Research Poster

Assessing a Food Safety Training Program Incorporating Active Learning in Vegetable Production

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Introduction

Gilliss (2011) reported that "contaminated food consumed in the United States causes an estimated 48 million illnesses, 128,000 hospitalizations, and 3,000 deaths annually" (p. 749). The risk of contaminated food reaching consumers can be reduced by the use of food safety training programs. As the number of vegetable consumers increases (Parker, Wilson, LeJune, & Doohan, 2012) and the consumers' concern for quality food grows (Miles et al., 2004), there is a need to improve food handler training programs.

The research purpose was to determine the influence of active learning strategies on the food safety training program among vegetable packing employees using Kirkpatrick's four level model of training evaluation. The purpose aligns with the American Association for Agricultural Education's National Research Agenda Research Priority Area Five: Efficient and Effective Programs (Doerfert, 2011).

Theoretical Framework

Kirkpatrick's (2006) model of training evaluation was widely used in industry for evaluating training programs. The model highlighted four program evaluation levels: reaction; learning; behavior; and results. The reaction level examined the degree to which participants reacted favorably to the learning event. The degree to which participants acquired the intended knowledge, skills, and attitudes was delineated in the learning level. Behavior focused on the degree to which participants applied the intended learning in their workplace. Results applied to which targeted outcomes occurred as a result of the learning event.

Methodology

This research incorporated mixed-methods to utilize each level of Kirkpatrick's model. Sixty-one ($N = 61$) subjects from one vegetable packaging facility participated in the assessment. The treatment group ($n = 27$) participated in active-learning based training while the control group ($n = 34$) participated in a traditional training series. Training topics included cross contamination, food security, hygiene, hand washing, and injury and illness. The pre-test and post-test consisted of 15 multiple choice questions based on industry regulations and company standard operating procedures (SOPs). The observations consisted of the researcher spending a minimum of 20 minutes observing each group on 20 specific observation points identified by the company's food safety staff and in consideration of industry SOPs. The training reaction survey consisted of ten statements related to the trainings and the trainer; the subjects were asked to rate their agreement with the statements using a four point Likert-type scale.

The two groups received the same training topics but were trained using different training methods. The traditional training method was used for the control group. These trainings were conducted using trainer centered lecture style teaching that offered little interaction between the trainer and the subjects or the subjects and the content. The treatment group covered the same content as the control group but used active learning methods. These trainings were learner centered and incorporated activities such as hands on demonstrations, skits, and subjects drawing on whiteboards.

Results

All participants were asked to self-identify their age group, highest level of education completed, number of years employed in the vegetable industry, number of years employed by Express Harvesting, and preferred language. The most frequently chosen age group was 35-44 years old. The overwhelming majority of both the treatment and control groups (86% and 92% respectively) reported completing high school or less. Both groups had subjects that ranged from ten or more years of work in the vegetable industry to less than one year of experience. One hundred percent of participants reported Spanish or Spanish and English as their preferred language; no subjects reported English only as their preferred language.

The groups' pre-test and post-test scores were analyzed using means and an one-way analysis of variance (ANOVA) for each test section related to a training topic as well total test score. The active learning training group showed statistically significant ($p < .01$) improvement in their test scores from the pre-test to the post-test on three of the test sections (Cross Contamination, Hand Washing, and Total Test Score). The effect size for each of these test sections suggested a large level of practical significance ($\eta^2 > 0.14$). The traditionally trained group improved ($p < .01$) on only one test section (Hand Washing) and their scores decreased on one test section (Injury and Illness). When comparing the treatment group's post-tests to the control group's post-test, the treatment group scored significantly higher ($p < .01$) on the hand washing section and the total test score.

On the training reaction survey, the treatment group chose agree or strongly agree more often than the control group on seven of the ten statements. The statement in which the active learning group chose strongly agree most often (93% of treatment group) was, "I plan on using the content of the training at my job." Only 79% of the control group chose strongly agree on this statement.

Primary observation goals were to observe food safety issues in the facility, to note when subjects recognized issues, and to record what was done to correct the issues. Most notably, unlocked doors leading into the facility were observed at the beginning of the study. After the food security training, subjects were observed locking these doors. Positive changes in behavior were observed in both the treatment and control groups.

Conclusions and Recommendations

Based on the results, it was concluded that both active and traditional training methods were received positively by the subjects and pre-assessment was critical to understanding the audience and training development. Further, it was determined that food safety training programs that incorporate active learning techniques can result in higher test scores than traditionally trained subjects. Based on the results from each instrument of this study, the addition of active learning methods was shown to positively influence subjects' reactions to the training program, overall test scores on the food safety knowledge exam, on-the-job behaviors and actions, and the overall effectiveness of the program.

Similar to the suggestions of Lillquist, McCabe, and Church (2005), it is recommend that vegetable food safety teams incorporate active learning strategies into their training programs. It also recommend that food safety trainers utilize pre-assessments to determine the knowledge levels and skills of their trainees and to better target individuals with active learning strategies. Food safety teams should continue to enhance and improve training programs to provide better trainings to employees with the goal of lowering risk of contaminated food causing food borne illnesses and outbreaks.

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