nutrition-related content.

### **Analysis**

Transcript analysis was used to examine the teachers' reflective discourse about Food & Nutrition. ATLAS.ti 6.2 ([A6], Scientific Software Development, Berlin, 2010) was the

software used to facilitate the analysis. The primary researcher sorted all eligible e-mails into 25 topical categories and calculated the frequency each topic was discussed to identify the most salient F&N issues facing teachers (Table 1). Peer debriefing was used to ensure the trustworthiness of data analysis, and it, too, relied on e-mail communication. The identities of subscribers were removed and anonymity was used in data analysis and reporting.

### Findings

Table 1 shows the most discussed topics in this listserv. These topics were merged into five broader-defined themes in order to present the findings comprehensively.

Table 1.

<i>Topics of Reflective Discourse</i>	<i>n<sup>a</sup></i>	<i>%</i>
Food labs	148	15.1
Teacher resources	114	11.7
Curriculum design & guidance	98	9.8
Recipes	90	9.2
Movies/Shows/Videos	53	5.4
Financial affairs	49	5.0
Food safety & Sanitation	39	4.0
Culinary skills	37	3.8
Policies, regulations and laws	35	3.6
Fruits & Vegetables	31	3.2
Professional events	31	3.2
Jobs & Careers	30	3.1
MyPyramid	30	3.1
Particular foods	29	3.0
Food & Events	25	2.6
Interdisciplinary teaching	24	2.5
Evaluation & Assessments	23	2.4
Food allergies	21	2.1
Environmental & Social issues	15	1.5
Miscellaneous	14	1.4
Dietary concerns	11	1.1
Educational technology	11	1.1
Dietary fat	10	1.0
Dietary guidelines	9	0.9
Dietary Substitutes	3	0.3

<sup>a</sup> Total sample of 978 e-mails

### Issues Teaching Food Labs

The listserv e-mails discussing laboratory management, instruction, and activities were coded as food labs. The FACS teachers were often responsible for managing the labs. They found themselves adding, fixing, and replacing certain lab supplies, appliances, and equipment. Budgetary constraints were common in every school. Getting permission and funding for new

merchandise can be an expensive proposition for improving the FACS department. Two teachers recommended making a bigger investment in quality materials and equipment at first if it fits the budget because they found “over the years they have proved a good deal”.

Lack of money also challenged teachers’ creativity when conducting food labs. One of the money-saving ideas was having students bring foods from home. For many families, however, there was never enough food at home, let alone enough extra food for their children to bring to school. A teacher stated, “. . . their budget is extremely low for the department of 4 teachers . . . the students really cannot afford to bring food in from home . . . Are there any companies out there that are willing to help out with donations?” In addition to purchasing inexpensive ingredients and using coupons and sales to lower the cost, one teacher obtained great help from the school food service manager who was able to share the excess and allowed the teacher to “order from her surplus commodity list and paid the shipping.” This kind of support could lead to further cooperation and collaboration throughout the school community.

Another challenge teachers faced with food labs was the increased number of students accepting free and reduced lunches (FRL), and schools having difficulties collecting lab/class/book fees from the non-FRL students. One teacher shared, “Our school . . . has about 50-60% . . . My principal told me we only collected about 20% from our parents last year. We put them on payment plans etc., but many still do not pay!” Another teacher pointed out the FRL students are qualified for the entire year regardless of their family’s employment status in the next week, so she felt the difficulties they met were caused by a flaw in the law.

To raise funds, teachers looked to grants and fundraisers. Although there were a few opportunities for federal grants announced through this listserv, such as Team Nutrition mini-grants and The U.S. Department of Agriculture Fresh Fruit and Vegetable Program, the opportunities were limited. On the other hand, fundraising not only helped teachers earn enough profits for their class but was a creative and practical way for students to apply learned skills in real life. A teacher stated, “I try to teach the students that when we possess a skill it is important to use that skill for others as well as for ourselves. For this reason . . . we also use the skill to earn money for the department.”

Increased enrollment also turned out to be another challenge. Having a larger class size means there are more students to supervise. The following statement is from a teacher who thought the administration seemed to have no understanding of this problem, “My administrator . . . has never been in my classroom . . . I am having trouble with the attitude of “just deal with it” with little to no consideration to students’ safety and the liability issues if someone gets hurt.”

Moreover, one teacher questioned whether the school could provide enough equipment for the extra students. Yet, it was necessary for the teachers to communicate with administrators. If the administrators still do not get it, a teacher suggested, “INVITE them to your class – let them SEE what you are talking about – BRIBE them with FOOD if you have to.”

A 45-50 minute lab time limits quality teaching. Teachers must adapt homemade recipes themselves or make requests for alternatives on the listserv. A teacher expressed her difficulties with a yeast fermentation lab and making yeast bread, “I picture myself punching down and baking 30 loafs of bread some evening by myself and then what would the students be learning?” Another teacher encouraged her to try a new cool-rise method which allows her to “make the yeast dough one day, put it in the refrigerator overnight, and bake the next day.”

Even with this method, teachers who taught multiple classes in one semester had to split the lab into two days. One teacher thought it was not a disadvantage, “because our students get to learn the time management skill of making foods ahead and freezing them.”

Food allergies are a life-threatening and ongoing health issue among children in the United States (HHS, 2012). It challenges teachers when they must revise their curriculum. A teacher described her struggles,

I have a student 4<sup>th</sup> period who is allergic to peanut butter . . . She was upset that I sent her to the library to do the same assignment that the rest of the class will be doing when finished with their 15 minutes of cooking. She asked why I keep having labs using peanut butter . . . (mainly because of the price and most students like it) . . . Should I ban peanut butter from my other 114 students so that she doesn't get sick?

Another teacher suggested, “Take this opportunity to teach your students about the explanation for allergies and how they will have to make these same changes when they become parents because they won't be able to offer all the same foods to their children . . .”

Two teachers mentioned their schools acknowledged the consequences of students' food allergies by creating a nut-and-peanut-free environment. They not only stopped using nuts and peanuts in classes but have “removed nut products from food lines, vending machines, and fundraisers sold inside the school (bake sales).”

### **Issues of Curriculum Design and Guidance**

The main issues included teaching with abstract concepts of foods and nutrients, unhealthy snacks, and difficulties covering chapters in textbooks. Teaching students the mechanism of how nutrients and metabolism benefit the human body can be difficult because students do not have a sufficient biochemistry background to support this conceptual learning. Teachers often encouraged students to memorize the functions and food sources of each nutrient, continuously reinforcing the information they obtained. A teacher reflected on her own teaching, “Unfortunately this topic doesn't seem relevant to them until some doctor later in their life tells them to improve their nutrition. (Notice how many adults complain to us that they wish they knew nutrition?).” As the teacher mentioned in the quote, when designing health-related curriculum on this subject, a real-life situation may help learners associate the knowledge with their personal interests and support their life-long learning. Four teachers suggested using the written lesson/activity, *Nutrient Bodies*, presented in a conference and published in the conference notebook. The lesson engaged students with drawings by tracing their own bodies. Teachers required students to label and match the functions and food sources of each nutrient with the relevant body parts. One teacher admitted, “Don't expect them [students] to grasp all the nutrients at once. Too much information, even though we don't think it sounds like that much, they do [not] see it as easily as we do.”

The information provided through conferences had successfully met teachers' satisfaction in their professional development. A teacher felt that she was left out from such opportunities because her school did not permit her to attend: “Since [our] school has not allowed the teachers to go to conferences for the past several years, how can we get the information . . . ?”

Another difficulty raised was teachers not having enough time to cover all chapters about nutrients. A teacher said, “. . . I do not feel that I have time to dwell on each nutrient for a specific period of time. Also, I find it difficult to discuss one without the other . . .” A shared strategy in the listserv showed it was more practical to facilitate students making connections

among nutrients and each food group via the food pyramid rather than to follow the textbook. It may save teachers time because the pyramid groups foods by their major nutrient content and all the nutrients included in these chapters can be systematically covered.

A teacher requested an activity to engage students about the basic relationship between nutrition and fitness by calculating the calories in Hershey Kisses versus calories burned during exercise. Many teachers had concerns that using candies in formal classroom teaching might go against school wellness policies because candies would be considered an unhealthy snack. One teacher described the implementation in her school, “Our cafeteria still sells anything they want, and the athletic concessions and fundraisers would be devastated if they couldn’t sell candy. We have a policy but it has basically been implemented as ‘suggestions’.” Teachers often held positive opinions when teaching with candies and considered them an effective way to first introduce the relationship between calories and fitness. Candies are highly accepted among teenagers, and they need to understand “how much work it takes to burn off candy no matter where they eat it. . .” in order to adjust their own behaviors.

### **Issues of Teacher Resources**

Online resources were the most shared format. Teachers spontaneously shared the resources they found. The listserv administrator compiled the shared information and resources on the corresponding website. She notified the teachers with the following announcement,

As more of you share files and URLs that lead to teaching resources, we’ll post them on the [state] FACS websites. This will keep the sending of large files through the Listserv to a minimum and will put the files on the website for your downloading convenience.

The study found that teachers’ lack of second language proficiency frustrated them during curriculum preparation. Moreover, a lack of teaching materials in Spanish prevented teachers from providing quality lessons. Some teachers suggested a few online search engines for finding materials and language tools, such as Yahoo and Google; however, they still needed someone to help them with the translations in person. A teacher expressed her frustration, “I do use freetranslation.com, but it is literal and the students give me funny looks sometimes after reading a translation!!” Another teacher, who had the same challenge, replied she had students translate who speak Spanish, and sometimes even their Spanish teachers in high school came to help in class. Collaborating with other members in school can be a good solution in solving problems.

### **Issues Showing Movies, Video Clips, and TV Shows in Public Schools**

Teachers were concerned about content when selecting movies, videos or TV shows to use in class. *Super Size Me* and *Ratatouille* were the most discussed movies. Both movies have two edited versions because of their content appropriateness and the target market.

Although the educational version of *Super Size Me* is priced four times higher than the PG-13 version, three of the teachers thought that it was a good investment because the disc included review sheets, and it was divided into age groups with lots of interactive activities to do with the class. The disc can “play just the portion of the movie you want to discuss in each specific lesson.” The thread first started because one challenge teachers had when showing the regular version to students was they had to create a study guide/a review sheet/discussion questions/activities themselves. Some teachers complained that the PG-13 version has one

vomiting scene, curse words, and discussion of private sex life. The educational version has deleted the scenes inappropriate for children.

Regarding *Ratatouille*, one teacher suggested this movie for the classes of Culinary Arts and Advanced Foods and Nutrition because “they use the correct culinary terms and even knife holding is correct!”. . . and the kitchen scenes are true to life.” One teacher was concerned about a rat cooking in a kitchen, but another teacher recognized it as an opportunity to address health and sanitation issues in the kitchen. Overall, the movie had more valuable topics (e.g., the arrangement of a professional kitchen, the different preparation methods used, and the hierarchy of management) to engage students in her classes. She further explained, “. . . ask students to evaluate the meaning of food in their families and how it can be used to celebrate holidays and traditions. . .”

Additionally, the legal issue of showing movies, videos and TV shows in schools was mainly associated with the local school policy. The listserv administrator specifically explained the terms stated in the law to the teachers through the listserv. Still, not all of the schools permitted teachers to use movies, video clips or TV shows in their classes even though other teachers recommended them and had positive experiences.

### **Issues of Teachers’ Vague Understanding of Content**

This section reports some teachers’ inadequate understanding of food safety and sanitation principles and difficulties grouping foods based on *MyPyramid*. First, the study found some teachers may be unclear about how to properly store fermented foods and bakery products. One teacher wondered if it is unsafe to leave Amish bread unrefrigerated because of the fermentation. Another teacher just simply answered her, “It will be fine,” but with no further explanation.

A similar confusion about proper food storage was revealed when teachers discussed whether Mayonnaise Cake should be refrigerated. A professor warned others about mayonnaise cake,

I remember hearing about a family becoming quite ill from eating the cake because it had been left at room temperature. Since the mayo is combined with egg, maybe milk, and other ingredients, it should be refrigerated as soon as possible.

Two teachers did not have a problem with this type of cake when left at room temperature. One reason was because “The eggs in mayonnaise just like the other egg in cakes, don’t lead to refrigeration once the cake is baked.”

Choosing proper cleaning substances was many teachers’ concerns. To prevent risk of foodborne illness, it is important for teachers to set an example by demonstrating good sanitation while teaching food labs. A teacher was using bleach water to clean her counter tops but she had heard it may be too harsh so she was seeking alternative suggests. Two teachers replied they use “hot, soapy dish water,” 3% peroxide, or some brand of cleaning products; however, none of the teachers mentioned the suggestions made by the Partnership for Food Safety Education or any institutes with credibility for food safety.

When teachers were trying to expose students to a variety of foods, it was easy for them to feel confused about grouping ordinary ingredients (e.g., tea, coffee and cocoa beans) based on the food pyramid. A teacher was uncertain about how to categorize tea leaves, “Where do tea leaves fit??? Are they fruit / Veg? or just what. (We are enjoying the leaves). With green tea being so very healthy how do they fit into the pyramid????” Although teachers were familiar

with the history of tea, its origination in different countries, and recognized it as “a very good anti-oxidant”, three teachers responded to the question and none of them provided accurate and comprehensive information. One teacher believed “the tea would fit into the same category as coffee. It’s a drug.”

### **Conclusion and Implications**

The purpose of this study was to explore the contemporary issues confronting F & N teachers in secondary schools and to offer solutions through the use of professional listserv communities. Many perceived barriers were identified in teachers’ reflective discourse. The findings provided suggestions and useful references for F & N teachers by addressing best practices and providing reliable resources within an online community, particularly when developing nutrition education curriculum, coordinating health programs, implementing wellness policies, and providing teacher support.

The implications of a professional listserv for F & N teacher support and informal professional development are threefold: (1) enhancing teachers’ problem-solving skills, (2) retaining best practices, (3) updating information about new trends in food choices, new guidelines, and wellness policies.

First of all, food lab management, budgeting, purchasing, fundraising, grant writing, communication, and teamwork are necessary skills for F & N teachers. Professional listservs provide an avenue to acquire and hone these skills by expanding social networks and forming partnerships with national and local companies, accessing donations of damaged or unwanted goods from national corporations and local businesses, and forming partnerships with universities and community clubs. When there is a need, it would be an efficient way to collect donations, free products and even expertise (Hazzard *et al.* 2011).

Second, it is critical to pass down best practices in order to preserve fundamental content, to share reliable resources, and to model the efficient strategies and tools. This study revealed that e-mail listservs can be a valuable source to effectively support the needs of teachers by: (a) exchanging information, online resources, ready-to-use documents and lesson plans/activities/recipes, (b) informing new trends, (c) sharing personal experiences, opinions and students’ work, and (d) brainstorming ideas without a huge investment of time. To maximize the advantages of participating in e-mail listservs, the study suggests that listserv subscribers collect and file all the useful information received from the listservs over time for future reference.

Internet and computer technologies gradually became these teachers’ all-time favorite methods for teaching and learning; however, a cautionary note is warranted. When accessing information through online search engines, choosing appropriate keywords is key. Hazzard *et al.* (2011) found one reason some teachers did not receive enough funding information was because they narrowed down the search areas. This could be the case as well when searching for materials and information. Listserv administrators should encourage subscribers to share their search strategies and enclose keywords in the e-mails. In addition, a reminder about copyright laws and school policies should be addressed to avoid district and/or legal problems.

Third, within our multicultural environment, a wider variety of foods are available in grocery stores and students’ homes. To equip teachers for what they will be teaching, continuing education programs and trainings need to address new trends in food choices and to update the information regarding new guidelines, health issues, and wellness policies.

Lastly, with respect to the application of e-mail listservs, we would suggest a professional e-mail listserv corresponding with the professional program be considered as a budget-saving

tool to encourage and support teachers' inquiry and their professional development. It provides a direct channel for teachers to make their voices heard.

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