Knowledge Generation Builds Confidence in an Advanced Production Class

Martin J. Zuidhof and Frank E. Robinson

NACTA Annual Meeting
Purdue University, West Lafayette, IN
June 28-July 1, 2017
The Problem

Undergrads normally assimilate knowledge passively

• Lectures
• Textbooks
• Regurgitation of facts

Can knowledge generation by students foster

• Engagement
• Mastery
• Confidence
• Synthesis of knowledge
Opportunity

Engaging students actively in research (knowledge creation) may have some benefits

• Immerse students in systematic investigation
• Deepen appreciation for empirically derived knowledge
• Increase interest in and mastery of subject matter, e.g.
  - Broiler flock management
  - Impact of genetic change on broiler growth and efficiency
• Build confidence
• Exposure to process of synthesizing new and existing knowledge, e.g.
  - Role of genetic change in socially responsible food production system
Pedagogical Questions

Can students benefit from the knowledge generation process?

Can this *High Impact Experience*

- Foster student engagement?
- Improve subject matter mastery?
- Build student confidence?

Assessment

- Evaluation over 4 cohorts (2013 to 2016)
  - Student comments from course evaluations
  - Comments from industry participants
  - Debrief with students after presentation
Animal Science 471: Applied Poultry Research

Level: 4th year production course

- Objective (overarching): “to become fluent in poultry”
- Undergraduate students: 11 to 26 per term
- Graduate students: 2 to 5 per term
- Course content (layers, turkeys, broilers, and broiler breeders)
  - Animal care and biosecurity
  - Anatomy and physiology
  - Nutrition and feeding
  - Reproduction
  - Incubation
  - Growth and development (modeling)
  - Management
  - Health and welfare
  - Processing
  - Industry issues
The Knowledge Generation Project

Rigorous experiment of publishable quality

• Research theme varied
  • Nutrition themes
  • Evaluation of genetic change over 60 years

• Learning outcomes:
  • Achieve fluency in industry issues
  • Understand key elements of poultry management
  • Understand the science behind production efficiency
  • Evaluate the economic relevance of the research for end user
  • Master communication skills
Knowledge Generation Project Scope

Broiler experiment during lab (6 week project)

• Week 1: Practical animal care training, project orientation
• Weeks 2-8: Run research project
  - Brooding
  - Measure feed intake
  - Weighing birds
  - Dissection
• Week 9: analysis and reporting
  - Nonlinear modeling of growth and development
  - Economic analysis
• Week 10: Presentation planning (Google slides)
• Week 11: Practice presentation
• Week 12: Presentation to industry
Student Evaluation (40% of Course)

Undergraduate students
• 3-4 page report (6,000 characters)
• Science journalism format

Graduate students
• Poultry Science manuscript

All Students: Presentation to industry
• A single 40 minute presentation
Impact

Key messages from student presentations

• The first meal matters
• Compensatory growth is complex and nuanced
• Genetic change over 60 years has made chicken production more socially responsible
Student Evaluations of their Experience

- Approximately 50% of students reported high level of engagement
  - Lab provided great hands-on poultry experience
- 10% of students expressed disapproval of the project
  - Critical of unstructured learning
  - Unaccustomed to self-directed work

“Time to practice the presentation was greatly appreciated. I was honestly amazed at how well it came together.”

“I like how we got lots of hands-on poultry experience for the lab, that was very, very valuable.”
Industry Audience Reaction

“It’s really great to see what the University is doing to train our future leaders”

“You never see that... during the question period after their presentation not one of them was distracted”

“To the person, everyone contributed impressively to the presentation”
Required Resources and Support

Project funding

Human resources
1. Graduate teaching assistant
   - Department standard: 1 per 20 students
2. Volunteer learning coach(es)
   - Undergrads who have taken the class before and ‘got it’

Teaching team role
• Data quality control
• Support, engage, coach, inspire students
Was it Worthwhile?

Pros

• Many students appreciated the hands-on learning
  – Rigorous systematic study
  – Practical poultry management
• Students worked together on all aspects of the project
• Students ‘owned’ the project, and audience noted their confidence and engagement

Cons

• Lab content scope narrows to a single research project
• Planning requirement
  – Funding
  – Ethics approval
  – Training
• Challenge to engage a larger class
Reflections

- Students self-reported their surprise and pride in what they accomplished
  - High impact story told fluidly by 13 to 29 people
- Smaller class (11 + 2) worked better

Next step

- Objectively quantify
  - Engagement
  - Confidence
  - Retention