The Journal of Extension

Volume 42 | Number 6 Article 23

12-1-2004

Active Assessment for HACCP Training: Integrating Pedagogical Reasoning with Primary Trait Analysis

Y Martin Lo
University of Maryland, ymlo@umd.edu

Kazuko Fukuskima
University of Maryland, fkazuko@wam.umd.edu

Thomas E. Rippen
University of Maryland Eastern Shore, terippen@mail.umes.edu

Susan L. Gdovin
University of Maryland, sg91@umail.umd.edu

Recommended Citation

Lo, Y., Fukuskima, K., Rippen, T. E., & Gdovin, S. L. (2004). Active Assessment for HACCP Training: Integrating Pedagogical Reasoning with Primary Trait Analysis. *The Journal of Extension, 42*(6), Article 23. https://tigerprints.clemson.edu/joe/vol42/iss6/23

This Ideas at Work is brought to you for free and open access by the Conferences at TigerPrints. It has been accepted for inclusion in The Journal of Extension by an authorized editor of TigerPrints. For more information, please contact kokeefe@clemson.edu.

December 2004 // Volume 42 // Number 6 // Ideas at Work // 6IAW4

Active Assessment for HACCP Training: Integrating Pedagogical Reasoning with Primary Trait Analysis

Abstract
An active assessment mechanism based on Primary Trait Analysis (PTA) and the six aspects of a pedagogical reasoning model was developed to leverage the effectiveness of Hazard Analysis Critical Control Point (HACCP) training. By integrating critical thinking into the design of problem scenarios, students are expected to go through five different levels of learning, starting with *comprehending* science content and available resources, *transforming* the information for accomplishing the task, and *implementing* into the target process and ending with *evaluating* and *reflecting* on various outcomes of the situation. Students are thereby are expected to develop *new comprehension* of the topics.

Y. Martin Lo
Associate Professor and Extension Specialist, Food Processing and Safety
Department of Nutrition and Food Science
University of Maryland
College Park, Maryland
ymlo@umd.edu

Kazuko Fukushima
Research Associate, Food Safety
Department of Nutrition and Food Science
University of Maryland
College Park, Maryland
fkazuko@wam.umd.edu

Thomas E. Rippen
Senior Extension Specialist
Sea Grant Extension Program
Maryland Cooperative Extension
University of Maryland Eastern Shore
Princess Anne, Maryland
terippen@mail.umes.edu

Susan L. Gdovin
Associate Director
Center for Teaching Excellence
University of Maryland
College Park, Maryland
sg91@umail.umd.edu

Tae-Shik Hahm
Visiting Scientist
Department of Nutrition and Food Science
University of Maryland
College Park, Maryland
thahm@umd.edu

Introduction

The Hazard Analysis Critical Control Point (HACCP) programs specific to the processes involved in

food production offer the food industry a comprehensive and science-based approach to enhance food safety. In addition to ensuring proper sanitation operation, assessing the likelihood of hazard occurrence, establishing critical limits, and assessing program validity, the success of HACCP lies in proper training of employees on the production floor and in quality control.

As the only higher education institution in the Mid-Atlantic area offering HACCP training to regional poultry and seafood processors, the University of Maryland has committed its resources across the state to promote effective HACCP education. However, much of the learning in the training workshops inherently has been rote, relying solely on intensive lectures and handout materials. To effectively convey important yet complicated information to the students, we believe that the training mechanism for HACCP workshops needs to be transformed so that emerging food safety issues can be adequately addressed.

Pedagogical research shows that the more students become involved with "real life" situations, the more they learn. This forms the foundation for problem-based learning (PBL), which emphasizes that the problem is encountered first by students and that learning takes place in response to the students' attempts to resolve the problem. It has been shown that, with PBL approach, complex, real problems motivate students to identify and research concepts and principles needed to solve the problems. Moreover, proactive approaches that encompass both cognitive and motivational goals must become the core emphasis of educational experiences. It is believed that such experiences will assist the students in meeting the content and process skills expected by the industry.

However, to prove the effectiveness of HACCP trainings, it is critical to establish an active mechanism to properly assess student performance. This article describes the establishment of an interactive HACCP training program based on Primary Trait Analysis (PTA) and the six aspects of a pedagogical reasoning model: comprehension, transformation, implementation, evaluation, reflection, and new comprehension.

Interactive HACCP Training Program

To reinforce critical thinking, our training focuses on breakout sessions to ensure students can control the processes, know the critical points, and properly use available tools. Equally important is how the students are guided to extend scientific principles during discussions. The HACCP problem scenarios are defined in collaboration with industrial supervisors based on three knowledge base components: subject matter knowledge, knowledge of learner, and knowledge of educational purposes and values.

Fundamental to the problem scenarios is the knowledge of the subject matter. Because most of the students have started their job and are familiar with the processes, this component comes first. Knowledge of the learner is often neglected in the design of a problem scenario. However, we've moved from information dissemination to a situation where learning is student-centered, with students exerting more control over the learning to be completed. The knowledge of educational purposes and values enables the instructor to interweave the HACCP scenario with students' job-specific interests.

Use of Primary Trait Analysis (PTA) is a key to the design of our problem scenarios. Basically, once the student identifies a process of interest, the factors or traits that would count for grade (such as "comprehension," "solution identification," and "control of variables") are selected. A five-point scale using descriptive statements on that trait is constructed. Depending on the process, most problems are designed based on one or two traits. For example, "comprehension" is a good trait for students working in Quality Assurance. For the scenario "What happens when the same bacteria contamination repeatedly occurs?" a typical five-point scale is:

1. Student merely identifies the problem (acknowledging safety concerns);
2. Student describes the problem (knowing the severity of the hazards);
3. Student explains the problem (associating with processing conditions);
4. Student analyzes the problem (understanding suitable preventative measures);
5. Student synthesizes the problem (knowing control criteria and proper reactions).

A list of traits that we use in the HACCP workshops is provided in Table 1. It is important to note that the scale is not additive or subtractive. Each level represents a different skill in pedagogical reasoning, a valuable tool for student assessment.

Table 1.
Example "Traits" Employed in the Primary Trait Analysis (PTA)

Traits and Their Typical Scoring Criteria	**5**	**4**	**3**	**2**	**1**

Solution Identification: Are the solutions just superficial, or do they demonstrate deeper processing? Do the solutions appear to be a restatement of someone else's words, or an interpretation in the student's own words? Have you mentioned applications or relationships to other processing step?					
Control of Variables: Have all important points been discussed? Are there omissions of information? Are the ideas correctly understood? What evidence illustrates that understanding?					
Creativity: Is the information connected to the student's personal observations and experiences?					
Understanding: Is there evidence that the student's understanding has increased? Did the student learn something that he or she didn't know before?					
Problem completion: Does it appear that problems have been attempted, or have they merely been skimmed over? What is the overall quality of the student's work in this assignment?					

Tools for Active Assessment

Evaluation and grading on student performance is more challenging for a training workshop than for any classroom testing. The grade on student performance is calculated based as follows: (1) 60% on problem scenario analysis during breakout, (2) 30% on quiz containing technical questions, and (3) 10% on closing interview.

At the beginning of working on a particular problem, the students, to be successful need to *comprehend* both the science content and available resources as the first part of their report to the class (Level 1). In the second or third breakouts, the students have to consider the potential pitfalls and determine the most appropriate approach, i.e., *transforming* the information for accomplishing the task. In this process, the students are expected to integrate the content knowledge required for this task (Level 2). After the students enter the *implementation* process (Level 3), they *evaluate* and *reflect* on various outcomes of the situation (Level 4) and are expected to develop *new comprehension* of the topics (Level 5).

In addition, a 5-minute closing interview is conducted. Prior to the interview, students are given a hypothetical product a food company is about to launch, with the availability of processing capacities similar to the company that they work for. Desirable quality measures are provided along with potential challenges. During this interview, students are asked to present how they would ensure product safety and why.

Similar grading criteria based on the PTA five-point scale are used (Table 2). During the academic years of 2000 to 2002, at least 60 students completed this HACCP training program with a grade average of 80.4 ± 3.1, better than the 72.2 ± 4.5 from previous years (1998 to 1999). Through direct conversations with the participants, both students and their supervisors found this program enjoyable and successful.

Table 2.
Grading Criteria Used in the Closing Interview

Grading Criteria	**5**	**4**	**3**	**2**	**1**
Thoroughness of comments: (4%) Are the comments just superficial, or do they demonstrate deeper processing? Do your answers appear to be a restatement of someone else's words, or an interpretation in your own words? Have you mentioned applications or relationships to other products or processing technologies?					
Understanding: (3%) Have all important points been discussed? Are the ideas correctly understood? Are there omissions of essential					

information? What evidence illustrates that understanding?					
Problem completion: (2%) Does it appear that all the possible options have been attempted, or have they merely been skimmed over? Is the information presented connected to content knowledge and/or your personal observations and experiences?					
Growth: (1%) Is there evidence that your understanding has increased? Did you learn something that you didn't know before? Have you thought of other questions? What is the overall quality of your work in this assignment?					