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Evaluating Program Outcomes via Decision Making Simulations

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Evaluating Program Outcomes via Decision Making Simulations

Abstract
Decision making-based methodology was proposed for evaluating program outcomes. The methodology was tested to measure the effect of safety enhancing curriculum on Safety Awareness, one of the 15 competencies ABE is using in program outcome evaluations. The results indicated a significant increase in safety awareness and shift in cognitive processes following implementation of the curriculum. Since ABE measures competencies via supervisory evaluation of graduates, the authors examine the opportunity of developing a longitudinal study for measuring the magnitude of impact of curriculum on outcomes at the workplace.

Disciplines
Agriculture | Bioresource and Agricultural Engineering | Educational Assessment, Evaluation, and Research | Engineering Education | Higher Education and Teaching | Operational Research

Comments
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Teaching Innovations

Evaluating Program Outcomes via Decision Making Simulations

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Need: Evaluation of program outcomes is a moving target. Evaluations through exams, quizzes, projects, etc. reflect the knowledge, skills and perspectives students acquired due to the implementation of the variety of learning activities. However, assessment of whether programs lead to shifts in cognitive patterns that will trigger the activation of the knowledge, skills, and attitudes that have been pursued is yet a challenge. For example, will teaching safety components as part of the curriculum lead to a higher safety orientation beyond the framework of the learning program? In this presentation, we will present a methodology that utilizes decision-making simulations to directly assess the impact of learning on program outcomes.

Overview: The Department of Agricultural and Biosystems Engineering (ABE) at Iowa State University (ISU) utilizes a competencies-based evaluation system for program outcomes. Current assessment efforts for program outcomes at (ABE) are perception-based, utilizing ratings on a 5-point Likert Scale. While perception-based evaluations carry merit, these surveys has several deficiencies, such as very low accuracy, bias, and lack of sensitivity needed to measure improvement/derogation in small increments. The assessment with decision-making simulation documents cognitive processes. Subjects are not aware of the procedure associated with analyzing the results of the simulation, thus, bias associated with awareness of the subject to the alma mater is avoided. Furthermore, the analysis of the decision portraits provides more insights on the effect of learning by, not only measure shifts in awareness to the alma matter but also, by understanding the cognitive processes associated with these shifts. Safety awareness is one of the competencies ABE is using to assess program outcomes. Students and supervisors rate this competency level low. In this presentation, we will present the results of implementation of the decision-making methodology above to measure improvement in safety awareness and orientation toward safety following the development and implementations of an online autonomous safety enhancement curriculum.

Major Points:

• ABE at ISU utilizes a competencies-based evaluation system for program outcomes.
• Current program outcome assessments carry merit but are limited in accuracy and are susceptible to biases
• A decision making-based methodology has been developed and implemented to assess impact on competency level
• Implementation of the decision making-based evaluation shows promising results

Summary: Decision making-based methodology was proposed for evaluating program outcomes. The methodology was tested to measure the effect of safety enhancing curriculum on Safety Awareness, one of the 15 competencies ABE is using in program outcome evaluations. The results indicated a significant increase in safety awareness and shift in cognitive processes following implementation of the curriculum. Since ABE measures competencies via supervisory evaluation of graduates, the authors examine the opportunity of developing a longitudinal study for measuring the magnitude of impact of curriculum on outcomes at the workplace.