USING GUIDED DISCOVERY TO TEACH STUDENTS FEEDSTUFF IDENTIFICATION IN A SWINE PRODUCTION COURSE

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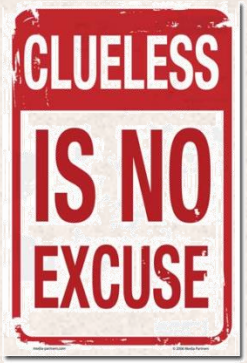
Challenges

Our typical student has little knowledge or experience in the swine industry, comparable to other animal industries

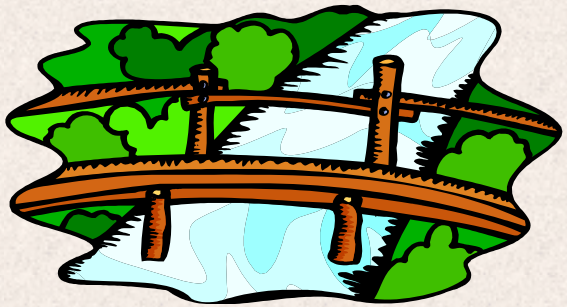


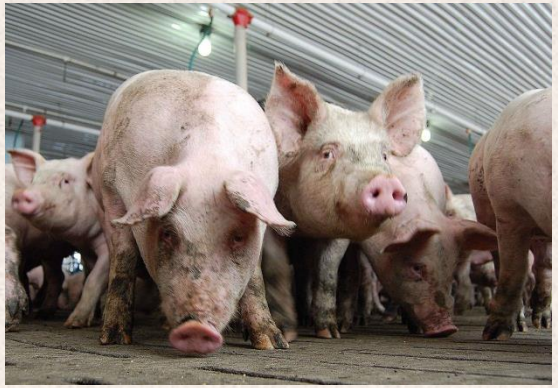
- self-reported (3.97 ± 1.89)

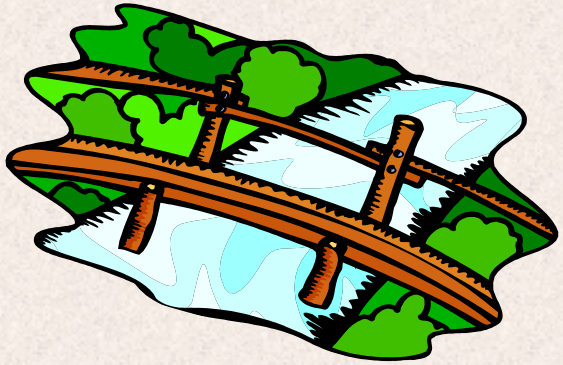
The typical student enrolled in swine production has a less-than-adequate ability to identify feedstuffs, even as a junior or senior and having successfully completed courses in nutrition

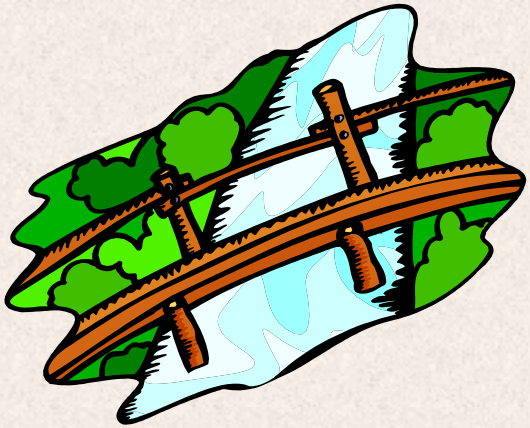
- self-reported (3.84 ± 2.01)

Challenges









Course Goals

- Explain key concepts in today's swine industry

[COMPREHENSION]

- Demonstrate comprehension by solving issues associated with the industry

[APPLICATION]

- Analyze different production systems and management principles currently used in the industry

[SYNTHESIS]

Rationale

- **Small projects and case studies are cost-efficient, in-class alternatives**

(Dahleen et al., 2003; El-Fadel et al., 2003)

- **Case-based and small-group learning is beneficial, however unequal group member participation is common-place**

(Turgeon, 2007)

- **Discovery Learning is a method of inquiry-based instruction**

(Bruner, 1967)

  - **students discover facts for themselves**
  - **uses previous knowledge and experience**
  - **more likely to remember concepts and knowledge**
  - **misconceptions & inaccuracies**

- **Guided Discovery learning alleviates these inaccuracies and involves the teacher**

Synopsis

Swine Production and Management (ANSC 354)

2 credits, 2 hours (2 one-hour meetings/week)

elective that satisfies major degree requirements (4 alternative options)

~25 students/semester (data over 2 years, or ~50 students)

classroom adjacent to animal science barn

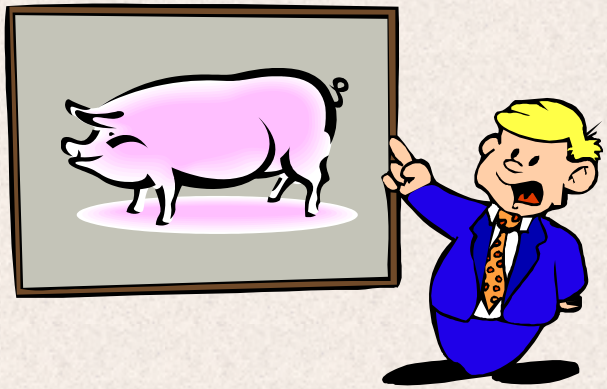
covers integration and practical applications of all principles of a swine operation and the swine industry

Objectives

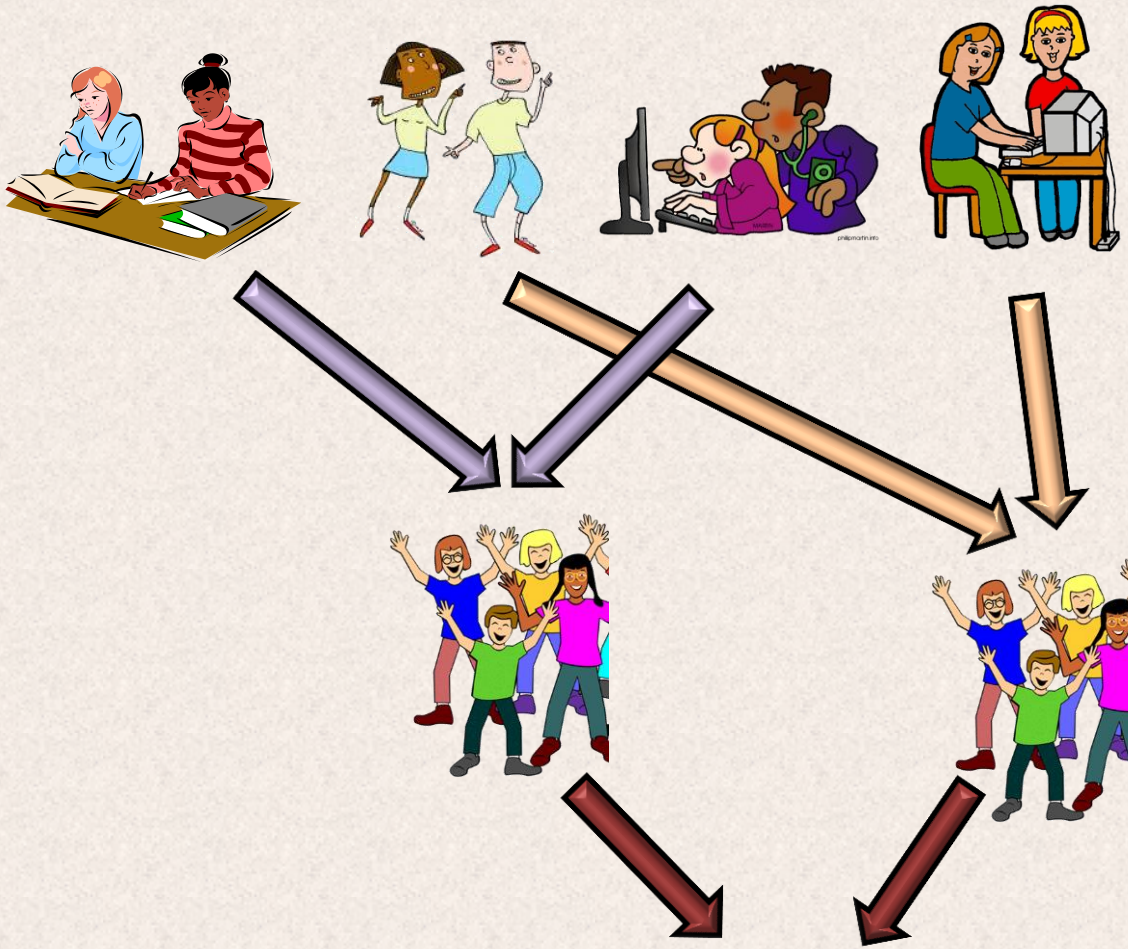
Introduce students to the principles of swine nutrition and basic feedstuff identification through:

- **traditional lectures**
- **guided discovery assignments**
- **diet formation project**

Experimental Design



Experimental Design



students form groups of 2
(n=50)

small groups randomly paired
to create groups of 4

guided discovery of feedstuffs commonly used in the industry

diet formulation project (semester-long)

Guided Discovery

Part II

Directions: Identify the feedstuff in each cup that is often used in feeding hogs.

Hints: Sample F and J are from the same source, Sample B and H are from the same source, Sample A and G are from the same source, Sample I and E are byproducts

Sample #	Identification
A	

Swine Feedstuffs

Part III

Directions: Identify the feedstuff in each cup that is often used in feeding hogs.

Sample #	Source of Carbohydrate or Protein?
A	

Swine Feedstuffs

Part I

Directions: Identify the feedstuff in each cup that is often used in feeding hogs.

Sample #	Identification
A	
B	
C	

Swine Feedstuffs

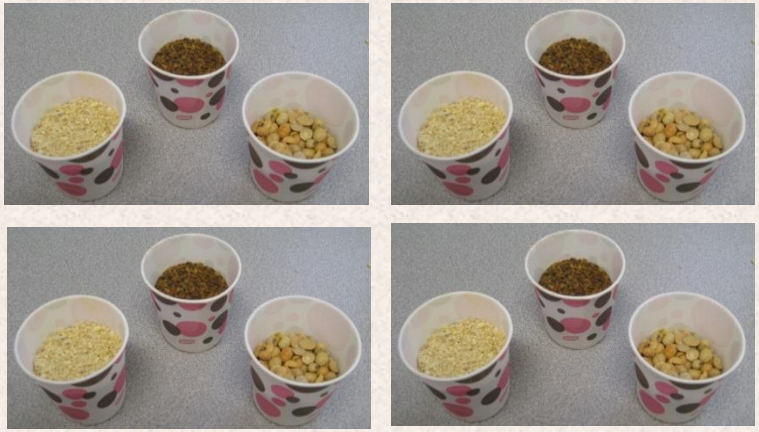
Part IV

Directions: Identify the feedstuff in each cup that is often used in feeding hogs.

Sample #	Identification	Did Your Answer Change Since Part I?	Correct or Incorrect
A			
B			
C			

Logistical Nightmare & time waster & not eco-friendly

Guided Discovery



Swine Feedstuffs

Sample #	1	2	3	4	5	6
A						
B						
C						
D						
E						
F						
G						
H						
I						
J						
K						
L						

Directions

Column 1:

Identify each feedstuff

Directions

Column 2:

Given that:

F and J are from the same source
B and H are from the same source
A and G are from the same source
I and E are byproducts

Identify each feedstuff

Directions

Column 3:

Write “C” if the feedstuff is a source of carbohydrate or “P” if the feedstuff is a source of protein

Directions

Column 4:

Identify each feedstuff

Directions

Column 5:

Has your answer changed since column 1?

Write “Y” if yes, “N” if no

Directions

Column 6:

THE ANSWERS!!!

Were you correct?

Write “Y” if yes, “N” if no

Project

Diet Formulations

Nutrition Project

Assignment:

Using the nutrition program (NEWSWINE) on Blackboard, formulate balanced rations for each of the following classes of pigs:

1) Gestating sow
2) Lactating sow
3) 40 pound feeder pig
4) 100 pound finishing pig
5) 200 pound finishing pig

Update the cost of each feedstuff using current market prices. The costs on this program are based on the $cwt (per 100 pounds) and some adjustments might be necessary.

A balanced ration is one that meets (ADQ) the nutrient requirements (no DFN)

Use common sense. The ration you formulate should be a legitimate option. For instance, if you can make a ration that uses only fat and fishmeal, is that really something you would feed all your hogs?

For each class, include the following information:

- Where you found the current costs for the feedstuffs used
- Date of the costs used
- Ingredients used
- % of each ingredient in the final ration
- Cost of each ingredient to produce 100 pounds of your formulated feed
- Cost to produce 100 pounds of your formulated feed

Evaluation

- ✓projects were graded independently from one another by the same individual
- ✓use of rubric to increase consistency (provided to students prior to projects)
- ✓grade was “individualized” by including peer evaluations of each team member
- ✓project grades were compared to exam and quiz grades covering corresponding material

- ✓student response and perception of the projects was conducted anonymously
- ✓ten-point Likert- scale from 1 = not at all to 10 = definitely/absolutely/expert level

Results: Student Learning

There were no significant differences between semester values for any endpoint, so semester was removed from the final model

Graded Assignments

Artifact	Mean Score (%)	Standard Deviation	
Project	86.77	1.69	
Quiz	82.60	5.02	n = 50
Exam I	76.00	8.36	
Exam II	85.70	6.21	

Student Perception

Scale: 1 = not at all, 10 = definitely/absolutely

n = 50

Statement	Mean Response (standard dev.) Beginning of Semester	End of Semester	
I feel that I can identify, describe, and explain the key terms/concepts of swine breeding, genetics, reproduction, nutrition, growth and development, and management in the industry	3.97 (1.89)	8.09 (1.05)	$p < 0.001$

Results: Student Perception

Scale: 1 = not at all, 10 = definitely/absolutely

Statement	Mean Response	Standard Deviation
I enjoyed learning how to identify feedstuffs and basic swine nutrition using guided-discovery methodologies	8.38	1.08
I think the guided-discovery increased my understanding and comprehension of the material	7.33	1.65

Statement	Mean Response (standard dev.) Beginning of Semester	End of Semester
I feel that I could easily identify feedstuffs	3.84 (2.01)	7.33 (1.74)

$p < 0.001$

n = 50

Results: Student Perception

Scale: 1 = not at all, 10 = definitely/absolutely

Statement	Mean Response	Standard Deviation
I believe the guided-discovery method is better than the traditional lecture method	8.88	1.44
I believe the guided-discovery method is better than the "show and tell" method	8.96	1.11
I feel like this learning style should be continued in the future with at least the feedstuffs	9.25	0.79

n = 50

Conclusions

- Students think the hands-on/guided discovery component of learning is important
- Team projects strengthened learning outcomes and overall comprehension of the material
- Projects (but mainly teamwork) are not widely accepted by all students and could decrease student satisfaction
- Student focus is an issue
- Current adjustments being made

Questions?