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Nutrition Nuggets for the Family and Consumer Sciences Classroom: An Experiential Approach to Professional Development

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Less than five percent of professional development (PD) opportunities for educators in Iowa are related to health and physical education (Iowa Area Education Agencies, 2017). *Even fewer opportunities are specific to health and nutrition-related disciplines such as family and consumer sciences (FCS). Iowa educators are required to earn six license renewal credits every five years to renew their teaching license (Iowa Board of Educational Examiners, 2018). This article describes and evaluates a project designed to provide nutrition PD for FCS educators that included technical content for high school nutrition and health educators to improve nutrition self-efficacy, cooking skills and attitudes, and eating competence.*

Background

Experiential Learning Theory

Career and Technical Education (CTE) programs consist of sequenced courses preparing students for employment. The FCS curriculum encompasses parenting, conflict management, cooking and sewing, personal and family finance, and other topics directly related to daily living. This curriculum typically addresses multiple subject areas. For instance, culinary classes in FCS classrooms extend beyond basic food preparation, emphasizing personal health and nutrition, science, and economics (American Association of Family and Consumer Sciences, 2017).

Concepts in CTE programs tend to be delivered in a very tactile manner. Experiential learning theory (ELT), which includes tactile experiences, is arguably the most successful approach to learning, particularly for nutrition and health behavior change (Coker, Heiser, Taylor, & Book, 2017; Diker et al., 2013; Dudley, Cotton, & Peralta, 2015; Parmer, Salisbury-Glennon, Shannon, & Struempler, 2009; Scogin, Kruger, Jekkals, & Steinfeldt, 2017). Developed as a bridge between cognitive and behavior change theories, ELT is a continuous cycle of four learning phases: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 1984). One reason ELT is so successful is the development of non-cognitive skills including problem solving, team-building, oral communication, professionalism and work ethic (Scogin et al., 2017). These skills are not necessarily taught with this approach but cultivated during the process of learning. As ELT is widely used for educational programming in many populations, it is logical for PD and continuing education to be created using ELT for maximum interest, engagement and retention for educators, which then extends to their students (Diker et al., 2013).

Self-Efficacy and Eating Competence

While ELT has consistently been shown as an effective method for increasing knowledge and retention of subject matter, researchers agree knowledge does not translate directly to behavior change: the impact of interventions on skills and behaviors also needs to be considered. Self-efficacy can be described as one's belief and ability to succeed in specific situations or accomplish a task (Bandura, 1977). Self-efficacy is a powerful indicator of the impact of educational interventions, such as tactile learning experiences, because as people practice and build skills, become empowered and confident in these skills, and are supported to succeed, they are more likely to achieve and sustain behavior change (Austin & Sonneville, 2013; Buchanan, 2004; Lytle, 2005). For educators, self-efficacy and affinity for educational material correlates with willingness to implement that material in their classroom, as well as effectiveness of delivery (Richards, Pratt, Skolits, & Burney, 2012)

While examining self-efficacy for eating behaviors is subjective, an objective measure to examine eating behavior is eating competence (Cunningham-Sabo et al., 2016; Krall & Lohse, 2010; Lohse et al., 2007; Satter, 2007, 2008). Eating competence is defined as the collective balance of positive eating behaviors and attitudes (Satter, 2007). The Satter eating competence model, used in this study, empirically assesses eating competence based on four constructs: 1) eating attitudes and attitudes about food, 2) food acceptance skills, 3) internal regulation skills, and 4) contextual skills (Satter, 2007).

The first construct in Satter's (2007) model, eating attitudes, encompasses the ability to comfortably enjoy desired foods in desired amounts. The development of this construct was based on clinical observations of the following attitudes: body dissatisfaction, interpersonal distrust, social insecurity, and an individual's drive for thinness.

Satter's (2007) second construct, food acceptance, includes the ability to try new foods and incorporate a variety of foods based on learned preferences, genuine interest, and enjoyment of food. This construct was based on observations of the number of foods liked, disliked and/or never tried, and the current stage of change for incorporating fruits/vegetables into an individual's regular daily diet.

Internal regulation, Satter's (2007) third construct, comprises the ability to trust and respect the body's instinctual cues for hunger, appetite and satiety, to modulate when to start and stop eating. This category includes eating disorders, financial stress and food security, and restrictive food behaviors.

Satter's (2007) final construct, contextual skills, covers concepts related to an individual's ability to manage the planning, preparing, and providing of regular, satisfying meals. This category is based on observations related to planning for eating, incorporating all food groups, correctly utilizing food labels/packages, spending time preparing meals from scratch, the frequency of dining in or out, and the enjoyment of cooking.

Individual knowledge, self-efficacy, attitudes, and behaviors of FCS educators can influence their classrooms and, ultimately, their students. Assessing educator self-efficacy, eating behaviors, attitudes, and eating competence can help identify their ability and effectiveness in delivering similar subject matter, as well as identify areas of improvement (Diker et al., 2013).

The objectives of this research were to: 1) Develop a health and nutrition-related curriculum using ELT for FCS classrooms; 2) Use this curriculum to create a PD opportunity for FCS educators; and 3) Improve FCS educators' nutrition self-efficacy, cooking skills/attitudes, and eating competence to impact their ability and willingness to teach health and nutrition-related topics.

Methods

Curriculum Development

Prior to the current study, a survey of 90 Iowa FCS educators (unpublished data) was conducted to assess PD needs and preferences. Information gathered included current sources and methods for gathering information (internet, journals, text books, blogs, e-learning); education field (coach, FCS educator, health or physical education, nurse, other responsible for nutrition education); class schedule type (traditional, block); opinions on importance of various nutrition topics and likeliness of implementing them (calcium-rich foods, food safety, food preparation skills and methods, genetically-modified organisms, MyPlate, organic versus conventional foods, protein supplements, sports nutrition, whole grains, unit pricing), importance of teacher license renewal credits for PD opportunities; preferred methods of learning and teaching (face-to-face workshops, live webinar, recorded webinar, combination). Survey results and the Dietary Guidelines for Americans 2015-2020 guided development of the curriculum and related PD opportunity offered to Iowa FCS educators.

The PD needs and preference assessment (unpublished data) of Iowa FCS educators identified eight topic areas: 1) diet analysis tools and label reading; 2) food safety in the kitchen and industry; 3) protein sources, supplements, and quality; 4) types of fat and related health effects; 5) sugar-sweetened and caffeinated beverages; 6) influences of marketing on eating behaviors and competence; 7) snack habits and quality; and 8) career opportunities in food science and nutrition.

Lessons for this research were developed using ELT and included lecture and hands-on activities, such as practical laboratory experiences, teamwork and discussion, student presentations, and class discussions. Two 45-minute lessons were designed for each topic area. The two lessons could be combined to accommodate 90-minute block schedules. Materials for each lesson included a lesson plan, PowerPoint® presentation, materials list, grocery list, recipe cards, worksheets, supplemental resources, food labels and other resources. The curriculum and PD opportunity were named *Nutrition Nuggets for the FCS Classroom* (hereinafter *Nutrition Nuggets*). This study was approved by the Iowa State University Institutional Review Board.

Participants

Nutrition Nuggets PD opportunity was advertised through the IAEA PD Online catalog, FCS educators' statewide listserv and promoted by Human Sciences Extension and Outreach (HSEO) Nutrition and Wellness Program Specialists. Participants had the opportunity to engage in two PD opportunities, each awarding one credit of teacher license renewal. A convenience sample of 24 educators participated in the hybrid training. Of the educators who participated in the training, 100% were FCS educators, two were also coaches.

Nutrition Nuggets Training:

The first PD activity used a hybrid format. Successful completion required finishing the online portion (eight hours) and a face-to-face regional workshop (eight hours). The online portion included viewing pre-recorded lessons (eight voice-over PowerPoints®) and completing readings, assignments, and discussion posts about topics in nutrition and health (i.e., supplements, genetically-modified foods, fad diets, etc.).

Participants also attended a workshop hosted regionally by a HSEO Nutrition and Wellness Program Specialist. Regional workshops were either one eight-hour session or two four-hour sessions depending on the HSEO Nutrition and Wellness specialist hosting the

workshop. During the workshop, participants completed all experiential activities for each lesson. These activities included preparing recipes, conducting sensory analyses, completing worksheets, accessing online nutrient analysis databases, utilizing dietary analysis software, and identifying credible information sources. Upon successful completion of all online and workshop activities, participants were awarded one teacher license renewal credit.

Participants successfully completing the hybrid training could complete the second PD activity by using the curriculum in their classroom. To satisfy the requirements of the second activity, educators taught and evaluated eight lessons. Teachers also completed an implementation log (date, time, number of students, comments) and pre- and post-implementation surveys. Lesson implementation provided the 15 hours contact time required for teacher license renewal credit (Iowa Board of Educational Examiners, 2018). Once the appropriate documentation was submitted, participants received one teacher license renewal credit.

Surveys

The impact of the PD opportunities on participants' nutrition self-efficacy, cooking attitudes and skills, and eating competence was examined using previously-validated tools discussed below. Surveys consisting of 61 items were administered prior to hybrid training (T1), after hybrid training (T2) and after implementation of curriculum (T3). Surveys were administered electronically via Qualtrics (Qualtrics 2018, Provo, UT), and could be completed via smartphones, computers, tablets or any device with internet capabilities. Surveys included six demographic questions. Participants were assigned the Economic Research Service (ERS) Rural Urban Continuum Code based on location of their school (Parker, 2016) as geographic location is associated with health literacy, health status and other health-related modifiable risk factors (National Center for Health Statistics, 2017).

Nutrition self-efficacy was measured with five items using a four-point Likert scale adapted from Schwarzer and Renner (2000). Cooking skills (14 items) and attitudes (four items) were examined using a survey developed by Condrasky and colleagues (2011). Both scales (cooking skills and attitudes) use five-point Likert scales. Internal consistency of cooking skills (Cronbach α=.91) and attitudes (Cronbach α=.95) as well as test-retest reliability (r=0.63–0.88) coefficients were reported. The sample used to validate this tool was diverse in age, race and employment status.

The Satter Eating Competence Inventory (2007) (ecSI 2.0) includes questions related to the four constructs as previously described: 1) eating attitudes (five items); 2) food acceptance (three items); 3) internal regulation (three items); and 4) contextual Skills (five items). The ecSI 2.0 uses a five-point Likert scale with a total possible score of 48. A higher score indicates greater eating competence, while a lower score indicates lower eating competence. The ecSI 2.0 has reported internal consistency (Cronbach α=0.77) and reliability (r=0.68; p<0.001) (Stotts & Lohse, 2007). It has been validated as a tool for measuring eating competence in demographically diverse populations (Cunningham-Sabo et al., 2016; Psota, Lohse, & West, 2007) including both low-income (Krall & Lohse, 2010; Lohse et al., 2007) and non-low-income females ages 18-49 (Stotts & Lohse, 2007).

Data Collection and Analysis

Prior to the hybrid training, participants were asked to complete a pre-survey (T1). After completing the workshop, participants were asked to complete a post-training survey (T2). If

participants elected to implement the curriculum, they were asked to complete the post-training survey a second time (T3) after implementing all lessons in their classroom.

Scores were calculated for each tool included in the survey. Scales were scored such that a higher score reflected more positive attitudes, skills or self-efficacy. In total, there were eight scores (maximum score): 1) nutrition self-efficacy (20); 2) cooking skills (70); 3) cooking attitudes (20); 4) overall eating competence – "ecSI" (48); 5) eating attitudes (15); 6) food acceptance (9); 7) internal regulation (9); and 8) contextual skills (15).

Scores were calculated at each time point (T1, T2, and T3) for each of the tools included in the survey. Change scores were calculated for each score (T1 to T2 for both groups; T1 to T3 and T2 to T3 for the implementation group) to examine the impact of the two PD opportunities.

Statistical analyses were conducted using SPSS 24.0 (IBM SPSS Statistics for Windows, Version 24.0). Paired t-tests were run on each score between each time point (T1 and T2 for both groups; T1 and T3 for the implementation group; T2 and T3 for the implementation group) using the Bonferroni method to correct for type 1 error (Table 2). Independent samples t-tests were conducted on the change score by training and implementation groups as well as dichotomous variables such as years teaching (greater than or less than 20 years), rural or urban location, and number of teaching roles (multiple vs FCS only). Finally, Spearman correlational analyses and Analyses of Variance (ANOVAs) were conducted to explore demographic variables and survey scores. Significance was set at $p \leq 0.05$ for all statistical analyses.

Results

Twenty-four educators completed the *Nutrition Nuggets* hybrid training. Of these, 10 (42%) successfully implemented all eight lessons in their classroom. Many participants chose not to implement the lessons for three main reasons: 1) teaching plans for the upcoming semesters were already determined; 2) requirement to complete all components as instructed; and 3) difficulty of lessons for their student body. Of the 24 participants who completed the PD, all were FCS educators, and five (22%) reported multiple teaching roles including coach, health or physical education. Six (25%) taught in urban areas, while 16 (67%) taught in rural areas, 2 (8%) did not indicate school location. Participants in urban areas were more likely to have multiple teaching roles compared to participants in rural areas ($t=2.75$; $p=0.03$). Nearly 60% reported teaching for greater than 20 years.

Paired t-tests of survey scores (T1→T2) indicate participants of training-only exhibited a significant decrease in contextual skills ($p \leq 0.05$) (Table 1). No other significant changes were observed for either group (training-only or implementation) between pre- and post-training.

Paired t-tests of survey scores (T1→T3 and T2→T3) for the implementation group revealed a significant improvement in cooking attitudes, ecSI, eating attitudes, food acceptance, internal regulation and contextual skills. These improvements occurred primarily between T2 and T3 except for cooking attitudes, which improved between T1→T3. Additionally, self-efficacy and cooking skills exhibited a trend ($p \leq 0.10$) towards improvement between T1→T3 (Table 1).

Table 1: Paired T-Tests of Survey Scores by Group and Time Point

Training Group Only (n=14)			
Variable	**T1**	**T2**	**T3**
Nutrition self-efficacy	65.71 + 3.39	66.43 + 3.72	
Cooking skills	88.37 + 3.67	88.57 + 3.88	
Cooking attitudes	38.57 + 4.55	37.50 + 3.91	
ecSI	31.57 + 2.17	29.50 + 1.81	
Eating attitudes	11.00 + 0.71	10.14 + 0.65	
Food acceptance	4.71 + 0.53	5.00 + 0.51	
Internal regulation	5.71 + 0.47	5.79 + 0.30	
Contextual skills	10.14 + 0.93	8.57 + 0.88[b]	
Implementation Group (n=10)			
Variable	**T1**	**T2**	**T3**
Nutrition self-efficacy	68.89 + 6.55	71.25 + 3.98	77.50 + 2.83[c]
Cooking skills	88.57+ 3.38	85.71+ 3.68	91.07 + 2.91[c]
Cooking attitudes	32.78 + 3.83	40.63 + 6.58	48.89 + 4.62[b]
ecSI	28.00 + 3.17	25.43 + 2.90	34.86 + 2.54[a,d]
Eating attitudes	9.44 + 1.04	9.25 + 0.92	11.88 + 0.85[a,d]
Food acceptance	4.67 + 1.01	4.25 + 0.82	6.00 + 0.78[a]
Internal regulation	4.89 + 0.79	4.00 + 0.62	6.14 + 0.67[a]
Contextual skills	9.00 + 0.97	7.38 + 1.09	10.38+ 0.91[a]

T1=Pre-training
T2=Post-Training
T3=Post-Implementation
a significantly different from T2 ($p<0.05$)
b significantly different from T1 ($p<0.05$)
c trend from T2 ($p<0.10$)
d trend from T1 ($p<0.10$)

Several change scores were negative at T2, indicating lower scores after training (Table 2). Independent samples t-tests were conducted on change scores (T1→T2; T1→T2/T3) between the two groups. No significant difference in change scores from T1→T2 between the two groups was detected. However, when comparing changes scores for the training only (T1→T2) with the implementation (T1→T3) groups, the implementation group had significantly higher cooking attitudes, ecSI (p-value), eating attitudes (p-value), and contextual skills (p-value) change scores (Table 2).

Paired t-tests were also conducted on change scores between T1→T2 and T2→T3 in the implementation. The ecSI and each of the individual four constructs had negative change scores between T1 and T2; however, these scores became positive between T2 and T3. Four of these scores suggest significant ($p \leq 0.05$) improvement (Table 3). Results suggest implementation of the curriculum had the greater impact on the ecSI score and its four constructs.

Analysis of variance (ANOVA) with Tukey's post-hoc analyses were conducted on T2→T3 change scores to investigate the influence of demographic factors on post-implementation change scores. No significant differences or trends were observed for change scores (self-efficacy, eating competence, eating attitudes, food acceptance, internal regulation

and contextual skills) by demographic factors (educator role, number of years teaching, technology skills, class schedule type and number of teaching roles).

Table 2: Independent T-Tests of Change Scores by Group

Change Score Variable	Training Only Group (n=14) T1→T2	Implementation Group (n=10) T1→T2	*p*
Self-Efficacy	0.71 ± 2.86	3.57 ± 8.29	0.69
Cooking Skills	0.20 ± 0.85	-1.84 ± 2.92	0.40
Cooking Attitudes	-1.07 ± 2.97	7.14 ± 5.44	0.16
ecSI	-2.07 ± 1.90	-6.17 ± 3.40	0.28
Eating Attitudes	-0.86 ± 0.75	-1.29 ± 1.06	0.75
Food Acceptance	0.29 ± 0.41	-0.43 ± 0.53	0.32
Internal Regulation	0.07 ± 0.45	-1.50 ± 1.18	0.14
Contextual Skills	-1.57 ± 0.69	-2.43 ± 1.19	0.51
Change Score Variable	**Training Only Group (n=14) T1→T2**	**Implementation Group (n=10) T1→T3**	***p***
Self-Efficacy	0.71 ± 2.86	8.89 ± 6.86	0.22
Cooking Skills	0.20 ± 0.85	3.86 ± 4.15	0.43
Cooking Attitudes	**-1.07 + 2.97**	**16.11 + 6.60**	**0.01**
ecSI	**-2.07 + 1.90**	**5.89 + 2.97**	**0.03**
Eating Attitudes	**-0.86 + 0.75**	**2.00 + 0.97**	**0.03**
Food Acceptance	0.29 ± 0.41	1.44 ± 0.87	0.25
Internal Regulation	0.07 ± 0.45	1.44 ± 1.14	0.21
Contextual Skills	**-1.57 + 0.69**	**1.00 + 0.78**	**0.03**

p-values calculated at CI (.95)

Table 3: Paired T-Test of Change Score for Implementation Group Time Points

Variable	T1→T2	T2→T3	*p*
Self-Efficacy	8.33 ± 8.03	3.33 ± 1.05	0.59
Cooking Skills	-1.84 ± 2.92	5.71 ± 3.28	0.15
Cooking Attitudes	7.14 ± 5.44	11.43 ± 7.38	0.74
ecSI	**-6.17 + 3.40**	**10.00 + 2.44**	**0.01**
Eating Attitudes	**-1.29 + 1.06**	**3.00 + 1.05**	**0.05**
Food Acceptance	**-0.43 + 0.53**	**1.71 + 0.61**	**<0.00**
Internal Regulation	-1.50 ± 1.18	2.17 ± 1.01	0.06
Contextual Skills	**-2.43 + 1.19**	**3.14 + 0.67**	**0.02**

p-values calculated at CI (.95)

Discussion

Greater change in pre- to post-scores for cooking attitudes, overall eating competence, and three of the four eating competence constructs occurred among those who took part in both the training and the implementation versus the training only. Moreover, these scores improved for the smaller implementation group, but did not improve for the training-only group. These results suggest experiential learning (implementation) may have been impactful, which is consistent with other research using ELT (D'Adamo et al., 2016; Dudley et al., 2015).

Improving eating competence has cognitive, behavioral, and social implications. Lohse and others (2017) determined specific behaviors and attitudes were associated with varying levels of eating competence: A person dissatisfied with their weight was 54% less likely to be a competent eater. Further, individuals with higher eating competence have significantly lower risk for cardiovascular events (Psota et al., 2007), are more likely to experience positive body satisfaction and improved weight management, and are more likely to meet dietary intake and physical activity recommendations (Stotts & Lohse, 2007). As the FCS classroom is often the venue for nutrition education, FCS educators need to be informed in these areas to model and guide behaviors of their students, as well as benefit their own health. Research has previously suggested experiences with challenges, discoveries, and reflections enable educators to deliver relevant educational material more effectively (Rehm, 2006).

The eating competence constructs, developed by Satter (2007), were based on clinical observations and treatment of disordered eating behaviors. They are particularly relevant given the prevalence of disordered eating patterns in today's society, which often lead to both underweight and overweight conditions (Le Grange, Swanson, Crow, & Merikangas, 2012). These conditions both have similar deleterious health implications such as increased risk for body dissatisfaction, body dysmorphia, and eating disorders (Clifford et al., 2015; Reba-Harreleson et al., 2009); increased smoking and alcohol use (Vurbic et al., 2015); cardiovascular events including heart attack and atrial fibrilation (Flegal, Graubard, Williamson, & Gail, 2005; Kang et al., 2016); renal disease (Fotheringham, Weatherley, Kawar, G. Fogarty, & Ellam, 2014; Sato et al., 2013); and increased years of work and life lost (Brown, Mishra, Kenardy, & Dobson, 2000; Fontaine, 2003).

In the current study, eating competence and the four individual construct scores among the training-only group were similar to eating competence scores previously reported in other studies. Scores for the implementation group were much lower than previously reported scores at T1 and T2, and similar or higher at T3 (Contento, Koch, Lee, Sauberli, & Calabrese-Barton, 2007; Lohse et al., 2007; Psota et al., 2007; Stotts & Lohse, 2018). The implementation group experienced a significant improvement in overall eating competence, eating attitudes, food acceptance and contextual skills.

Greene et al (2012) reported no significant change in eating competence following a 10-week online nutrition education intervention program. The significant change in eating competence identified through the current study may be related to the use of ELT strategies. Results of the paired t-tests on raw scores between T1→T2 for the training-only group, and T1→T3 for the implementation group indicate the training-only group exhibited just one significant change (in contextual skills) while the implementation group had significant improvement in all eight of the survey tools (healthy eating self-efficacy, cooking skills and attitudes, overall ecSI, and the four individual constructs). These results suggest implementation of learned material is the catalyst for behavior and attitude change, which is consistent with other research using experiential learning approaches (D'Adamo et al., 2016; Dudley et al., 2015).

Self-efficacy related to healthy eating and cooking has been shown to improve in educators after completing experiential learning activities (Diker et al., 2013). Improving self-efficacy, healthy behaviors, cooking skills, and attitudes of nutrition educators benefit both students and educators. Current recommendations suggest implementing behavior-based interventions to help students achieve a healthy lifestyle (Dietary Guidelines Advisory Committee, 2015). Thus, educators need to implement ELT strategies, which include experiential learning activities actively engaging students in the behavior change process.

Interestingly, scores for cooking attitudes, overall ecSI, eating attitudes, food acceptance, and contextual skills decreased between T1 and T2 (negative change scores) indicating lower self-efficacy, skill, or competence among both groups. It is possible participants were over-confident and/or not familiar with the constructs measured by the survey tools. For example, during the hybrid training, educators were introduced to the constructs of the eating competence model and mindful eating. These were possibly new concepts for the educators and post-training scores (T2) may have reflected an enhanced appreciation and understanding of these constructs, thus the lower scores. Similar to the paired t-tests in the implementation group, a number of change scores between the training only and implementation groups were significantly different ($p \leq 0.05$) or trended ($p \leq 0.10$). The significantly higher changes detected for cooking attitudes, ecSI, eating attitudes and contextual skills in the implementation group support previous research showing the positive impact of ELT on nutrition knowledge, behaviors and attitudes (Jarpe-Ratner, Folkens, Sharma, Daro, & Edens, 2016; Diker et al., 2013; Parmer et al., 2009; Scogin et al., 2017), and further support use of ELT as a model for PD.

Change scores did not appear to be impacted by demographic differences, such as teaching role, years teaching, technology skills or class schedule type. This may be due to the small sample size and lack of diversity in the sample. Although not significant, change scores observed in educators with more than 20 years of teaching experience were greater than those observed in educators with less than 20 years. This result was unexpected, particularly for cooking attitudes, cooking skills, and nutrition self-efficacy. These results may indicate this population's interest in learning new material or benefits resulting from experiential PD opportunities. These results also support conclusions from the National Center for Education Statistics, which reported CTE educators as more likely to: 1) participate in field-specific PD; 2) seek new information/training after completing field-specific PD: and 3) change teaching practices based on that information and training (US Department of Education, 2000).

Limitations

The ability to generalize these findings to other educator populations is limited due to a non-diverse, small sample, the researchers' limited ability to assess curriculum protocol adherence, and the use of self-report data. Participants in this study were a convenience sample of FCS educators teaching primarily in rural locations in a Midwest state. Although preferred for qualitative investigation, conclusions based on convenience samples typically cannot be generalized to other, larger populations.

Less than half of the participants chose to implement the lessons. Additionally, adherence to curriculum protocol could not be guaranteed as the researchers had no physical contact with participants, their classrooms or their teaching materials. Further, all data collected was self-report, which has inherent limitations. Finally, components of this curriculum, such as introducing, discussing and measuring eating competence, required participants to be insightful,

highly self-aware and honest with themselves and the researchers. This is a challenging task even with extensive training.

Conclusion

Educators' comfort and willingness to implement new learning material and strategies in the classroom varies by educator. This is particularly relevant for nutrition education, which is a relatively new area of science and continues to evolve. Providing FCS educators with topic-based PD affords them the latest research-based tools to inform their teaching practices, encourages growth in their field of study, and facilitates positive changes in behaviors and attitudes of their students.

Content-specific opportunities to fulfill PD requirements for FCS educators are lacking. Moreover, availability and accessibility of PD opportunities can be limited due to geographical location/residence of the educator relative to the PD being offered, or the modality of the PD being offered. However, results from this study and others indicate ELT as a model for hybrid (combination of online and face-to-face) PD is an effective method for increasing nutrition self-efficacy and other positive health behavior outcomes of participating educators. Active and experiential learning models strengthen teaching and learning among the four core concepts of FCS: Basic Human Needs, Individual Well-Being, Family Strengths, and Community Vitality.

More research is needed regarding assessment of knowledge, skills, self-efficacy, perceptions, behaviors and teaching practices of the current generation of FCS educators and their classrooms. This information is necessary when designing field-specific PD opportunities for these educators. PD opportunities should utilize ELT to maximize the desired teaching and learning outcomes.

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Family and Consumer Sciences Education Students' Assessment of their Understanding of the North Carolina Secondary Family and Consumer Sciences Programs of Study and FCCLA

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After completing the "Introduction to Family and Consumer Sciences Education" course at Appalachian State University, students completed a self-assessment regarding their knowledge, awareness, and abilities related to the North Carolina family and consumer sciences (FCS) education programs of study and Family, Career, and Community Leaders of America (FCCLA). Students rated themselves as being most knowledgeable about the middle school, foundational, and beginning specialized FCS courses, while feeling less prepared to teach the upper level career-based courses. Regarding FCCLA, students reported being more knowledgeable about FCCLA resources and promotion of FCCLA to the community; in addition, they felt capable of developing an effective program of work for their chapters. While students felt they had a sound understanding of FCCLA STAR events, they did not feel the same about their understanding of the FCCLA National Programs.

Recent studies have found high satisfaction among FCS teachers, (Bartley & Sneed, 2004; Godbey, & Johnson, 2011; Lee, 2013; Mimbs, 2000; Mimbs, 2002; Tripp, 2006; Tripp & Hollarn, 2016; White & Tripp, 2009), findings that are extremely encouraging to FCS teacher candidates. However, such studies also reveal that FCS teachers face unique challenges (Arnett, 2012; Davis, 2010; Lee, 2013). Acquiring and maintaining a sound understanding of the various high school FCS courses of study as well as developing the ability to effectively facilitate the FCCLA student organization are two such challenges for FCS education pre-professionals.

Given the number of content areas included in the secondary FCS program, it can be daunting for FCS teacher candidates to develop a comprehensive understanding of all the high school FCS courses of study. Using the Delphi method, Davis (2010) sought to determine FCS content and experiences that were priorities for FCS teacher candidates. Among those priorities were an understanding of content in the areas of consumer economics, resource management, family and human development, foods and nutrition, apparel and textiles, housing and interior design, child development and parenting, as well as knowledge of curriculum development and instructional strategies. Likewise, Arnett (2012), noted the challenges beginning teachers face when they are expected to teach in all FCS areas, sometimes with insufficient content knowledge or experience.

Developing the ability to effectively advise a high school FCCLA student organization is another priority for FCS education pre-professionals (Davis, 2010). However, several FCS teachers do not facilitate FCCLA chapters because they find the organization is complicated and confusing, and they do not know how to implement a chapter (Alexander, Davis, & Pierce,

2015). Yet, given the incredible leadership opportunities it provides for FCS students, FCCLA should be an integral part of every high school FCS education program

Developing beginning competence in both tasks is an expectation for students in an upper level FCS course at Appalachian State University, *Introduction to FCS Education*. The purpose of this course is to provide students with an introduction to the North Carolina programs of study in secondary FCS, as well as the student organization, FCCLA. This three-hour course includes the following: (1) a study of the history and organizational structure of career technical education; (2) a survey of the North Carolina FCS secondary programs of study; (3) guided observations at the secondary level to develop awareness of the various roles played by the FCS teacher, as well as to distinguish among the various courses; and (4) the study of effective procedures for organizing and advising an effective FCCLA chapter. In this class that meets three hours per week, students review the various secondary FCS programs of study and FCCLA resources; complete weekly observations at a public high school; develop a curriculum file for the various program areas; and attend the FCCLA state meeting. The purpose of this study was to obtain data on students' self-assessment of their competence related to their knowledge, awareness, and abilities related to the secondary FCS programs of study and FCCLA.

Methodology

At the beginning of the Spring 2016 semester, students received a course syllabus which included the course description, course objectives, class assignments, and a schedule listing the various topics to be addressed each week. Throughout the semester, students carried out the class activities and assignments that were required.

After gaining an overview of the history and organization of career technical education, students began their study of the North Carolina FCS education program of studies. Students joined the state's online FCS professional learning center to access the various FCS curriculum guides. They completed guided reviews of the middle school, foundational, and entry level specialized courses: *Exploring FCS Education*, *Teen Living*, *Foods 1*, *Parenting & Child Development*, *Apparel & Textile Production 1*, and *Interior Design 1*. In addition, as the entry level specialized courses were addressed, further information regarding upper level courses in that area was also provided. For example, as *Foods 1* was reviewed, information regarding *Foods 2 Technology*, *Foods 2 Enterprise*, *Culinary Arts*, and *ProStart* was also brought into the discussion to increase students' awareness of additional courses in that career pathway.

As students reviewed the various FCS secondary courses, they also made weekly observations in high school FCS classrooms, completing reflective reviews after each observation. Reflective reports required the following: brief description of what happened during the class; one thing that stood out to them; and a specific response to the concept being observed that day. For example, when considering the concept of the multiple roles of the FCS teacher, the prompt was the following.

> *Discuss the various roles in which the teacher was engaged (instructor, FCCLA adviser, career adviser, provider of work-based learning, curriculum developer, promoter of FCS program, evaluator, classroom manager, etc). How effectively did the teacher carry out these various roles? How does the teacher balance all these roles?*

Since students observed different FCS courses and teachers, their follow-up class discussions

enabled them to distinguish more clearly among the various FCS course offerings. In addition, students gained valuable insights into the various roles carried out by FCS teachers.

Along with the guided reviews, observations, and reflective reports, students developed a resource file for each of the basic courses they reviewed. The purpose of this assignment was to help the students to clarify the content for each of the introductory and specialized FCS courses by selecting appropriate teaching resources for those courses. The resource file could then be utilized during the student teaching experience.

The second part of the *Introduction to FCS Education* course focused on the FCCLA organization. Using the *Handbook to Ultimate Leadership* (2009) FCCLA resource, students studied FCCLA traditions, organization, membership, funding, adviser's role, student leadership, communication, public relations, and FCCLA national programs and STAR events. One of the weekly high school observations concerned FCCLA, with the prompt being:

> *What evidences do you see that this teacher has an active FCCLA chapter? Bulletin boards? Co-curricular activities? Involvement in FCCLA events? If there is an active FCCLA, find out about it: How the teacher facilitates it; how many members there are; when meetings are held; how involved in various events and projects students are; etc. If there is not an active chapter, see if you can find out why that is the case. If there is an active chapter, reflect on what they do that you might also want to do with your future chapter. If there is not an active chapter, reflect on how you might get one started–what specific actions would you take?*

For an FCCLA field experience, students served as judges for North Carolina's STAR Events competition which was held during the FCCLA state meeting. Students prepared for this experience by studying the event to which they were assigned, and then serving as a judge alongside FCS teachers and professionals. This experience enabled the students to see FCCLA in action.

At the end of the semester, students presented their resource files and FCCLA experiences to the class. They also completed a self-evaluation of their awareness, knowledge, and abilities regarding secondary FCS programs of study and the FCCLA student organization. Eleven FCS education students completed the self-evaluation instrument. The survey asked students to evaluate their awareness, knowledge, and competence related to the secondary FCS program of studies and FCCLA. Students were asked to rate themselves using a 3-point Likert-type scale (3 = "I have definite readiness or awareness in this area;" 2 = "I have some readiness or awareness;" and 1 = "I am still weak and uncomfortable in this area").

Results

Descriptive statistics were utilized to determine the mean scores of students' responses. Regarding their awareness/knowledge of the secondary FCS programs of study, students were most confident in their understanding of the following courses: (1) middle school Exploring FCS Education (mean = 2.55); (2) Teen Living (mean = 2.55); and (3) the specialized courses (Foods 1, Parenting & Child Development, Interior Design 1, & Apparel & Textile Production 1) (mean = 2.55). Students were less confident in their understanding of the history, organization, and status of career technical education in general (mean = 2.27). They were least certain regarding their knowledge of the career type courses (*Early Childhood Education*, *Culinary Arts*, etc.)

(mean = 1.73).

Regarding FCCLA, students reported being most knowledgeable about the resources available to FCCLA advisers (mean = 2.82), as well as feeling most competent in promoting FCCLA to students and the community (mean = 2.82). Students also reported feeling capable of developing an effective program of work for their chapters (mean = 2.73) and promoting the development of student leadership skills (mean = 2.73). Overall, students had a clear understanding of the facts, history, and traditions of FCCLA (mean = 2.55) and STAR events (mean = 2.55). They were less confident in their understanding of the national programs (mean = 2.18) and the overall organization of FCCLA at the district, state, and national levels (mean = 2.18).

Discussion and Conclusion

After completing the *Introduction to FCS Education* course at Appalachian State University, students reported that they were most knowledgeable about the middle school, foundational, and beginning specialized FCS courses, while feeling less prepared to teach the upper level career-based courses. Regarding FCCLA, students reported being more knowledgeable about FCCLA resources and promotion of FCCLA to the community; in addition, they felt capable of developing an effective program of work for their chapters. While students felt they had a sound understanding of FCCLA STAR events, they did not feel the same about their understanding of the FCCLA National Programs.

Findings from this study indicated that students were more knowledgeable regarding the courses that beginning teachers are more likely to teach in their first positions, and this aligns with the instructional emphasis in the *Introduction to FCS Education* course. In addition, most of students' public-school observations were completed in those foundational classes. Students appeared to recognize the value of reviewing the FCS curriculum guides and completing the weekly observations in high school FCS classrooms as indicated by some of their open-ended comments:

> *For me the most valuable thing was the exploration of the various NC curriculum guides. It was something I had never looked at but is very important as it provides the basis of our classrooms in the future.* (Student A)

> *The observations and reflection prompts allowed me to look deeper instead of just sitting and observing. I tend to take things at face value, but the prompts challenged me to consider more than just the surface.* (Student B)

> *The classroom observations really helped me see firsthand what I'm going to be doing soon. It was great to see it in action.* (Student C)

Regarding FCCLA, it appeared that students' direct involvement with the STAR events at the state meeting enhanced their understanding of those events. A similar experience related to the national programs was not completed, and students appeared less confident in that area. However, even in most of the lower rated areas, students had some readiness or awareness. Students' open-ended comments indicated that they valued the experience of serving as a judge at the FCCLA STAR Events:

> *I enjoyed going to the FCCLA STAR Events. I was able to talk with FCS teachers and learn about the basics of FCCLA."* (Student D)

> *The most helpful learning experience in this class was serving as a judge in the FCCLA STAR Events. It made everything much clearer for me as a future adviser to an FCCLA club, and it gave me plenty of insights."* (Student E)

Additional comments from the students revealed their desire for even more class discussion regarding their FCS classroom observations to share more fully with their classmates who might have different perspectives. In addition, students requested that more time be allotted for exploration of the state's FCS professional learning center to not only review the basic curriculum guides, but also the more advanced FCS guides, as well as the resources related to FCCLA. Finally, students desired more information on the specifics of helping their future students prepare for an FCCLA STAR event.

Limitation

This study's main limitation was its small number of participants; however, additional data will continue to be collected. In addition, these findings and students' comments will be considered as future course revisions are made.

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Conceptual Change During the Professional Socialization Process

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Through the professional socialization process, novice family and consumer sciences (FCS) students are asked to let go of their lay knowledge about the profession to make room for changes to their existing mental schema. The premise of this paper is that the professional socialization process is better ensured if it is informed by conceptual change theory. Three different lines of conceptual change inquiry (i.e., knowledge as theory, elements and context) are discussed. Application of these lines helps university program planners and faculty better appreciate and facilitate the intellectual challenge they are expecting novice professionals to embrace.

Higher education FCS, home economics, and human ecology (hereinafter FCS) degree programs are charged with socializing laypeople into the profession ensuring they identify with the profession upon graduation (Cornelissen, 2006; McGregor, 2011). A layperson is not formally trained nor qualified in a particular profession and does not have specialized or professional subject knowledge. Their notions of and knowledge about the profession arises from outside the academy (Maranta, Guggenheim, Gisler, & Pohl, 2003) and are often based on positive or negative personal experiences, biased pigeonholes, misrepresentations, and stereotypes.

Professional socialization serves to augment lay knowledge with discipline- and profession-specific knowledge. It is "the process by which people selectively acquire the values and attitudes, the interests, skills and knowledge – in short, the culture – current in groups of which they are, or seek to become, a member" (Merton, Reader & Kendall, 1957, p. 278). Students are expected to move from being a novice through apprenticeship and maturity to an emergent professional. The latter has internalized and committed to the professions' mission and mandate (see Figure 1, drawn from Weidman, Twale, and Stein, 2001).

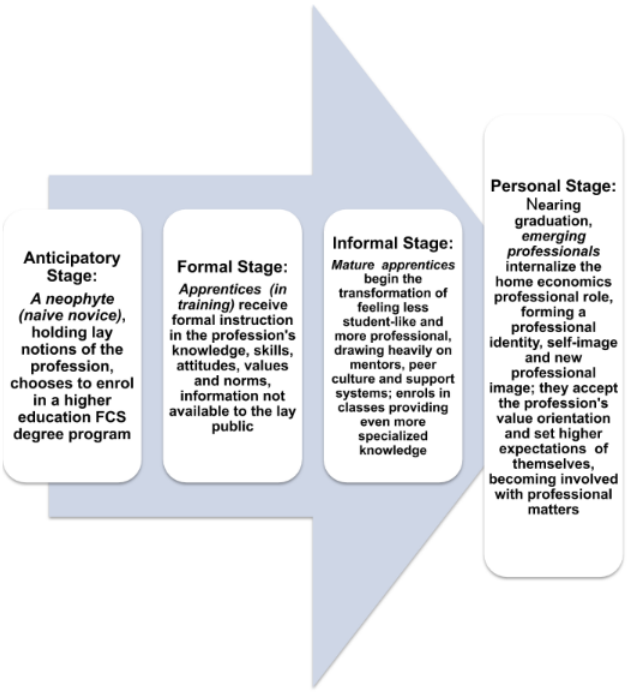
The socialization process involves deep and far-reaching conceptual change necessary to relinquish inherent reliance on lay knowledge. Conceptual change refers to "the process by which people's central organizing concepts change from one set of concepts to another, incompatible with the first. [That] is, how concepts *change* under the impact of new ideas or new information" (Posner, Strike, Hewson, & Gertzog, 1982, p. 211). To identify with the profession, novice students must internalize the profession's norms and values into their mental schema.

Mental Schema

Mental schemas are internal sets of interrelated concepts that people draw on when facing the problem of interpreting what they are experiencing (Cartelli, 2009). Examples of schemata

include worldviews, internal scripts, and social scripts (Nadkarni & Narayanan, 2007). In this paper, lay knowledge of FCS is considered a mental schema. People rely on schemas to understand their world and rapidly process new information with little effort, made possible because schemata serve as a heuristic (Greek *heuriskein*, "to find") for sorting through memories to make sense of a situation. These internal search rules simplify information processing and decision making.

Figure 1. Stages of Professional Socialization Process.



Ironically, schemas can sometimes hamper the uptake of new information with the mental rules precluding acceptance of new input (Tuckey & Brewer, 2003). This can be problematic because mental schemas are quite stable even in the face of contradictory information (Nadkarni & Narayanan, 2007). They are both a structure of preconceived ideas (e.g., lay knowledge) and a system of organizing and perceiving new information. People tend to pay more attention to things when they fit within their schemata or frame of reference (Nadkarni & Narayanan, 2007). FCS curriculum must, therefore, be planned in such a way that it accommodates initial push back against contradictory notions of what the profession is about. To complicate matters, students' attention to new information can be diverted through naivety and blind spots, which is also problematic because deeply entrenched lay knowledge is hard to pry open and replace.

Naivety

The first stage of professional socialization is novelty and naivety (Weidman et al.,

2001). Conceptual change researchers use the idea of naivety to refer to people's reliance on lay notions. They are interested in understanding how students move from naive to more sophisticated conceptualizations (Vosniadou, 2007). Naive means lacking experience, wisdom or judgement. Naive people often deliberately reject or lack knowledge of sophisticated approaches and alternatives, relying instead on entrenched, popular or lay conceptualizations (Anderson, 2014).

This is not surprising given that "experts are supposed to be knowledgeable and lay persons are ignorant" (Maranta et al., 2003, p. 150) meaning they lack knowledge or awareness. Appreciating this, FCS curriculum planners and faculty members need to remain open to the possibility of protracted push back from naive students until they overcome the urge to fall back on lay knowledge and become receptive to more sophisticated understandings of the profession and discipline. Resistance is natural but not conducive to professional socialization (Weidman et al., 2001).

Blind Spots

Another way to conceive this naivety is to view it as a conceptual blind spot, which refers to conventional wisdom that no longer holds true but still guides thinking (Porter, 1980). At first, naive students will be inclined to hold onto convention (i.e., what they think and know) and draw comfort from their lay knowledge of the profession even when it becomes evident that it longer holds true. These blind spots impair people's ability to see reality for what it really is (Tuchman, 1985); it is too easy to fall back on memory search heuristics. The additional term "cognitive blind spots" reflects the idea that people often do not know they have a blind spot; that is, "we do not see *that* we do not see" (von Forrester, 2003, p. 284).

Blind spots can make it very difficult to accept that phenomena can be seen and understood from alternative perspectives (Meyerson & Martin, 1987). FCS curriculum planners and faculty members need to appreciate that naive students' natural blind spots represent what they "don't know enough to even ask about or care about" (Wagner, 1993, p. 16). Blind spots keep students from seeing the profession as clearly as they might (Wagner, 1993). Faculty need to respect and work around and through these blinders if they want naive students to engage in conceptual change during their studies.

Main Approaches to Conceptual Change Theory

Asking novice students to let go of their lay knowledge about the profession to make room for new knowledge involves them changing their mental conceptual schema. This pedagogical challenge can be understood using conceptual change theories. Originally conceived by Posner et al. (1982), conceptual change has evolved into a thriving line of inquiry, rich with nuanced, ongoing debate amongst theory proponents (Özdemir & Clark, 2007). It is focused on what is involved in people changing their central organizing concepts about a phenomenon when exposed to new information and ideas about it (Posner et al., 1982). An example is novice FCS students being asked to see the profession as a powerful change agent focused on the family for the good of humanity (East, 1979). It is quite likely they did not enter the program with this conceptualization in mind.

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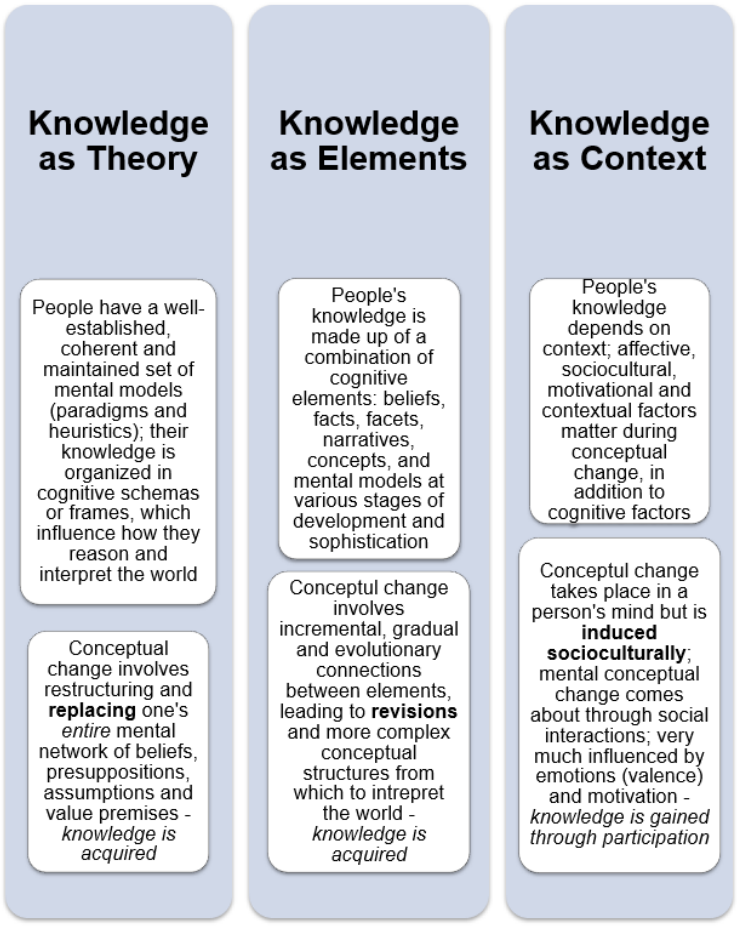
Conceptual change theories offer insights into how students learn new, abstract concepts and constructs and how existing and newly acquired concepts change with ongoing learning and development (Mason, 2007; Vosniadou, 2007, 2013). Although there are no widely-accepted, well-articulated and tested theories of conceptual change (diSessa, 2006), three approaches have evolved: knowledge as theory, elements and context (see Figure 2). *Knowledge as theory* assumes that people's knowledge is a "coherent, unified framework of theory-like character" (Özdemir & Clark, 2007, p. 351). This "overarching hierarchal conceptual structure" (p. 352) can only change if learners experience a radical paradigm shift enabling them to assimilate and accommodate new ideas. The *knowledge as element* approach assumes people understand things in terms of "collections of multiple quasi-independent elements [comprising beliefs,] facts, facets, narratives, concepts, and mental models at various stages of development and sophistication" (Özdemir & Clark, 2007, p. 354). The *knowledge as context* approach focuses on the role of emotions, social factors, motivation and context during conceptual change (Mason, 2007; Vosniadou, 2007). Implications for FCS curriculum planners and faculty members are integrated into the discussion of these three approaches.

Figure 2. Major Approaches to Conceptual Change Theory



Knowledge as Theory

A person's current conceptualization will influence their receptiveness to and selection of new concepts (Davis, 2001; Özdemir & Clark, 2007; Posner et al., 1982). The lay knowledge held by novice FCS students will affect their receptivity to expert knowledge about the profession. These existing conceptions are extremely resilient and highly resistant to change because concepts are so dependent upon the cognitive artifacts within a person's "conceptual ecology" (Posner et al., 1982 p. 212). This is the internal environment within which all information is interpreted. It helps stdents reason about what they observe and are exposed to during learning. Resultant changes in this internal environment (i.e., collection of concepts) reflect new knowledge being absorbed and integrated into it (Park, 2007).

To complicate the situation, this approach assumes conceptual change and the acquisition of new knowledge is a gradual process with change occurring at the level of individual concepts. Because some concepts are attached to others, the revision of one may require revisions to others (Chi, 2008; Özdemir & Clark, 2007; Vosniadou, 2013). For example, if a novice student succeeded in replacing the concept of "FCS is just cooking and sewing," that student would also have to reconceptualize these activities as more than mundane. Because concepts are also connected through belief systems, students' beliefs must be open to revision and radical shifts (Chi, 2008; Özdemir & Clark, 2007; Vosniadou, 2013). Belief shifts may be difficult because lay notions are deeply entrenched (Maranta et al., 2003).

The knowledge as theory approach further presumes that conceptual change is likened to a paradigm shift. At any given point in time, people maintain a small number of well-developed coherent mental models that provide consistent predictions and explanations across significant domains in their lives (Davis, 2001; Kuhn, 1970; Özdemir & Clark, 2007). These entrenched paradigms (including attendant mental schemas) constrain future learning of new concepts, making the conceptual change process difficult because people must revise and restructure an entire mental network of beliefs, presuppositions, assumptions and value premises (Chi, 2008).

The latter forms the foundation of people's knowledge so any revisions may have serious implications for subsequent knowledge structures that are based on them: a lot has to change, and the change will be deep (Vosniadou, 1994). Consequently, if they embrace this theory of conceptual change, FCS faculty must remain cognizant of what is involved when facilitating paradigm shifts (see McGregor, 2006) and appreciate the pedagogical philosophy of deep learning, which involves self-reflection and examining one's beliefs and value system (Nicholls & Adolphus, 2003).

Knowledge as Elements

Whereas knowledge as theory views conceptual change as a "broad, theory-replacement process," knowledge as elements involves "a piecemeal evolutionary process [by which] elements and interactions between the elements are revised and refined through addition, elimination, and reorganization" (Özdemir & Clark, 2007, p. 355). The knowledge as theory approach assumes knowledge is organized in schemas or frames. Changes to concepts are revolutionary, with change or innovation leading to a new frame. In contrast, the knowledge as

elements approach assumes conceptual change is incremental, gradual and evolutionary replete with times when conflicting ideas can coexist within a person's conceptual ecology (Özdemir & Clark, 2007).

This approach further assumes that implicit presumptions can influence people's reasoning when interpreting the world (Özdemir & Clark, 2007); they assume things happen in life just because "that is the way things are." These unquestioned beliefs emerge from people's experiences, observations and abstractions of phenomena, including lay knowledge of FCS. However, with help, incremental changes in these concepts can occur over time. FCS curriculum planners should thus be very cognizant of the role scope and sequence plays when designing curricula. This involves a concern for what to teach at what level of detail and in what order based on both learners' needs and the content that must be taught (North Dakota Department of Public Instruction, 2000).

Assuming that people spontaneously connect and activate existing knowledge pieces (elements such as facts and beliefs) with little effort (i.e., they use already-learned heuristics), the knowledge as elements conceptual change process leads to a total renewal and reorganization of these pieces and interactions among them. In this process, small elements get reconnected to create more complex conceptual structures resulting in a more complex base from which to interpret a phenomenon (Özdemir & Clark, 2007). This means that blind spots and naivety are somewhat mitigated.

When embracing this approach to conceptual change, FCS faculty must accommodate gradual, step-by-step changes in students' internal conceptualizations of the profession. This involves honoring their lay knowledge while respectfully augmenting it with discipline- and profession-specific knowledge and perspectives. Students will slowly become comfortable with letting go of their lay notions and eventually open up to being socialized into the full remit of the profession. These incremental changes depend heavily on FCS instructors fully appreciating the need to remove students' blind spots.

Knowledge in Context

The cognitive approaches (i.e., knowledge as theory and elements) may underestimate the complexity and diversity of conceptual change phenomena because change is not solely influenced by cognitive factors (diSessa, 2002). Instead, affective (emotional), social-cultural, motivational, and contextual factors can also contribute to conceptual change (Davis, 2001; Mason, 2007; Sinatra & Pintrich, 2003). Jovchelovitch (2007) coined the term *knowledge in context* to account for the cognitive and social nature of conceptual change.

Emotional. The adoption of alternative viewpoints that contradict existing stances requires changes to the valence people hold for the new ideas (Thagard & Zhu, 2003). Valence means chemistry - a visceral reaction to an idea. "Emotional conceptual change is a change of valence from positive to negative or vice versa" (Thagard & Zhu, 2003, p.100). To illustrate, in order for students to accept FCS as a focus on family for the good of humanity (East, 1979), they would not only have to change their beliefs about family and how it possibly relates to the whole of humanity, but also change the valence they have for these three concepts: the family, the good, and humanity. FCS curriculum planners will need to be aware of how new ideas about the

profession resonant with novice students and attend to how and if these initial reactions change over time.

"Entrenched emotional attitudes may be a substantial barrier to . . . largescale cognitive-emotional shifts" (Thagard & Zhu, 2003, p. 101). Helping others intentionally understand and evaluate the emotional responses they have to alternative points of view makes it easier for conceptual change to occur (Sinatra and Pintrich, 2003; Thagard & Zhu, 2003). Dealing with valence in FCS university curricula could thus entail inventorying students' positions on and visceral reactions to key concepts when they enter the program and then monitoring shifts in valence as students progress. A learning passport could be used to gauge evolutions and transformations in emotional valence for key FCS concepts and principles. This self-maintained record of learning achievements can help students to stay motivated (Lai, Yang, Liang, & Chan, 2005). Sustained interest in learning new ways to understand the profession will move students along the professional socialization continuum (see Figure 1).

Social-cultural and motivational. The social-cultural approach holds that affective, motivational, and personal variables matter during conceptual change. "Conceptual change cannot be seen as an individual, internal, cognitive process but as a social activity that takes place in a complex sociocultural world and that the surrounding situational, cultural and educational context should be taken into account" (Vosniadou, 2007, p. 58). Accordingly, conceptual change involves people doing more than replacing an incorrect conception with a correct one. It entails appreciating that context helps students determine when different conceptions are appropriate in addition to being (in)correct (Vosniadou, 2007).

Also, knowledge is activity that cannot be considered separately from the context in which it takes place; hence, knowing means belonging, participating and communicating during a process of enculturation into a learning community. This contrasts with the cognitive perspective wherein knowledge is an entity in someone's head and knowing means possessing that knowledge. Furthermore, conceptual change goes beyond modifications of one's conceptual structures to a concern for their embeddedness; that is, how firmly fixed they are in the person's mind (Mason, 2007).

In summary, the socio-cultural approach assumes that conceptual change takes place in an individual's mind but is induced socioculturally. Conceptual change is inseparable from the context in which it occurs, including social practices of communication and discourse (Mason, 2007). While the cognitive approach to conceptual change embodies the acquisition metaphor (i.e., individual minds can acquire, develop and change concepts), the contextual approach uses the participation metaphor: concepts are gained through knowing and doing and participating in social and cultural activities (Sfard, 1998). Conceptual change is a mental change that comes about because of social interactions, a process that is greatly influenced by motivation and emotions. These determine when someone retains or adopts a new frame of mind (Thagard, 2003).

If FCS curriculum planners embrace the knowledge in context approach to conceptual change, they and other faculty members could turn to several attendant strategies including fostering communities of practice and learning communities among novice students. They could facilitate social activities and engagements that provide opportunities to change their internal

conceptualizations of the profession by drawing on and being inspired by sociocultural stimulants. The curriculum could include a reflective component in concert with instructional strategies such as discourse, dialogue and conversations. Students could also have opportunities to engage with the valance of any new orientations that are challenging or augmenting their lay knowledge.

To continue, the learning community and reflective curriculum could also provide students time to question their motivations for entering and remaining in the profession and query how they feel about this affective aspect of their socialization into the profession. Finally, the curriculum could help students appreciate that the new mental schema they are being asked to formulate will serve as a tool for engaging with peers and others about issues pertinent to the profession. If they choose to or are convinced to identify with the profession, this new mental schema should become embedded in their professional psyche.

Accommodating Conceptual Change

To help novice and maturing students to accommodate conceptual change, FCS faculty need to be cognizant of factors that affect mental schemata change. These include students' perceptions of the intelligibility, plausibility and fruitfulness of the new FCS material and information along with dissatisfaction at some level with their existing conceptual framework (including lay knowledge) (Park, 2007; Posner et al., 1982).

Intelligibility

For students to consider any alternative conception of the profession, they must find it intelligible and be able to internally represent it in their mind. Only then can the concept become a tool of thought for them to use (Posner et al., 1982). Such is the case for reframing FCS from lay knowledge. However, aside from superficially knowing what new ideas mean individually, intelligibility also involves grasping what they mean when combined as a whole. This type of learning is very demanding because it is so easy to simply use lay knowledge in a superficial way without the necessary revisions to one's conceptual ecology (Posner et al., 1982).

To offset superficiality, opportunities for deep learning need to be provided wherein students delve into both lay and newly-acquired knowledge in detail, understanding and questioning basic principles, assumptions, beliefs, and value systems (Nicholls & Adolphus, 2003). Deep learning helps students extract meaning from their learning experiences and life (Warburton, 2003) so they can expand their understandings and make the new concepts more intelligible.

Plausibility

Another challenge to embracing conceptual change is the plausibility of what students are being asked to accept. If the new idea is counterintuitive to their long-established way of knowing, there will be much resistance and implausibility (Posner et al., 1982). A prime example of this is asking students to accept FCS as an agent of change and empowerment. It goes against people's intuitive senses to ask them to accept that FCS is anything more than technical skills for cooking and sewing.

As long as students remain committed to their current beliefs and cognitive blind spots, they will find any new conceptualizations counterintuitive and implausible. To place less energy on "protecting [one's] metaphysical commitments" (Posner et al., 1982, p. 220), people must delve deeply into self reflection to determine the strength and depth of their beliefs because this determines the extent to which they can move past the implausibility of the new idea (see also Kincheloe & Steinberg, 1993). This means that faculty are charged with convincing students of the merit of the views of the profession being promoted in the degree. Students need to accept this image of the profession as plausible and then choose to identify with it.

Fruitfulness

Accepting a new idea is also contingent upon the fruitfulness of the new conception (Posner et al., 1982). If an idea is fruitful, its application will produce fertile and rich insights and helpful outcomes. For people to embrace a new conceptualization, they must be convinced of its potential to be productive and achieve significant results when applied. If new insights and discoveries are produced when they apply the new idea, "then the new conception will appear fruitful and the accommodation of it will seem persuasive" (Posner et al., 1982, p. 222). In effect, a plausible conception must be intelligible, and a fruitful conception must be intelligible *and* plausible (Duit & Treagust, 2003). This means, for example, that novice students need to find the concept that "FCS focuses on the family for the good of humanity" as both intelligible and believable before they will ever consider using it to see if it is fruitful. This indeed is a conceptual challenge given how stereotypical notions of FCS shape most day-to-day, lay thinking of the profession.

Dissatisfaction with Existing Conceptions

Finally, Posner et al. (1982) proposed that people "must first view an existing conception with some dissatisfaction before [they] will seriously consider a new one" (p. 220). People are less inclined to receive new ideas if they cannot be convinced that their current conceptualization is inadequate. Novice FCS students have drawn on their lay knowledge about the profession for many years believing it has served them well despite it being potentially erroneous and stereotypical. The role of the FCS curriculum is thus to convince novice students both that (a) their lay knowledge may be incorrect, inadequate, even harmful if perpetuated and (b) the degree was designed to move them beyond this novice status through apprenticeship to emergent professional. Students will eventually become dissatisfied with their lay knowledge and yearn to become more sophisticated.

In short, FCS instructors need to help students (a) create mental pictures of the new concepts, (b) appreciate that it is reasonable to accept the new ideas, (c) avail opportunities to apply them so their fruitfulness is appreciated, and (d) become convinced that their lay knowledge needs to change given the intelligibility, plausibility, and fruitfulness of the new ideas about the profession. With trust and credibility (Maranta et al., 2003), university programs can instill in naive students a deep sense of identity with the profession.

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Conclusion

The professional socialization process is better ensured if FCS faculty appreciate the merit of drawing on conceptual change theory as it complements the professional socialization model. Marrying the two lines of inquiry yielded useful insights into how the curriculum and its implementation can be purposefully designed and developed to better ensure that novice students graduate with a solid identity with the profession. This entails respecting and honoring their lay knowledge while instilling the merit of letting it go to make room for discipline- and profession-specific knowledge.

Changes to their naive conceptualization of the profession can be facilitated by viewing changes in their knowledge as focused on (b) broad shifts in overall conceptualization, (b) incremental tweaks to specific elements, and (c) respect for the context; respectively, knowledge as theory, elements and context. Informed by conceptual change theories, FCS faculty are better prepared to ensure that students leave the program with a respect for and identity with the profession - the ultimate goal of professional socialization.

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Teaching Lesson Planning in Family and Consumer Sciences

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Family and consumer sciences (FCS) teacher educators need to be able to teach the lesson planning process to pre-service teachers. Learning the lesson planning process is important to the professional development of FCS pre-service teachers. The process of teaching lesson planning, however, is challenging. Following a literature review, the author provides an example of teaching lesson planning in FCS education.

We need to understand the process of teaching lesson planning in FCS education as it is central to teaching. However, teaching pre-service teachers the process of lesson planning is difficult (Curran, 2016; Martin, 1990). In teaching about lesson planning we need to keep in mind the development of the pre-service teacher regarding the planning process (including planning-based concepts as well as FCS subject matter concepts) (Shulman, 1986; 1987). Emphasis on the process of writing is one way in which to facilitate lesson planning. The purpose of this paper is to provide an overview of literature as well as share an example of teaching the lesson planning process.

Literature Review

Over the past several decades, considerable discussion occurred regarding the focus of FCS including middle and high school level FCS education (Brown, 1978; Brown & Paolucci, 1979; Johnson & Fedje, 1999; McGregor, 2003; NASAFACS, 2017; Redick et al., 1998). Simultaneously, teacher responsibilities and competencies have been further defined (Danielson, 1996; Council for the Accreditation of Education Preparation, 2013). Considering such changes, the *National Standards for Teachers of Family and Consumer Sciences* were developed (Erickson, Fox, & Stewart, 2010). The "curriculum development" standard states that FCS teachers should be able to "develop, justify, and implement curricula" (Erickson, Fox, & Stewart, 2010, p.1). An important competency, therefore, is the ability to develop curriculum, and more specifically, lesson plans.

Lesson Planning

The importance of teaching planning for beginning FCS teachers has been examined by FCS education researchers. Nichols and Mundt (1996) ranked instruction as one of the most critical teacher responsibilities for beginning teachers. Yahnke and Love (1997) found that both FCS teachers and teacher educators identified planning for instruction as one of the key competencies needed for beginning FCS teachers. Davis (2010), in a study of teacher educators' program priorities, also found that "teaching methods, curriculum and resources" ranked highly. Davis (2010) also found that written lesson and unit planning (based on the national standards for FCS middle and high school level students) was of lower priority. Teaching about instructional or lesson planning is generally viewed as important.

The purpose and nature of the lesson plan varies among individuals. For beginning teachers, the purpose of the lesson plan ranges from that of a written lesson plan that must be followed to that of a memory aide to guide teaching (Kagan & Tippins, 1992). Martin (1990) noted that beginning teachers perceive instructional planning skills more useful than experienced teachers. For experienced teachers, the purpose of the lesson plan is to organize events or procedures to follow in the classroom (Shimmel & Columbia, 2016). From both perspectives, lesson planning is focused on what happens during classroom instruction. Teacher educators may also have an additional purpose, that is, to engage the pre-service teacher in the lesson planning process.

The components included in the lesson plan vary as well across subject matter areas. Smith (2012) stated that for the beginning teacher lesson plans generally include the "introduction to the lesson, review of previous lesson, presentation of new content, application of new information, assessing new learning and closure" (p. 10). Shimmel and Columbia (2016) found that for experienced teachers the "essential elements of a lesson plan are objectives, questions to ask, materials, and warm-up explanation" (p. 518). It is suggested that a list of procedures and processes to guide classroom instruction is needed rather than detailed written plans. Detailed plans which are strictly adhered to by the teacher may prevent improvisation or the flexibility needed in teaching practice (Livingston & Borko, 1989; Shimmel & Columbia; 2016).

The pre-service teacher thinks about planning differently than experienced teachers**.** Among FCS teachers, Martin (1990) determined that "beginning teachers gave more serious consideration to conceptualizing objectives, content, learning experiences, organizing lesson plans, and specific details" (p. 36). Martin further noted that experienced teachers are more likely to use routines and habits within planning that beginning teachers have not yet developed. This idea is supported by other researchers. Experienced or expert teachers have developed schemata or mental scripts from which they can draw upon to effectively and efficiently develop subsequent lessons (Livingston & Borko, 1989; Stender, Brűckmann, & Neumann, 2017). In contrast, beginning or novice teachers need to simultaneously develop or modify their mental scripts of teaching while planning a lesson. As a result, beginning teachers may be more focused on the details of the instructional plan but are less efficient in their planning process (Livingston & Borko, 1989; Stender, Brűckmann, & Neumann, 2017).

Writing and Lesson Planning

Writing lesson plans can be time consuming but important to the development of pre-service teachers' understanding of the planning process. Writing is about communicating the meaning of ideas and is, therefore, essential to lesson planning, both in understanding the process itself, as well as how to communicate ideas (Montgomery, 2008; Smith & Morgan, 1986; Vermont Writing Collaborative, 2016, Wiggins & McTighe, 1998). In general, writing is developed through the phases of pre-writing, writing, and post-writing (Sharp, 2016); this process can be applied to lesson planning as well. There is not, however, one set of defined strategies to teach the process of writing (Council for Writing Program Administrators, et al., 2011; Sharp, 2016). Simultaneously, there is also not one set of strategies to teach the process of writing lesson plans.

The idea of connecting lesson planning and writing is not new. Holcombe and Fedje (1983) developed a framework for teaching lesson planning paired with the writing process (see Figure 1). In their framework a teaching and learning plan (TLP) is developed. This framework

includes the following four phases: (1) development of a concept, (2) structuring the plan, (3) designing teaching and learning, and (4) reviewing peers TLPs. Within each of these phases, strategies are incorporated to develop pre-service teachers' understanding of both the planning process and FCS concepts.

Figure 1: Phases of the Teaching and Learning Plan Process and Strategies

(Holcombe & Fedje, 1983)

Planning Process Phase	Strategies
1. Developing a Concept	● Selecting a concept from the program or unit plan. ● Concept analysis (definition, attributes, non-attributes, examples, non-examples).
2. Structuring the Plan	● Development of key questions – Expanding on the idea of the concept and identifying the key ideas which impact on and are part of the concept. ● Development of a concept outline ● Identification of possible teaching methods or strategies
3. Designing Teaching and Learning	● Development of the written plan which includes: - Orientation set: Experiences which set the stage for learning. - Learning Experiences - Learning Experience Questions - Review Closure: Questions, conclusions or summaries - Transition Set: Link between consecutive activities - Transfer Closure: Connection of the concept to one's life. - Evaluation
4. Reviewing Peers TLPs	● Engage in periodic peer review of plans at different stages of the developmental process.

Multiple strategies may be used by teacher educators to teach lesson planning. Drost and Levine (2015) conducted research on the methods used to teach lesson planning to pre-service teachers, specifically regarding the alignment of content standards. In this study, Drost and Levine found three primary methods were used by teacher educators: expository instruction (e.g. lecture, video), collaborative instruction (e.g., discussion, joint-writing, peer review) and hands-on instruction (e.g. develop lesson and unit plans, interview teachers). Hands-on instruction was the most prevalent method used (Drost & Levine, 2015). In FCS, strategies for curriculum development have also been identified. Montgomery (2008) proposed curriculum development strategies such as the examination of the perennial problem, development of a rationale and key questions, and the identification of broad concepts. Smith (2012) discussed FCS program development from technical (scientific) and non-technical (problem-based) curriculum orientations.

Summary

There is limited literature about teaching the lesson planning process in FCS education, however, educational literature more broadly can help to inform us about teaching this process. Teaching about lesson planning is challenging but important to the development of pre-service teachers. Sharing examples about teaching lesson planning may help current and future FCS teacher educators learn about best practices.

One Example of Teaching the Lesson Planning Process

When I first became a teacher educator I struggled to teach the lesson planning process. I understood the components of planning, but not how to teach it well to pre-service teachers. I needed to determine ways in which I could be better communicate the planning process. The following ideas have been developed over the course of my career based on my philosophy and practice.

Lesson Planning as a Script

Lesson planning is a developmental process which includes pre-planning, planning and post-planning phases that occur within and across FCS education coursework (see Figure 2). The components are based on Holcombe and Fedje's TLP framework (1983) as well as Hunter's lesson design elements (Burden & Byrd, 2007). Writing is incorporated into all planning phases. But the lesson plan itself begins as a written script. Dr. Julie Johnson, University of Nebraska – Lincoln, shared that she found a more detailed written or scripted lesson plan to be of benefit for the pre-service teacher when they were implementing instruction. I incorporated this idea into my own practice. I believe a script helps pre-service teachers envision what the lesson will look like when implemented in the FCS classroom. The emphasis of the script is to write about what the teacher and student will do and say. This is based on Holcombe and Fedje's (1983) emphasis on addressing both teaching and learning within the lesson plan. In subsequent FCS education courses, the lesson planning process is revisited.

Over time, however, pre-service teachers are directed to write the lesson plan in bulleted phrases/ideas. This is more consistent with how experienced teachers plan as described by Shimmel and Columbia (2016). The underlying premise is not to just reduce the amount of writing but that the pre-service teacher has more fully developed their understanding of lesson planning as well as FCS subject matter content. Pre-service teachers are encouraged to "write more when needed" if they are not as familiar with a concept or activity procedures.

Concrete to Complex Planning Concepts

One teaching and learning principle that has guided my practice is to begin with concrete concepts and move toward more complex concepts (e.g., Smith & Morgan, 1986). Throughout the FCS education courses, pre-service teachers are introduced to increasing more complex planning components. For example, in the pre-planning phase, general questions are focused on the educational context. In subsequent FCS education courses, the educational context is researched and described in a written paper.

An additional example of this principle occurs in the planning phase. During the initial FCS education course, overarching planning components are developed (e.g., concept, rationale, student objectives) which cover the scope of the plan. I refer to this an umbrella plan because this metaphor helped me to better communicate these planning components. In subsequent coursework, a unit umbrella plan is developed, which covers the scope of the unit and links

lessons together. (As I talk the umbrella plan with pre-service teachers, I frequently find myself arching my arms over my head to visually represent an umbrella.)

Another example that represents this teaching and learning principle relates to assessment. In the initial FCS education course, assessment, as checks for understanding, is focused on the development of questions to which students will respond. In later coursework, checks for understanding become pre- and post-assessment strategies that are incorporated into

Figure 2: Lesson Planning Phases and Development

Phase	Initial Development	Subsequent Development: Selected Examples
Pre-Planning	**Pre-thinking about the lesson. Questions such as:** ● To whom will the lesson be taught? ● What concept will be the focus of the lesson? ● What do you know about the students? ● What activities could you use to for students to learn about this concept?	Researching and writing about the educational context (school, district, students, FCS course/program).
Planning	**Developing the written plan.** *Umbrella for the Lesson* - Course & Grade Level - Concept – Identification and description of specific concept - Rationale for teaching the concept - Student Objectives - FCS Standard(s) *Lesson Plan* 1. Introduction - Introduction of new concept and/or brief review of previously learned ideas. 2. Goals - State the goals of the lesson in student language as related to the concept. 3. Advanced Organizer - Give an overview or preview of what is to come (agenda, concept map, outline, diagram, illustration). 4. Learning Experiences/Activities – (a) Purpose - Tell the purpose of the activity and the connection to the concept to be learned. (b) Teacher - Directions/guidelines for the teacher - Include the main points, examples, questions, etc. What will the teacher (you) do and say? (c) Students - Directions/guidelines for the students. What should students do and say? 5. Check for Understanding - Ask questions about the concept. 6. Conclusion/Summary - What will the teacher or students do and say? *Review and Revise* – Strategies such as explaining the plan and teaching to peers; self and peer review; making revisions based on feedback.	Developing the umbrella plan for a unit. Incorporation of pre- and post-assessment strategies for lesson(s) and unit.
Post-Planning	**Reflecting and analyzing planning, teaching and learning.** *Planning process* - What did you do to prepare this lesson? What was challenging for you? If you were to teach this lesson again, what changes would you make? Why? *Teaching Process* - From your own perspective what worked well in implementing this lesson? From the FCS teacher's perspective? What didn't work as well? *Student Learning*- What do you believe students learned from this lesson? Did this match the objectives that that were planned for this lesson? Why or why not?	Analysis of pre- and post-assessment data.

the lesson and/or unit plan. This principle is also represented in the post-planning phrase. In the initial course, pre-service teachers reflect upon the lesson. In subsequent FCS education courses, post-planning includes the collection of assessment data (from the pre- and post-assessment), analysis, and interpretation of the data. Additional attention is also given to reasoning for action, process questions and problem solving in both planning and teaching methods (NASAFACS, 2017).

The Lesson Plan Should Change Forms

The lesson plan should change depending on the pre-service teacher's level of development and teaching experiences. For instance, pre-service teachers in our program complete three semesters of FCS education courses before student teaching. Within each of these courses, pre-service teachers complete field experiences in which they develop and implement a lesson. In the initial course, a more detailed written plan is developed (e.g., the script). For implementation, however, pre-service teachers are encouraged highlight important parts. In this way the lesson plan serves more as a guide for instruction. Most often, pre-service teachers will state something like "I knew the plan so well ahead of time. I didn't need to follow the written lesson plan when I taught." In subsequent courses, students are encouraged to write the instructional component of the lesson plan as bullets but also to "write more if needed." During the student teaching semester, the lesson plan becomes more of a working plan in which there should be penciled-in revisions and comments, not a perfectly typed lesson plan.

Concerns

From my observations, for most pre-service teachers, lesson planning becomes a pattern of thinking which is developed through multiple learning experiences in the college classroom and within schools. Pre-service teachers share common concerns about lesson planning. For example, they are initially concerned about the time and investment it takes to develop and write one plan. Moving from scripts to bulleted lesson plans helps to address the amount of writing but an investment in thinking about the plan is still necessary. Or, for instance, they are concerned what they are doing is not how their cooperating teacher plans lessons. Pre-service teachers are encouraged to further discuss this difference. During student teaching, they are also encouraged explore the cooperating teacher's lesson planning process or format to better facilitate their communication.

Invitation

These are few examples of my philosophy and practice of teaching lesson planning. By sharing this I hope it will encourage other FCS teacher educators to also share their philosophy and practice experiences. By doing so, I believe we can further develop our understanding of teaching lesson planning in FCS education.

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