The Impact of a Statewide Training To Increase Child Care Providers' Knowledge of Nutrition and Physical Activity Rules in Delaware

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Abstract

Background: Childhood obesity has been recognized as a national problem of epidemic proportions. Child care represents an ideal venue in which to address this problem, as many young children spend a significant amount of time and consume the majority of their meals in this setting. Recognizing this opportunity, Delaware recently enacted reforms to statewide licensing regulations designed to improve the quality of the nutrition-, physical activity-, and screen viewing–related environments in child care settings.

Methods: To facilitate the translation of these regulations into practices, a series of broad-scale trainings was held throughout the state. Attendance was required for all Child & Adult Care Food Program (CACFP)-participating facilities, although child care providers from non-CACFP facilities also attended. Pre- and posttraining surveys were used to assess changes in providers' knowledge of the regulations and satisfaction with the training.

Results: In total 1094 presurveys and 1076 postsurveys were received. Participants were highly satisfied with the training format and content, including the instructors, materials, and schedule. Data analysis demonstrates improved knowledge of all 26 regulation components from presurvey to postsurvey. Family child care providers, providers with more years of experience, CACFP-participating facilities, and facilities with food service personnel scored significantly higher than their center staff, less experienced and non-CACFP counterparts, as well as those without food service personnel.

Conclusions: Broad-scale, in-person training can effectively increase child care providers' knowledge of the regulations and is well received by this audience. Other states and jurisdictions seeking to improve nutrition, physical activity, and screen-viewing practices in child care settings should consider this model of quality improvement.

Introduction

For more than a decade, childhood obesity has been recognized as a national problem of epidemic proportions.^{1–4} In 2009–2010, 31.8% of US children and adolescents aged 2–19 were either overweight or obese. Among children aged 2–5 years, the prevalence of overweight and obesity was 26.7%.⁵ Overweight and obese children are at increased risk for developing a range of chronic conditions, including type 2 diabetes, hypertension, sleep apnea, asthma, depression, and anxiety.⁶ Childhood obesity rates in Delaware are comparable to or even exceed those documented nationally; in 2008, the prevalence of overweight and obesity ranged from 40% to 46% across Delaware's three counties and was highest among non-white children (49%) compared with white children (37%).⁷

To make progress toward reducing childhood obesity, policy and environmental change interventions must be

implemented in the settings in which children live, learn, and play. Child care settings represent an ideal venue for such interventions for several reasons. First, approximately 80% of preschool-aged children with employed mothers spend an average of nearly 40 hours a week in some form of nonparental care.⁸ Second, early childhood is a crucial period during which children develop the food habits and patterns of nutrient intake that will follow them into adolescence and beyond.⁹ Furthermore, while in full-time child care, young children typically consume half to three-quarters of their daily total calories.^{10,11} As such, child care is a highly opportune setting to promote healthful eating.

Recognizing child care as a critical setting for addressing childhood obesity, the state of Delaware recently enacted reforms to statewide child care licensing rules designed to improve the quality of the nutrition-, physical activity-, and screen viewing–related environment in child

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Table 1. Selected Delaware Rules for Child Care

Component	Rule
Rules for infants (up to 1 year of age)	
Juice	Juice is not allowed.
Meats and meat alternates	Cheese products and cheese foods are not allowed. Only real cheese may be served.
	Processed meats are not allowed.
	Fried or prefried and then baked meats are not allowed.
Fruits and vegetables	Fried or prefried and then baked fruits and vegetables are not allowed,
Grains and breads	A whole grain product must be served at least one time each day for infants 8–11 months. ^a
	Cereals must contain no more than 6 grams of sugar.
	Sweet grains (e.g., cookies, cakes, donuts, Danishes, etc.) are not allowed.
Combination foods	Combination foods, a mixture of two or more different meal components, (e.g., turkey and rice) are not allowed. Only combinations of fruits and/or vegetables are allowed.
	Desserts, cobblers, puddings, and jarred cereals with fruit are not allowed.
Physical activity	Limit time spent in “confining equipment” (e.g., swings, strollers, high chairs) to 30 minutes during waking hours.
Rules for children (1 year and older)	
Juice	No more than one serving per day of 100% juice may be served to children 1–18 years of age.
	Non-100% juice (juice drink or cocktail) is not allowed. All juice must be 100% fruit or vegetable juice.
Milk	Children 12–23 months of age must be served whole milk.
	Children 2 years of age and older must be served fat-free or 1% (low-fat) milk.
Meats and meat alternates	Processed meats (e.g., hot dogs, sausage, bologna, etc.) may be served only one time every 2 weeks.
	Fried or prefried and then baked food items are not allowed (e.g., chicken nuggets, fish sticks) unless no more than 35% of their total calories are from fat.
	Cheese products and cheese foods are not allowed. Only real cheese may be served.
Fruits and vegetables	Fried or prefried and then baked fruits or vegetables (e.g., French fries, Tater Tots) are not allowed unless no more than 35% of their total calories are from fat.
Grains and breads	A whole grain product must be served at least one time each day.
	Cereals must contain no more than 6 grams of sugar per serving.
	Sweet grains/baked goods (e.g., cookies, cakes, donuts, Danishes, etc.) may be served one time every 2 weeks for snack only (not for breakfast, lunch, or supper).
Physical activity	Provide at least 20 minutes of moderate-to-vigorous physical activity for every 3 hours a child is in a program.
Screen time	Prohibit the use of television, videos, video games, etc., for children under the age of 2, and limit screen time to no more than 1 hour for children older than 2 years. Parental permission is required for use.

^aThis rule applies only if the infant has been introduced to grains such as crackers, bread, etc. It does not apply to infants who are still consuming only breast milk/formula and infant cereal.

Adapted from *First Years in the First State: Improving Nutrition and Physical Activity Quality in Delaware Child Care, Administrators' Guide*, Nemours Health and Prevention Services, 2011.

care settings (Table 1). Prior to these reforms, Delaware child care facilities were required to follow the meal patterns and rules set forth by the federal Child & Adult Care Food Program (CACFP). This program is administered by the USDA Food and Nutrition Service (FNS) and reim-

burses eligible child care facilities for approved meals and snacks served. The updated rules, known as the Delaware CACFP/*Delacare* Rules, go above and beyond federal standards in limiting sugar and fats from cereal, fried foods, and baked goods. They apply to all licensed child

care centers, family child care homes, and large family child care homes, and have been enforced since January of 2011.

This article describes the results of the evaluation of a statewide training for child care providers on the revised rules—specifically, providers' satisfaction with the rules and knowledge change.

Methods

To facilitate the translation of the updated rules into practices, an intensive training of over half of licensed child care center staff and family child care home owners in the state was undertaken. At the time of training, Delaware had 540 licensed child care centers and 1062 family child care homes. Seven training sessions were offered in the spring of 2011, and attendance at one full-day training session was required for all centers and family child care homes participating in CACFP in the state (130 centers and 740 family child care homes). All facilities participating in CACFP ($n=870$) were sent letters by the Department of Education informing them of this mandatory training. Additional recruitment took place through the Office of Child Care Licensing, local CACFP-sponsoring organizations and child care newsletters.

The trainings were based on a series of implementation toolkits designed to convey practical, "how-to" information directly aligned with implementation of the new rules (the First Years in the First State toolkits are available online from the Nemours Health and Prevention Services website). Training covered key toolkit materials and included hands-on activities and opportunities for providers to practice newly acquired skills in groups. All training sessions were conducted by the same 4 individuals who were recognized as approved trainers by the Delaware Institute for Excellence in Early Childhood, Delaware's professional development body for child care providers. In addition, 3 of the 4 trainers were credentialed health educators and held advanced degrees in public health or health promotion.

The evaluation of this training used self-administered written pre- and postsurveys to gather participants' demographic information, assess their knowledge of the rules, and gauge satisfaction with the training. In total, 1115 child care providers attended the training. Among those who completed the presurvey ($n=1094$), 923 providers represented CACFP-participating facilities and 131 represented non-CACFP facilities (the remainder did not indicate CACFP affiliation on the presurvey). The pretraining survey had 38 questions (see Appendix A for excerpt), including 12 questions that solicited demographic information about the respondent and his/her facility (e.g., job function, CACFP status, number of staff in various categories).

The pretraining survey also included 26 multiple-choice questions covering the state's 24 updated nutrition, physical activity, and screen-viewing rules. Each item asked about one component of the rules and presented four possible answer choices, including the correct answer.

Pretraining surveys were collected immediately upon completion, and identical questions pertaining to the rules were asked on the posttraining survey approximately 7 hours (and nine training modules) later. While the training was focused on implementing the rules, trainers did not review the correct answers to the pretraining questions at any point during the day. Thus, the act of completing the presurvey should have had no effect on knowledge change; instead, all knowledge change should have been the result of the training itself. The posttraining survey, composed of 30 total questions (see Appendix B for excerpt), also included four additional items assessing participant satisfaction with the training, perceived barriers and facilitators to implementation, and desired areas for professional development.

Surveys were reviewed by content experts and piloted with child care providers before being administered during full-scale training. Survey items were modeled after similar surveys (e.g., Nemours' Delaware Child Care Provider Survey) that had been successfully administered to Delaware child care providers in the past.

All data were analyzed using IBM SPSS Statistics, Release 19.0.0 (Chicago, IL, 2011). Basic descriptive tests were run to gain a better understanding of providers' knowledge of the rules. A total score was calculated by adding the number of correct answers for each provider with complete data. Student *t*-tests and analysis of variance (ANOVA) were used to compare demographic and facility-level characteristics with total score at baseline for binary and categorical covariates, respectively.

This evaluation was approved by the Nemours Institutional Review Board (IRB) and has been given an "exempt" research status.

Results

In total, 1094 presurveys and 1076 postsurveys were received. The response rate for the pretraining survey was 98.1%, whereas the posttraining survey garnered a 96.5% response rate (21 participants declined to complete the presurvey, 28 declined to complete the postsurvey, and 11 left the training early due to family matters, an emergency at their child care facility, or other issues). Detailed information about respondents is presented in Table 2. Of note, the majority of the attendees represented centers or child care homes that participate in CACFP (84%). Regarding job function, the majority of training participants were family child care providers (62%) or teachers (9%). Providers reported having extensive experience in the early care and education field; 59% had more than 10 years of experience. Respondents also reported on their highest level of education: One-third (33%) of the providers had a college degree or higher, whereas the majority had either a high school diploma/GED (39%) or had completed some college credits (28%). It is important to note that several facilities, primarily large child care centers, sent multiple representatives to the training.

Table 2. Training Participant Demographic Information

Item	n (%)
CACFP status	
CACFP participant	923 (84%)
Not CACFP participant	131 (12%)
Unknown CACFP affiliation	40 (4%)
Job function	
Center owner	55 (5%)
Family child care home provider	661 (62%)
Center director ^a	56 (5%)
Program director ^b	32 (3%)
Chef/food service personnel ^c	56 (5%)
Teacher	98 (9%)
Assistant caregiver	57 (5%)
Other	58 (5%)
Years of experience in the ECE field	
Less than 2 years	46 (4%)
2–5 years	174 (16%)
6–10 years	228 (21%)
More than 10 years	635 (59%)
Educational experience	
High school/GED or less	425 (39%)
Some college credits	302 (28%)
Associate degree	142 (13%)
Bachelor degree	129 (12%)
Some graduate credits	40 (4%)
Graduate degree	43 (4%)

Response rate varied across items.

^aResponsible for operations of entire child care center.

^bResponsible for a particular division within a child care center, generally a certain age group (e.g., infant, preschool, school-age, etc.).

^cApplies only to representatives of child care centers.

Abbreviations: CACFP, Child & Adult Care Food Program; ECE, Early Care and Education.

The postsurvey included questions about participant satisfaction with the training and the instructors. Overall, participants reported high levels of satisfaction with the training format and content, including the instructors, materials and schedule (Table 3). In particular, 97% of participants *agreed* or *strongly agreed* that the information was easy to understand, and 94% *agreed* or *strongly agreed* that they learned new ideas/skills that will help them to work with children.

Participants improved their knowledge of all 26 rule components from presurvey to postsurvey (Table 4). Before the training, the average number of rule components correctly identified was 17 of 26 (data not shown). After the training, the average number of components correctly identified was 23 of 26. The number of respondents who were correctly able to identify all 26 rule components increased from 10 (pretraining) to 175 (posttraining). After the training, over 85% of participants correctly identified the rules for infants pertaining to meats (fried/prefried meat and cheese), grains (servings of whole grains required and sugar limit for cereal), juice, combination foods (both type and the rule for desserts), and confining equipment. For the rules pertaining to children, over 85% of participants correctly identified the rules for meats (processed meat and cheese), grains (whole grain servings required and sugar limit for cereal), juice (both type and number of servings), milk, and TV/computer time allowed each day.

We examined the relationship between participant characteristics and knowledge of the rules from the pre-training survey only to identify subpopulations of providers that may be especially important to target for training due to low levels of knowledge of the rules. The total number of components correctly identified (score, out of 26) was used for these comparisons. Center staff scored significantly lower than family child care providers (14.7 versus 18, $p < 0.001$). Participants with more years of experience scored significantly higher than those with less experience (ANOVA $p < 0.001$), although there was no relationship between educational attainment and score. We also examined the relationship between facility characteristics and knowledge and found that facilities that did not participate in CACFP scored significantly lower (12.7 correct versus 17.2; $p < 0.001$) than participating facilities, and that facilities without food service personnel on staff scored significantly lower ($p < 0.001$) than those with food service personnel.

Discussion

Analyzing child care providers' knowledge of the rules at baseline and pre/post knowledge change revealed interesting results. First, knowledge for several rules was very low at baseline. Less than half of training attendees were able to correctly identify the rules pertaining to fried or prefried and then baked fruits, vegetables, and meats for children; the amount of physical activity required for children; and the amount of time that infants are permitted to be in confining equipment. These questions are unique, however, in that several respondents chose an answer choice that was actually more restrictive than the rule. For example, Delaware requires that children be provided with the opportunity to engage in 20 minutes of moderate-to-vigorous physical activity (MVPA) for every 3 hours in child care. However, several attendees marked 30 minutes as their answer. Providing 30 minutes of MVPA is certainly a best practice, but for the purposes of this survey, it

Table 3. Participant Satisfaction with Training

Item	Strongly disagree	Disagree	Agree	Strongly agree
Experience questions	n (%)			
The times and days scheduled were appropriate to meet the needs of child care providers.	45 (4.3%)	66 (6.3%)	524 (50.1%)	411 (39.3%)
The information was easy to understand.	25 (2.4%)	5 (0.5%)	467 (45.3%)	535 (51.8%)
The materials were helpful.	29 (2.8%)	3 (0.3%)	422 (41%)	576 (55.9%)
The amount of time was just right.	44 (4.3%)	108 (10.6%)	506 (49.5%)	365 (35.7%)
The room was comfortable.	40 (3.9%)	58 (5.7%)	517 (50.6%)	407 (39.8%)
I learned new ideas/skills that will help me to work with children.	35 (3.5%)	25 (2.5%)	475 (47%)	475 (47%)
Instructor Items				
The instructor provided information in a variety of ways, such as discussion, activities, and handouts.	23 (2.2%)	5 (0.5%)	441 (42.4%)	572 (54.9%)
The instructor was respectful of everyone.	27 (2.6%)	4 (0.4%)	387 (37.5%)	613 (59.5%)
The instructor was organized.	26 (2.5%)	3 (0.3%)	377 (36.7%)	621 (60.5%)
The instructor helped me to see how to do a better job.	25 (2.5%)	16 (1.6%)	457 (44.9%)	519 (51%)
Response rate varied across items.				

was technically an incorrect response. A similar trend was observed with fried and prefried and then baked fruits, vegetables, and meats for children. The rules state that these items can be served to children as long as no more than 35% of their total calories are from fat, but many providers selected the answer choice “cannot be served at all.”

A second interesting observation was that several rules did not exhibit a very large knowledge change. For example, the rules pertaining to cheese, whole grains, and juice for children only showed a 10% or less increase in knowledge. Knowledge of these rules, however, was very high at baseline—90%, 90%, and 97%, respectively. These high percentages did not allow much room for improvement.

Third, knowledge of select rules remained fairly low, even after the 7-hour training, with 75% or less of training attendees marking the correct answer choice. There are several possible explanations for this observation. First, it is possible that the rule is too complicated, as in the case of sweet grains. The Delaware CACFP/*Delacare* rules state that sweet grains can only be served to children once in a 2-week menu cycle as a snack. They cannot be served for breakfast, lunch, or supper, and they cannot be served to infants. This rule is complicated because it has multiple components—frequency and meal type—and because it requires determining whether a food is considered a sweet grain based on a fairly technical definition or lengthy list of items. This may explain why, even after the training, only 71% of attendees knew that sweet grains cannot be served to infants. The rule governing processed meats is also complicated; they can be served to children once in a 2-

week menu cycle, but they cannot be served to infants. It is possible that training attendees confused the details of this rule, as only 75% of providers correctly identified the infant-specific component of this rule.

The last rule for which knowledge remained low even after the training was the amount of MVPA required for children during their time in child care. Knowledge of this rule started low (21%) and remained low (68%) posttraining compared to other rules, which demonstrated nearly 100% comprehension. However, the number of providers who were able to correctly identify this rule increased over three-fold after the training, a very sizeable increase. It is possible that knowledge of this rule remained relatively low for the reason described previously; namely, that attendees selected the answer choice that was actually above and beyond the rules and thus was scored as incorrect.

We also found that levels of variability in knowledge across provider groups was large, despite the fact that compliance was being actively enforced by the state of Delaware prior to the trainings being implemented. Specifically, results revealed that center staff and providers with fewer years of experience appeared to be less knowledgeable about the rules at baseline than family child care providers and those with more years of experience. These results are fairly intuitive, given that job duties vary substantially between center staff and family child care providers. Many child care centers, for example, have food service workers that plan menus and prepare meals. Because the directors and teachers at these centers are not directly involved in meal preparation, they may be less familiar with the state’s nutrition rules. Family child care

Table 4. Participant Knowledge of Rules Pre- and Posttraining

Rule component	Correct <i>n</i> (%)		Percent change from pre- to postsurvey
	Pretraining	Posttraining	
Infants			
Fruits and vegetables: fried or prefried	741 (72%)	873 (83%)	15%
Meats: fried or prefried	764 (74%)	895 (85%)	15%
Meats: processed	653 (64%)	786 (75%)	17%
Meats: cheese	719 (72%)	953 (94%)	31%
Grains: whole grain servings	803 (79%)	970 (93%)	18%
Grains: sweet grains	598 (59%)	735 (71%)	20%
Grains: cereal sugar quantity	579 (56%)	1009 (95%)	70%
Juice: type	603 (58%)	934 (88%)	52%
Combo foods: type	532 (53%)	927 (88%)	66%
Combo foods: desserts	636 (63%)	930 (90%)	43%
PA/TV: confining equipment	327 (32%)	926 (87%)	172%
Children			
Fruits and vegetables: fried or prefried	422 (41%)	848 (82%)	100%
Meats: fried or prefried	411 (40%)	807 (78%)	95%
Meats: processed	720 (71%)	902 (86%)	21%
Meats: cheese	902 (90%)	1029 (99%)	10%
Grains: whole grain servings	913 (90%)	1002 (95%)	6%
Grains: sweet grains frequency	572 (57%)	876 (83%)	46%
Grains: sweet grains meal	588 (58%)	856 (82%)	24%
Grains: cereal sugar quantity	633 (61%)	1005 (95%)	56%
Juice: type	984 (97%)	1025 (99%)	2%
Juice: number of servings per day	792 (86%)	951 (98%)	14%
Milk: type ages 12–23 months	706 (70%)	897 (86%)	23%
Milk: type ages 2+ years	697 (70%)	942 (93%)	33%
PA/TV: amount of PA per day	213 (21%)	712 (68%)	224%
PA/TV: amount of TV per day	786 (76%)	1001 (95%)	25%
PA/TV: amount of computer time per day	767 (75%)	988 (94%)	17%

Please note that percent knowledge change from presurvey to postsurvey was calculated using response rates unique to each item due to missing cases within items.

Abbreviation: PA, Physical activity.

providers, on the other hand, are responsible for all aspects of their facilities' operation, including purchasing food, planning menus, and preparing food. As sole employees, they are required to be well-versed in all state regulations.

Results also revealed that representatives of CACFP-participating facilities were able to correctly identify more rule components than those from non-CACFP facilities. These results were also expected. Child care centers and family child care homes enrolled in CACFP are required to

submit monthly menus to the Department of Education and local CACFP-sponsoring organizations, respectively. If review of these menus reveals a violation of the CACFP meal pattern, the meal in question is not reimbursed. In a tough economic climate, this loss of revenue can be detrimental to small business owners. Additionally, CACFP-participating family child care homes are supported by local CACFP-sponsoring organizations (*i.e.*, liaisons) and can reach out to these organizations with questions. For

these reasons, CACFP-participating facilities are likely to be more familiar with the rules.

Conclusion

Our experience suggests that broad-scale, in-person training can effectively increase child care providers' knowledge of the rules. This experience, however, also reveals areas where Delaware and other entities pursuing similar rules can modify their approach. First, it is very important to carefully consider the complexity and clarity of definitions when instituting rules applying to child care providers. Rules with multiple components and technical language are difficult to comprehend, and presumably also difficult to translate into practice. Accordingly, Delaware is actively looking for ways to refine and better communicate the definition of these rule components.

High levels of variability in knowledge across provider demographic groups, furthermore, suggests that simply changing licensing rules may not result in concomitant changes in knowledge, let alone practice, at the facility level. Even though Delaware began enforcing the updated rules in January of 2011, the pre/postsurvey results demonstrate that many providers were still unfamiliar with some rules. Accordingly, training should target the subgroups that appear to be less knowledgeable about the rules (*i.e.*, child care center staff and providers with fewer years of experience in the field). Targeting center teachers is particularly important, because turnover rates tend to be high among this group. This strategy may prove particularly effective for entities that do not have the ability, due to financial or geographic constraints, to conduct statewide training as Delaware did. States and jurisdictions should continue to support these efforts, because child care represents such a pivotal setting for influencing children's dietary intake, activity levels, and weight status.

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Author Disclosure Statement

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Appendix A. Sample Questions from Pretraining Survey

SECTION II: PRELEARNING EVALUATION

Please answer the following questions based on your knowledge of the DE CACFP and *Delacare* Rules pertaining to children in Delaware licensed child care centers and family child care homes.

FRUITS AND VEGETABLES

1. What is the rule regarding serving fried or pre-fried and then baked vegetables or fruits (e.g., French fries, tater tots, sweet potatoes) to children?

- ☐ Cannot be served unless no more than 35% of their calories comes from fat.
 ☐ Cannot be served at all
☐ Can be served only once per 2-week period
 ☐ Not sure

MEATS AND MEAT ALTERNATES

2. How often can processed meats be served (e.g., sausage, hot dogs, bologna) to children?

- ☐ Once per 2-week period
 ☐ Never
☐ Twice per 2-week period
 ☐ Not sure

PHYSICAL ACTIVITY AND SCREEN TIME

3. Each child should be provided with at least how many minutes of moderate-to-vigorous physical activity for every 3 hours of care?

- ☐ 10 minutes
 ☐ 30 minutes
☐ 20 minutes
 ☐ Not sure

4. TV/DVD/video watching must be limited to how many hours per day for children ages two and older?

- ☐ 1 hour
 ☐ 3 hours
☐ 2 hours
 ☐ Not sure

Appendix B. Sample Questions from Postlearning Survey

*Posttraining survey questions on the DE CACFP/*Delacare* Rules were identical to those on the pretraining survey (see Appendix A).

SECTION II: TRAINING EXPERIENCE

1. What do you think about this professional development experience?

	Strongly disagree	Disagree	Agree	Strongly agree
a. The times and days scheduled were appropriate to meet the needs of child care providers.	☐	☐	☐	☐
b. The information was easy to understand.	☐	☐	☐	☐
c. The materials were helpful.	☐	☐	☐	☐
d. The amount of time was just right.	☐	☐	☐	☐
e. The room was comfortable	☐	☐	☐	☐
f. I learned new ideas/skills that will help me work with children.	☐	☐	☐	☐

2. What do you think about the instructor or instructors?

	Strongly disagree	Disagree	Agree	Strongly agree
a. The instructors presented information in a variety of ways, such as discussion, activities, and handouts.	☐	☐	☐	☐
b. The instructor was respectful of everyone.	☐	☐	☐	☐
c. The instructor was organized.	☐	☐	☐	☐
d. The instructor helped me to see how to do a better job.	☐	☐	☐	☐