Expected Outcome 1: 1-Poultry Nutrition

Students will be able to explain the role of proper nutrition on poultry growth efficiency, including the functions and deficiency signs of amino acids, minerals, and vitamins.

Assessment Method 1: Pre/post-testing

Assessment Method Description

A pre-test/post-test was administered in POUL 5050 to assess student learning with respect to poultry nutrition. The pre-test was administered on the first class day and not returned nor discussed with the students. Post-test questions, identical to the pre-test, were incorporated into lecture examinations throughout the semester. The evaluation tool is shown below.

```
PRE-TEST POUL 5050/6050 Fall 2013

Major: ___________________ Undergraduate/Graduate: ___________________

1) Which is/are correct for water?
   □ a) Dietary fiber increases water consumption.
   □ b) Pelleted feed decreases water consumption.
   □ c) Infectious diseases do not affect water consumption.
   □ d) Water consumption increases as birds advance in age.

2) Which is/are correct for energy?
   □ a) Starch and hemicellulose are utilized well by poultry to meet their energy needs.
   □ b) Carbohydrates are found primarily in plant sources.
   □ c) Pectin is the major source of non-starch polysaccharides in soybean meal.
   □ d) Only functions of carbohydrates are to provide energy and heat to the bird.
   □ e) Amino acid requirements do not differ for male and female broilers.

3) Which is/are not correct as it relates to Aflatoxins?
   □ a) Inhibits DNA synthesis
   □ b) Hepatocarcinogen
   □ c) Inhibits initial step of protein synthesis
   □ d) Most toxic mycotoxin in poultry

4) Which is/are correct for phytase?
   □ a) High conditioning temperature can influence its efficacy.
   □ b) Exogenous phytase is present only in liquid form.
   □ c) Minimizes phosphorus content in litter.
   □ d) Phytase is used only in about 50% of the diets for broilers.

5) Which is/are correct for U. S. Grade # 2 corn?
   □ a) Minimum test weight is 54 lbs per bushel.
   □ b) 0.5% heat damaged kernels.
   □ c) Total damage is 5.0% or less.
   □ d) Foreign material and broken corn is 3.0% or less.

6) Which is/are not correct for fat oxidation?
   □ a) Increased vitamin potency.
   □ b) Increased metabolizable energy.
   □ c) Decreased membrane stability.
   □ d) Decreased feed intake due to poor palatability.
```
Findings

Twelve poultry science students completed the pre- and post-tests during Fall 2013. The complete data set appears in the table below. Overall, student learning increased nearly 10-fold based on the number of correct responses on the pre-test and post-test. The performance of the students on three questions (3, 5, and 7) was still quite low.
How did you use findings for improvement?

With the post-test questions being incorporated into lecture exams, current students would see their errors, which should improve their learning. For future students, areas where specific deficiencies were identified will be addressed by modification of the lecture material. Lastly, the biochemistry prerequisite has evolved over time into a co-requisite, which means students are less well prepared entering into POUL 5050. Students have been informed that the biochemistry prerequisite will be enforced starting in the fall semester of 2015.

**Assessment Method 2: Graduate surveys**

**Assessment Method Description**

Question(s) on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome. Questions 7, 13, and 14 address poultry nutrition. Scores range from 1 (little ability) to 4 (advanced ability). The survey instrument is shown below.

<table>
<thead>
<tr>
<th>Question</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2/12</td>
<td>10/12</td>
</tr>
<tr>
<td>2</td>
<td>1/12</td>
<td>6/12</td>
</tr>
<tr>
<td>3</td>
<td>0/12</td>
<td>4/12</td>
</tr>
<tr>
<td>4</td>
<td>0/12</td>
<td>11/12</td>
</tr>
<tr>
<td>5</td>
<td>0/12</td>
<td>4/12</td>
</tr>
<tr>
<td>6</td>
<td>0/12</td>
<td>8/12</td>
</tr>
<tr>
<td>7</td>
<td>0/12</td>
<td>4/12</td>
</tr>
<tr>
<td>8</td>
<td>0/12</td>
<td>6/12</td>
</tr>
<tr>
<td>9</td>
<td>2/12</td>
<td>10/12</td>
</tr>
<tr>
<td>10</td>
<td>0/12</td>
<td>9/12</td>
</tr>
<tr>
<td>11</td>
<td>0/12</td>
<td>11/12</td>
</tr>
<tr>
<td>12</td>
<td>5/12</td>
<td>12/12</td>
</tr>
<tr>
<td>13</td>
<td>0/12</td>
<td>6/12</td>
</tr>
<tr>
<td>14</td>
<td>0/12</td>
<td>7/12</td>
</tr>
<tr>
<td>total</td>
<td>10/168</td>
<td>99/168</td>
</tr>
<tr>
<td>percentage correct</td>
<td>6%</td>
<td>59%</td>
</tr>
</tbody>
</table>
Findings

Six graduating seniors completed the OIRA survey during the 2013-14 academic year. In the general area of nutrition (question 7), students felt that they had an intermediate ability (3.17). However, the other two questions related to nutrition received the lowest scores on the survey; nutrient function and deficiency (question 13) scored an average of 2.83 while ability to formulate a diet (question 14) was lower at 2.67. The subject area receiving the highest score was processing (question 9).
How did you use findings for improvement?

As mentioned previously, the initial step for improving learning about poultry nutrition will be enforcing the prerequisite course (biochemistry). Additional survey data over time would be beneficial to know whether this student perception is a one-time event or an actual trend.

Assessment Method 3: Graduation Exam

Assessment Method Description

A 40-question exam is given to graduating poultry science students to assess their global learning during their time in the program. The exam is administered by the department head. This evaluation tool is shown below.
Undergraduate Poultry Science Exit Exam

1. Further processing refers to those procedures that take place.__________
   a) After chilling c) in the supermarket
   b) Reworking birds d) before inspection

2. Yield and__________ are the greatest challenges facing procedures of boneless breast meat. This latter problem can be improved by increasing the time between killing and deboning.
   a) Water uptake c) bruising
   b) toughness d) shrink

3. Failure to kill the bird before scalding will result in__________
   a) Poor feather removal c) condemnation
   b) Increased profit d) less pin feathers

4. Under the new Federal Regulations which were phased in between 1997 and 2000, each processing plant was required to develop a__________ plan.
   a) Marketing c) HACCP
   b) PDO d) maximum profit

5. Federal inspection in broiler processing plants is__________.
   a) Mandatory c) voluntary
   b) Totally inadequate d) done by random sample

6. Most instances of food borne illness are the result of activities__________.
   a) During first processing c) on the farm
   b) During further processing d) after leaving the plant

7. Eggs are sized as Jumbo, Extra Large, Large, Medium, Small and pea wee. Large eggs are the standard and weigh__________ oz/doz.

8. The average American broiler has a live weight of__________ pounds.
   a) 2 b) 4 c) 16 d) 16

9. The three top broiler producing states are__________.
   a) California, Indiana, Minnesota c) Arkansas, Georgia, Alabama
   b) Florida, Mississippi, Louisiana d) Illinois, Wisconsin, Colorado

10. During a typical table egg layer’s first year of lay, she will produce__________ eggs.
    a) 75 b) 150 c) 250 d) 400

11. The major difference between Broiler and Leghorn eggs is__________.
    a) Size c) color
    b) The nutritional value d) the air cell

12. Chicken eggs require__________ days from beginning of incubation to hatching.
    a) 18 b) 21 c) 35 d) 72

13. Physiological zero is a term applied to a__________.
    a) Broody hen c) hatching egg
    b) Minimum number of microbes d) lack of cardiac function

14.__________ is a procedure to determine shell thickness without breaking the shell.
    a) Specific gravity c) basil strength
    b) Haugh Units d) irradiation

15. The sex of the offspring of a mating is determined by the__________.
    a) Hormone level c) chick
    b) Male d) female
16. What is the ratio of males to females in a commercial broiler breeder flock?
   a) 1:1    b) 1:2    c) 1:10    d) 1:20
17. What are the two primary feedstuffs used in the diets of poultry in Alabama?
   a) Corn/soy    b) corn/milo    c) com/SBOM    d) corn/cotton seed
18. The protein level of a starter diet is ________ that in a grower diet in commercial broiler formulations.
   a) Higher than    b) lower than    c) equal to    d) less important
19. The workable concept of separate male and female feeders was developed at ________.
   a) USDA    b) CSREES    c) Georgia    d) Auburn
20. ________ will help meet the sulfur requirement of chickens.
    a) Lysine    b) Arginine    c) Glycine    d) Methionine
21. Feed accounts for ________% of the cost of producing broilers.
    a) 30    b) 40    c) 50    d) 60
22. The temperature under the brooder should be ________ degrees F for day old chicks.
    a) 90    b) 95    c) 90    d) 70
23. The ________ has the role of ensuring food safety in the processing plant.
    a) USDA    b) integrator    c) FDA    d) state veterinarian
24. The final temperature of broilers leaving the chiller must reach ________ degrees F within 4 hours.
    a) 28    b) 32    c) 40    d) 38.6
25. ________ is the primary means of controlling bacteria during processing.
    a) Disinfectant    b) band washing    c) Employee training    d) IIIC
26. The ________ is an important organ in establishment of immune function in the young broiler.
    a) Liver    b) thyroid    c) bursa    d) gizzard
27. Mash, crumbles, and ________ are three forms in which commercial chicken feeds may be purchased.
    a) Fully cooked    b) fat free    c) pellets    d) feed blocks
28. ________ are added to some poultry diets to increase energy levels.
    a) Vitamins    b) Amino acids    c) Fats    d) Minerals
29. The level of calcium in a laying diet should be ________%.
    a) 1    b) 2    c) 3    d) 6
30. Day length should never be ________ in laying hens.
    a) Increased    b) decreased    c) changed    d) a consideration
31. ________ is a parasitic intestinal disease that affects broilers.
    a) New Castle    b) Gumboro    c) Coccidiosis    d) Erysipelas
32. Refrigerated eggs are still considered wholesome after ________ days of storage (select maximum number).
    a) 3    b) 7    c) 14    d) 21
33. The four USDA grades of table eggs are ________.
    a) Premium    b) AA    c) clean    d) rough
34. Small blood spots are ________ in table eggs that have been USDA graded.
    a) Not permitted    b) permitted    c) removed during processing    d) common
35. The process of ________ is used to identify defects in table eggs.
    a) breakout    b) candling    c) sizing    d) x-raying
36. The ________ owns the birds and feed on a contract broiler farm.
    a) Farmer    b) integrator    c) bank    d) Federal Government
37. Per capita egg consumption reached its peak after ________.
    a) WWI    b) WWII    c) 1970    d) 1999
38. Per capita consumption of chicken meat has ________ since the late 1960s.
    a) Increased steadily    b) decreased steadily    c) remained constant    d) been up and down
39. In order to improve egg quality and quantity, hens are often ________.
    a) Spiked    b) exposed to music    c) molted    d) irradiated
40. The feed conversion of the typical broiler is ________.
    a) 1    b) 2    c) 3    d) 6
Findings

During the 2012-13 academic year, students (n=13) scored an average of 80% on the exam with 92% of the students scoring a minimum of 70%. During the 2013-14 academic year, students (n=10) scored an average of 72% on the exam with 70% of the students scoring a minimum of 70%. For 2013-14, students struggled with questions related to processing, food safety, and table eggs.

How did you use findings for improvement?

Based on the graduation exam, poultry nutrition was not identified as a deficiency. With respect to poultry nutrition, the pre-test/post-test will be the primary “driver” for improvements.

Separate issues identified through this process are the appropriate organization and analysis of the graduation exam. A review of this exam by poultry science faculty indicated some questions have become outdated. The exam above will be re-designed and updated to better match the student learning outcomes so deficiencies in specific learning outcomes can be more easily identified.

Expected Outcome 2: 2-Poultry Health

Students will recognize health issues associated with poultry production, including the prevention of diseases and how to counteract diseases if they do occur.

Assessment Method 1: Pre/post-testing

Assessment Method Description

A pre-test/post-test was administered in POUL 5080 to assess student learning with respect to poultry health. The pre-test was administered on the first class day and not returned nor discussed with the students. The post-test, identical to the pre-test, was administered during the final week of the semester. The evaluation tool is shown below.
Findings

Eight poultry science students completed the pre- and post-tests during Spring 2014. The complete data set appears in the table below. Overall, student learning increased 240 percent, based on the number of correct responses on the pre-test and post-test. The performance of the students on three questions (1, 3, and 5) was still quite low.
How did you use findings for improvement?

The post-test was reviewed with the class during the final week of the semester, which enhanced the learning of the current students. The instructor of this course has recently “flipped” the course where students participate in more active learning. Pop quizzes have also been implemented. For future improvements, the material associated with questions 1, 3, and 5 will be emphasized in a different manner next year. Finally, the prerequisite for this course (microbiology) has evolved over time into a co-requisite, resulting in students being unprepared for the poultry health material. Students have been informed that prerequisites will be enforced for this course.

Assessment Method 2: Graduate surveys

Assessment Method Description

Question(s) on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome. Questions 2, 5, and 6 address poultry health. Scores range from 1 (little ability) to 4 (advanced ability). The survey instrument was shown previously and is not repeated here.

Findings

Six graduating seniors completed the OIRA survey during the 2013-14 academic year. In the area of poultry health, students felt that they had between intermediate and advanced abilities (scores of 3.33, 3.50, and 3.50). These scores are slightly lower than for processing, but higher than nutrient function (question 13) and ability to formulate a diet (question 14).
How did you use findings for improvement?

Students appear to be confident in their ability related to poultry health. Improvements related to poultry health material will be based on the pre-test/post-test data.

**Assessment Method 3: Graduation Exam**

**Assessment Method Description**

A 40-question exam is given to graduating poultry science students to assess their global learning during their time in the program. The exam is administered by the department head. This evaluation tool was shown previously with the first student learning outcome. It is not repeated here.

**Findings**

During the 2012-13 academic year, students (n=13) scored an average of 80% on the exam with 92% of the students scoring a minimum of 70%. During the 2013-14 academic year, students (n=10) scored an average of 72% on the exam with 70% of the students scoring a minimum of 70%. For 2013-14, students struggled with questions related to processing, food safety, and table eggs.

How did you use findings for improvement?

The graduation exam did not identify poultry health as a weakness. Improvements will be based on the pre-test/post-test data, which was discussed previously.

**Expected Outcome 3: 3-Anatomy and Physiology**

Students will be able to describe the anatomy and physiology of poultry.

**Assessment Method 1: Pre/post-testing**

**Assessment Method Description**

A pre-test/post-test was administered in POUL 3150 during the Spring 2014 semester to assess student learning with respect to poultry anatomy and physiology. The pre-test, consisting of 40
questions, was administered on the first class day and not returned nor discussed with the students. The post-test, identical to the pre-test, was administered as part of the final exam. The evaluation tool is shown below.

POUL 3150 Pre-Test - Dr. Lien - Spring 2014

Carefully read each choice, circle letter of single best answer and write to left of question number.

1) Cell membranes are primarily made up of _____, which have their _____ inside the membrane and _____ on the outside.
   a) proteins / negatively charged, water soluble tails / uncharged, water soluble heads
   b) phospholipids / negatively charged, water insoluble tails / uncharged, water soluble heads
   c) proteolipids / uncharged, water insoluble heads / positively charged, water soluble tails
   d) phosphoproteins / positively charged, water soluble heads / uncharged, water soluble tails
   e) phospholipids / uncharged, water insoluble tails / positively charged, water soluble heads

2) The _____ is the internal tubular transport system of the cell. It runs throughout the _____ and out to the ______.
   a) Golgi complex / nucleus / cell membrane
   b) endoplasmic reticulum / cytoplasm / cell membrane
   c) Golgi complex / nucleus / nuclear membrane
   d) cytoskeleton / cytoplasm / ribosomal layer
   e) microtubules / cytoskeleton / protein pores

3) In the mitochondria, _____ via the ______ of sugars to ______.
   a) carbohydrates are formed from starches / metabolism / create heat
   b) ADP is broken down to ATP / synthesis / carbohydrates from sugars
   c) ATP is broken down to ADP / oxidation / starches to sugars
   d) ATP is formed from ADP / oxidation / carbon dioxide and water
   e) proteins are formed using amino acids / breakdown / chemical bonds

4) With respect to body water, protein & fat content, a good rule of thumb is that as fat decreases:
   a) water must decrease, since fat has no water, & muscle, which is mostly water, must increase.
   b) water must increase, since fat has no water, & muscle, which is mostly water, must increase.
   c) water must decrease, since fat has a higher water content than muscle, which is mostly protein.
   d) water must increase, since protein must increase to provide the cytoskeleton of fat cells.
   e) water must decrease, since metabolism will increase, yielding less water from the TCA cycle.

5) During periods of ______ the hematocrit of roosters and hens would be about ___ and ___ respectively.
   a) sexual inactivity / 35% / 35%  d) semen and egg production / 25% / 45%
   b) sexual activity / 45% / 45%  e) reproductive activity / 35% / 35%
   c) sexual inactivity / 20% / 20%

6) Poikilotherms are animals that can maintain their:
   a) body temperature only when within a very narrow range of environmental temperatures.
   b) body temperature within a narrow range over a broad range of environmental temperatures.
   c) internal fluid environment within wide limits to function in a broad range of environments.
   d) body fluid levels at a relatively high concentration even when water intake is varied.
   e) body fluid pH levels within theriological concentrations.

7) In going from extreme acidosis to extreme alkalosis, blood hydrogen ion concentrations in a bird’s blood could be expected to:
   a) increase from 0.02 ppm to 0.1 ppm  d) decrease from 0.1 ppm to 0.02 ppm
   b) increase from 7.0 ppm to 7.7 ppm  e) decrease from 7.7 ppm to 7.0 ppm
   c) decrease from 0.35 to 0.07 ppm

8) Diffusion is responsible for:
   a) O₂ arriving at muscle, moving out of blood, through interstitial space & into muscle cells.
   b) H₂O in blood arriving in capillary bed moving into interstitial spaces.
   c) swelling of blood cells in a hypotonic solution.
   d) shrinking of blood cells in a hypertonic solution.
   e) H₂O in blood arriving in glomerulus, moving into kidney capsules & down kidney tubules.
9) During dehydration, body water
   a) level increases, since plasma becomes more concentrated and muscle cells lose water.
   b) level increases, plasma becomes less concentrated and blood cells shrink.
   c) level does not change, but plasma becomes more concentrated and blood cells shrink.
   d) level decreases, plasma becomes less concentrated and blood cells swell.
   e) level decreases, plasma becomes more concentrated and blood cells shrink.

10) Blood pulse and pressure are markedly reduced by the:
    a) vena cava  b) kidney tubules  c) arterioles  d) venules  e) capillary beds

11) In the hepatic portal system, nutrient laden blood leaves the ______ via the ______, then flows
    through the _______ before passing through the _______ en route to the vena cava.
    a) hepatic capillary beds / hepatic vein / gall bladder / hepatic portal vein
    b) renal capillary beds / hepatic vein / hepatic sinuses / hepatic portal vein
    c) intestinal capillary beds / hepatic portal vein / hepatic sinuses / hepatic vein
    d) intestinal capillary beds / hepatic vein / hepatic parabronchi / hepatic vein
    e) pulmonary capillary beds / hepatic portal vein / pulmonary sinuses / hepatic vein

12) The primary function of the ______ lining of the ______ of the bird's lung is to prevent ________.
    a) endolaminar surface / parabronchi / the obstruction of gas exchange due to edema
    b) endophilic surfactant / capillaries / fluid transudation from capillaries to parabronchi
    c) capillary endothelium / parabronchi / surface tension from collapsing the parabronchi
    d) basal lamina / capillaries / fluid transudation from parabronchi to capillaries
    e) osmophilic surface / parabronchi / fluid transudation from capillaries to parabronchi

13) A 2 kg wild type chicken would have an actual heart weight of ______ and a relative heart weight of ______.
    a) 20 g / 1.0%  b) 100 g / 0.5%  c) 10 g / 0.5%  d) 15 g / 0.75%  e) 20 g / 0.5%

14) Another name for water belly in birds is:
    a) pulmonic hypertension syndrome  d) pulmonary hypertension syndrome
    b) coronary hypertension syndrome  e) left congestive heart failure
    c) bronchial hypertension syndrome

15) The distortion of the right ventricular wall due to stretching of the muscle ultimately causes:
    a) an increase in pulmonary arterial pressure  d) the failure of the right pulmonary artery
    b) the failure of the bicuspid right sinoatrial valve  e) a decrease in central venous pressure
    c) the failure of the monocuspid right atrioventricular valve.

16) Ascites in poultry is generally due to the heart needing to pump too much blood ______ due to a ______ with an extremely high metabolic rate due to its _______.
    a) through the body / large return from the lungs / very muscular body / rapid growth
    b) through the body / large venous return / very fat body / adaptation for flight
    c) through the lungs / large venous return / very rapidly consuming bird / adaptation for flight
    d) through the lungs / large venous return / very muscular body / rapid growth
    e) through the liver / large flow from the gut / very rapidly consuming bird / extreme appetite

17) Litter treatments which result in short term reductions in ammonia may prevent ascites by:
    a) delaying parabronchial wall thickening due to ammonia irritation
    b) avoiding hypoxia due to increased O2 levels associated with excessive ventilation.
    c) increasing early growth rates due to healthier conditions.
    d) delaying increases in hepatic sinusoidal pressure induced by ammonia burns
    e) encouraging increased CO2 levels by allowing reduced ventilation rates.

18) In the Bohr effect, ______ affinity for O2 decreases in response to ______ caused by ________.
    a) carbonic anhydrase’s / increasing pH / increased blood CO2 levels
    b) hemoglobin’s / increasing pH / decreased blood CO2 levels
    c) myoglobin’s / decreasing pH / decreased blood CO2 levels
    d) carbonic anhydrase’s / increasing pH / increased blood HCO3- levels
    e) hemoglobin’s / decreasing pH / increased blood CO2 levels
19) Total respiratory system volume of a 6.5 lb chicken is ______. ______ of this is in the lungs.
   a) 65 ml / 20%  b) 300 ml / 10%  c) 250 ml / 25%  d) 650 ml / 5%  E) 360 ml / 50%

20) Birds that____ well have a greater percentage of____ than____ birds which have a greater percentage of____
   a) fly / neopulmonic parabronchi / non-flying / paleopulmonic parabronchi
   b) run / neopulmonic parabronchi / swimming / paleopulmonic parabronchi
   c) fly / primary bronchi / non-flying / parabronchi
   d) run and swim / air capillaries / flying / neopulmonic parabronchi
   e) can’t fly / secondary bronchi / flying / primary bronchi

21) A breath takes____ inspiration/expiration cycle(s) to move through a bird’s respiratory system. A breath passes
   through each of the functional groups of air sacs____, through the neopulmonic parabronchi____ and the
   paleopulmonic parabronchi____
   a) one / twice / twice / once
d) three / once / twice / twice
c) two / once / twice / once
e) four / once / twice / once
c) two / twice / twice / twice

22) Smooth muscles are____ in that they are____. Their contractions are spontaneous like____; however, smooth muscle’s contractions are____
   a) unique / not striated / cardiac muscle / irregular
   b) like cardiac muscle / not striated / skeletal muscle / inherently rhythmic
   c) unique / multi-nucleated / cardiac muscle / inherently rhythmic
   d) like skeletal muscles / striated / cardiac muscle / irregular
   e) like cardiac muscle / made up of white fibers / skeletal muscle / pulsatile

23) The wave of depolarization stimulating contraction of a skeletal muscle fiber begins at the____ of the fiber & is
   propagated along the____
   a) intercalated disc near the middle / T-tubules towards both ends
   b) motor end plate at the end / T-tubules to the sarcolemma
   c) motor end plate near the middle / sarcolemma towards both ends
   d) motor end plate near the middle / sarcoplasmic reticulum to the T-tubules
   e) 2 lines at the ends / sarcomere towards the M-lines

24) Which of the following are listed from most to least in terms of immediate availability as energy for skeletal muscle
   contraction?
   a) ADP, creatine phosphate & glucagon
d) ATP, creatine phosphate & glycogen
   b) glucose, glycogen & ATP
e) ATP, glycogen & myoglobin
   c) fats, carbohydrates & sugars

25) Muscle fibers with a single nucleus and intercalated discs at their ends would be:
   a) red
   b) smooth
   c) skeletal
d) cardiac
e) voluntary

26) SDS mortality usually peaks at____ when mostly____ are found in a characteristic posture____
   a) 4 to 5 weeks of age / heavier male broilers / on their backs with their wings out
   b) 4 to 5 weeks of age / lighter female broilers / on their bellies gasping for air
   c) 1 to 3 weeks of age / heavier male broilers / on their backs with head tucked under
   d) 6 to 8 weeks of age / undernourished male breeders / under the slats
   e) 1 to 3 weeks of age / average male layers / on their backs with wings out

27) Fast twitch muscle in the P. minor is predisposed to DPM since it contains low concentrations of____, low
    numbers of____, and low____ density.
   a) hemoglobin / lysosomes / capillary
d) myoglobin / mitochondria / capillary
   b) glycogen / mitochondria / structural protein
e) myoglobin / chromosomes / calbindin
   c) hemoglobin / chromosomes / elastoprotein
28) Oxygenated blood enters the liver via the _______ directly from the _______.
   a) hepatic artery / dorsal aorta  
   b) hepatic portal vein / gut  
   c) hepatic vein / dorsal aorta  
   d) hepatic artery / vena cava  
   e) hepatic portal vein / coronary artery

29) In birds, _______ goes directly to the duodenum. The other goes to _______. This provides ____________ of bile secretion that is increased after meals by _______
   a) one bile duct / the proventriculus / two points / high fst levels in the digesta  
   b) one bile duct / the gall bladder first / a steady low level / gall bladder contractions  
   c) one hepatic vein / the vena cava first / an intermittent pattern / blood pressure  
   d) one hepatic vein / the spleen / a steady low level / contractions of the spleen  
   e) one hepatic portal vein / the vena cava / a steady source of / blood flow

30) In the liver, excess protein is _______ creating the byproduct _______ which must be rapidly _______.
   a) aminated by Kupffer cells / urea / transported to the kidneys  
   b) transaminated by phagocytes / uric acid / detoxified  
   c) deaminated by hepatocytes / ammonia / detoxified  
   d) deaminated by reticuloendothelial cells / uric acid / secreted in the bile  
   e) deaminated by hepatocytes / ammonia / secreted in the bile

31) Although often attributed to __________, FLHS is more correctly due to __________.
   a) increased metabolism / increased blood pressure  
   b) excess estrogen levels / excess blood calcium  
   c) inadequate energy intake / excess carbohydrate intake  
   d) excess energy intake / excess carbohydrate intake  
   e) excess energy intake / inadequate carbohydrate intake

32) The Ca:P ratio in most growing feeds is _______ since bone is made up of _______, while in laying feeds it is _______ since eggshell is made up of _______.
   a) about 1:1 / primarily calcium and phosphorous / about 3:1 / primarily CaSO4  
   b) about 1:2 / primarily calcium and potassium / about 6:1 / primarily CaPO4  
   c) about 2:1 / primarily cadmium and phosphorous / about 1:3 / primarily CaC03  
   d) about 2:1 / primarily calcium and phosphorous / about 6:1 / primarily CaC03  
   e) about 1:2 / primarily calcium and potassium / about 1:6 / primarily CaApo

33) Bone development in the chicken is initiated at _______ when ________ of ________ first form.
   a) 3 to 10 days of incubation / rods, disks or plates / cartilage  
   b) 3 to 10 days of age / hollow tubes / medullary bone  
   c) 1 to 3 days of incubation / two growth plates / developing bone  
   d) 10 to 14 days of embryonic development / rods, disks or plates / endochondrogen  
   e) 7 to 14 days of age / spheres, ovals or rectangles / cortical bone

34) As bone grows, anabolic bone cells develop from:
   a) chondrocytes into osteoblasts & then osteocytes  
   b) chondrocytes into osteoblasts & then osteocytes  
   c) osteoblasts into osteocytes & then osteocytes  
   d) glycosaminoglycans into osteoblasts & then osteocytes  
   e) spongiosities into apocyties & then osteocytes

35) In TD, the _______ cells do not fully ________ and continue forming _______ too long.
   a) chondrocyte / hypertrophy / cartilage  
   b) osteocyte / hypertrophy / cartilage  
   c) chondrocyte / hypertrophy / cortical bone  
   d) osteoclast / degenerate / free calcium  
   e) osteoblast / calcify / cancellous bone
Findings

Thirteen undergraduate poultry science students completed the pre-test while 15 students completed the post-test. The results are shown in the data table below. Overall student learning in the area of anatomy and physiology increased as seen by the nearly 100% increase in the percentage of correct responses from pre-test (33%) to post-test (62%). However, several areas showed low levels of improvement, which were questions 18, 23, 30, 39, and 40.
How did you use findings for improvement?

A new instructor will be teaching this course in the future. These assessment results will be shared with her so she is aware where students struggled previously.

Assessment Method 2: Graduate surveys

Assessment Method Description

Question(s) on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome. Question 1 addresses poultry anatomy and physiology. Scores range from 1 (little ability) to 4 (advanced ability). The survey instrument was shown previously and is not shown again here.

Findings

Six graduating seniors completed the OIRA survey during the 2013-14 academic year. In the general area of physiology (question 1), students felt that their abilities were between intermediate and advanced (score of 3.50). Two nutrition-related questions (13 and 14) were the lowest scoring of this survey while processing (question 9) was the highest scoring.
How did you use findings for improvement?

Students feel confident with their abilities in the area of poultry anatomy and physiology. Suggestions for improvements will be based on the pre-test and post-test data. Once more data is collected over time, we can better determine the validity of these results.

Assessment Method 3: Graduation Exam

Assessment Method Description

A 40-question exam is given to graduating poultry science students to assess their global learning during their time in the program. The exam is administered by the department head. This evaluation tool was shown previously and is not repeated here.

Findings

During the 2012-13 academic year, students (n=13) scored an average of 80% on the exam with 92% of the students scoring a minimum of 70%. During the 2013-14 academic year, students (n=10) scored an average of 72% on the exam with 70% of the students scoring a minimum of 70%. For 2013-14, students struggled with questions related to processing, food safety, and table eggs.

How did you use findings for improvement?

Anatomy and physiology was not identified as a weakness on this exam. Improvement strategies will be based on the pre-test/post-test.

Expected Outcome 4: 4-Processing

Students will be able to describe how poultry meat and eggs are processed into food products.

Assessment Method 1: Pre/post-testing

Assessment Method Description

A pre-test was administered in POUL 5140, however the faculty member in charge of this course began employment at another job and failed to give the post-test.
Findings

None

How did you use findings for improvement?

It was not possible to identify areas in need of improvement. A new faculty member will teach the processing course the next time it is offered (probably Fall 2015). They will be advised to conduct a pre-test/post-test so student learning can be assessed.

Assessment Method 2: Graduate surveys

Assessment Method Description

Question(s) on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome. Question 9 addresses poultry processing. Scores range from 1 (little ability) to 4 (advanced ability). The survey instrument was shown previously and is not shown here.

Findings

Six graduating seniors completed the OIRA survey during the 2013-14 academic year. In the area of processing (question 9), students felt that they had an advanced ability (3.83); this score was the highest in the survey. Two questions related to nutrition received the lowest scores on the survey (2.83 and 2.67).

How did you use findings for improvement?

Based on student perception, improvement in this area may not be necessary. Other assessment tools will be used to determine potential improvement strategies.

Assessment Method 3: Graduation Exam

Assessment Method Description
A 40-question exam is given to graduating poultry science students to assess their global learning during their time in the program. The exam is administered by the department head. This evaluation tool was shown previously with the first student learning outcome. It is not repeated here.

Findings

During the 2012-13 academic year, students (n=13) scored an average of 80% on the exam with 92% of the students scoring a minimum of 70%. During the 2013-14 academic year, students (n=10) scored an average of 72% on the exam with 70% of the students scoring a minimum of 70%. For 2013-14, students struggled with questions related to processing, food safety, and table eggs.

As an interesting comparative note, data from the OIRA survey indicated students felt they had the greatest ability in processing. Yet the graduation exam indicated it was an area of weakness.

How did you use findings for improvement?

The new faculty member, once hired, will be informed of this weakness so they can decide how to approach it within their lecture material.

**Expected Outcome 5: 5-Embryonic Development**

Students will be able to explain poultry fertility concepts and embryonic development within the egg.

**Assessment Method 1: Pre/post-testing**

**Assessment Method Description**

A pre-test/post-test was administered in POUL 3060 to assess student learning with respect to fertility and embryonic development of poultry. The 31-question pre-test was administered on the first class day and not returned nor discussed with the students. The post-test, identical to the pre-test, was administered during the final week of the semester. The evaluation tool is shown below.
1. Approximately when was the chicken first domesticated?
   a. 5400 BC
   b. 1000 years ago
   c. 3500 BC
   d. 2500 BC

2. Primary broiler breeder companies are ______ integrated broiler or layer companies.
   a. Owned by
   b. Contract out their production to
   c. An independent supplier to
   d. Owners of

3. What is the role of the “breeder” farm?
   a. Produce broilers
   b. Table egg production
   c. Produce hatching eggs
   d. Rear young birds to be breeders

4. In the U.S., where is the broiler (and broiler breeder) industry concentrated?

5. Which of these are required for reproduction?
   a. Gametes
   b. Transport of gametes to site of fertilization
   c. Nourishment and protection of the embryo
   d. Birthing the offspring

6. The two functions of the ovary are:
   a. Synthesize yolk and albumen
   b. Fertilization and transport of the ova.
   c. Produce ova and hormones
   d. Produce albumen and shell

7. Yolk material is formed in which organ? What hormone controls yolk production?
   a. Liver, estrogen
   b. Liver, testosterone
   c. Ovary, progesterone
   d. Ovary, testosterone

8. What controls what time of day a hen will lay an egg?
   a. Feeding time
   b. Whether or not she is mated by a rooster
   c. Biological clock
   d. Sunrise

9. The “hormone producing cells” of the testes are the:
   a. Sertoli cells
   b. Oocytes
   c. Leydig (interstitial) cells
   d. Spermatogonia
   e. Primordial germ cells
POUL 3060 Pre-test/post-test (continued)

10. The main mineral components of eggshell are:
   a. Earth, air, fire, water.
   b. Calcium, carbonate
   c. Phospholipids, proteins
   d. Phosphate, protein.

11. The hen gets calcium for her bones and eggshells from her diet. Where does she get the carbonate for eggshells?
   a. atmosphere
   b. diet
   c. respiration
   d. transpiration
   e. perspiration

12. “Specific gravity” of an egg refers to:
   a. Density of the egg relative to water.
   b. Density of the eggshell.
   c. Eggshell strength
   d. Weight of the egg

13. Avian sex cells (ova, sperm).
   a. Always have WW chromosomes and are haploid.
   b. Always have ZZ chromosomes and are diploid.
   c. Are always ZW and are haploid.
   d. Are either Z or W and are haploid.

14. Quantitative traits are traits that involve many alleles. Which of these are true about heritability of quantitative traits?
   a. More heterozygosity = greater expression of the trait.
   b. More homozygosity = greater expression of the trait.
   c. Homozygosity has no role in expression of the trait.
   d. The greater the number of alleles involved in a trait, the lower its heritability.
   e. Traits controlled by few alleles have higher heritability.

15. What is the main reason we delay the sexual maturation (beginning of egg production) in broiler breeder hens?
   a. Older birds have better shell quality
   b. To allow the hens to catch up to the roosters in maturity
   c. Chicks quality gets better as the hens age
   d. Eggs are too small to hatch if hens start laying too early

16. Extra-retinal photoreception in the bird depends on:
   a. adequate intensity of long (red) wavelengths of light
   b. short (ultraviolet) wavelengths of light
   c. broad spectrum UV light
   d. any light that the bird can see by will do

17. Breeder pullets become sensitive to stimulation by long days:
   a. immediately after hatching
   b. after exposure to short days for 8-12 weeks.
   c. after exposure to long days for 8-12 weeks.
   d. after exposure to total darkness for 11-16 hours.
18. Photorefractoriness is:
   a. reduced sensitivity to light after exposure to long days.
   b. increased sensitivity to light after exposure to short days.
   c. increased sensitivity to light after exposure to long wavelengths.
   d. ended by exposure to short days.

19. What type of flooring system is most commonly used for breeders?
   a. litter floor
   b. concrete
   c. all wire mesh
   d. slats and litter
   e. all slats

20. What is the recommended number of nests per hen in a breeder house?
   a. one nest per hen
   b. one nest per 10 hens
   c. one nest per 4 hens
   d. one nest per 1 rooster and 10 hens

21. What happens to egg size as hens age?
   a. eggs get smaller
   b. eggs get larger
   c. egg size does not change

22. What is the incubation period of the chicken?
   a. 21 days
   b. 22 days
   c. 18 days
   d. 24 days
   e. 14 days

23. What is the usual incubation temperature for chicken eggs in an incubator (setting machine, first 18-19 days of incubation) in a commercial hatchery?
   a. 75°F
   b. 85°F
   c. hen body temperature
   d. 99.5°F
   e. 98-99°F

24. What does the term "physiological zero" refer to?
   a. Temperature at which physiological processes in the avian embryo are essentially stopped.
   b. Temperature at which the physiological processes in an avian embryo stop irreversibly.
   c. Optimum temperature for egg storage.
   d. Temperature at which death occurs.

25. Hatching eggs are usually stored at what temperature?
   a. 55°F
   b. 65°F
   c. 65°C
   d. 75°F
   e. 77°F
Findings

Sixteen undergraduate poultry science students completed the pre-test and post-test. The results are shown in the data table below. Overall student learning in the area of fertility and embryonic development increased as seen by the 37% increase in the percentages of correct responses from pre-test (55.8%) to post-test (76.6%). However, four areas showed low levels of improvement, which were questions 2, 7, 9, and 18.
How did you use findings for improvement?

Material taught later in the course scored higher on the post-test than material taught earlier in the semester. The instructor recognizes the importance of reinforcing information throughout the semester. The post-test was not reviewed with the class during the current year, but it is anticipated it will be reviewed next year so the class can understand questions that were commonly missed.

Assessment Method 2: Graduate surveys

Assessment Method Description

Question 15 on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (embryonic development). Scores range from 1 (little ability) to 4 (advanced ability). The assessment instrument was shown previously and is not shown here.

Findings

Six graduating seniors completed the OIRA survey during the 2013-14 academic year. In the area of embryonic development (question 15), students felt that they had an intermediate ability (score
of 3.33). Two questions related to nutrition received the lowest scores on the survey (2.83 and 2.67) while processing scored the highest at 3.83.

<table>
<thead>
<tr>
<th>Question #</th>
<th>Topic</th>
<th>Little Ability</th>
<th>Basic Ability</th>
<th>Intermed. Ability</th>
<th>Advanced Ability</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>physiology</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>3.50</td>
</tr>
<tr>
<td>2</td>
<td>diseases</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>3.50</td>
</tr>
<tr>
<td>3</td>
<td>growth rate</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>4</td>
<td>feed conversion</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>5</td>
<td>health issues</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3.50</td>
</tr>
<tr>
<td>6</td>
<td>disease prevention</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3.33</td>
</tr>
<tr>
<td>7</td>
<td>nutrition</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3.17</td>
</tr>
<tr>
<td>8</td>
<td>integrated production</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>9</td>
<td>processing</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>3.83</td>
</tr>
<tr>
<td>10</td>
<td>husbandry</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>11</td>
<td>production</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3.00</td>
</tr>
<tr>
<td>12</td>
<td>layers versus turkeys</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3.33</td>
</tr>
<tr>
<td>13</td>
<td>nutrient function</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2.83</td>
</tr>
<tr>
<td>14</td>
<td>formulate diets</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2.67</td>
</tr>
<tr>
<td>15</td>
<td>embryonic development</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3.33</td>
</tr>
</tbody>
</table>

How did you use findings for improvement?

A sample size of n=6 is not sufficiently large to recommend major changes. It is desirable to collect more data over time to identify trends. Improvements will be based primarily on the pre-test/post-test data.

Assessment Method 3: Graduation Exam

Assessment Method Description

A 40-question exam is given to graduating poultry science students to assess their global learning during their time in the program. The exam is administered by the department head. This evaluation tool was shown previously and is not repeated here.

Findings

During the 2012-13 academic year, students (n=13) scored an average of 80% on the exam with 92% of the students scoring a minimum of 70%. During the 2013-14 academic year, students (n=10) scored an average of 72% on the exam with 70% of the students scoring a minimum of 70%. For 2013-14, students struggled with questions related to processing, food safety, and table eggs.

How did you use findings for improvement?

Embryology was not identified as a weakness on this exam. Improvement strategies will be based on the pre-test/post-test.

Expected Outcome 6: 6-Growth Rates

Students will be able to describe the growth rate in modern meat-type chickens and egg production in modern broiler breeders.

Assessment Method 1: Pre/post-testing
Assessment Method Description

Pre- and post-testing was not conducted in the course that measures this outcome during the 2013-14 academic year.

Findings

No data exist as of yet. It is expected that data will be collected Fall 2014 for this outcome when a new instructor teaches the production course (POUL 3030).

How did you use findings for improvement?

Data are unavailable upon which to make improvement suggestions.

Assessment Method 2: Graduate surveys

Assessment Method Description

Question 3 on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (growth rates). Scores range from 1 (little ability) to 4 (advanced ability). The assessment instrument is shown below.

Findings

Six graduating seniors completed the OIRA survey during the 2013-14 academic year. In the general area of poultry growth rates (question 3), students felt that their abilities were between intermediate and advanced (score of 3.67). Two nutrition-related questions (13 and 14) were the lowest scoring of this survey while processing (question 9) was the highest scoring.

<table>
<thead>
<tr>
<th>Question #</th>
<th>Topic</th>
<th>Little Ability</th>
<th>Basic Ability</th>
<th>Intermed. Ability</th>
<th>Advanced Ability</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>physiology</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>3.50</td>
</tr>
<tr>
<td>2</td>
<td>diseases</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>3.50</td>
</tr>
<tr>
<td>3</td>
<td>growth rate</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>4</td>
<td>feed conversion</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>5</td>
<td>health issues</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3.33</td>
</tr>
<tr>
<td>6</td>
<td>disease prevention</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3.17</td>
</tr>
<tr>
<td>7</td>
<td>nutrition</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3.17</td>
</tr>
<tr>
<td>8</td>
<td>integrated production</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>9</td>
<td>processing</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>3.33</td>
</tr>
<tr>
<td>10</td>
<td>husbandry</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>11</td>
<td>production</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3.00</td>
</tr>
<tr>
<td>12</td>
<td>layers versus turkeys</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3.33</td>
</tr>
<tr>
<td>13</td>
<td>nutrient function</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2.83</td>
</tr>
<tr>
<td>14</td>
<td>formulated diets</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2.87</td>
</tr>
<tr>
<td>15</td>
<td>embryonic development</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3.33</td>
</tr>
</tbody>
</table>

How did you use findings for improvement?

Students feel confident in their abilities in the area of poultry growth rates. Suggestions for improvements will be based on the pre-test and post-test data.

Assessment Method 3: Graduation Exam

Assessment Method Description
A 40-question exam is given to graduating poultry science students to assess their global learning during their time in the program. The exam is administered by the department head. This evaluation tool was shown previously and is not repeated here.

**Findings**

During the 2012-13 academic year, students (n=13) scored an average of 80% on the exam with 92% of the students scoring a minimum of 70%. During the 2013-14 academic year, students (n=10) scored an average of 72% on the exam with 70% of the students scoring a minimum of 70%. For 2013-14, students struggled with questions related to processing, food safety, and table eggs.

**How did you use findings for improvement?**

Understanding poultry growth rates was not identified as a weakness on this exam. Improvement strategies will be based on the pre-test/post-test, once data are collected.

**Expected Outcome 7: 7-Communication**

Students will demonstrate effective oral and written communication skills.

**Assessment Method 1: Course assignments**

**Assessment Method Description**

Many poultry science courses contain assignments related to developing and improving written and oral communication skills. Courses that had written assignments included POUL 3030 (production), POUL 3150 (physiology), POUL 5050 (poultry nutrition), and POUL 5140 (poultry processing). These assignments were a memo, a small research paper, or a laboratory report. The rubric used for a written poultry nutrition problem-solving memo (POUL 5050) appears below. Similarly, oral presentations were also required in several courses (POUL 5140, 5080). The rubric used for the poultry health presentation is shown below.
<table>
<thead>
<tr>
<th>Points</th>
<th>Exemplary</th>
<th>Competent</th>
<th>Acceptable</th>
<th>Needs Work</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Presentation:</strong> Memo Format and Mechanics (20%)</td>
<td>Memo contains all required components and title page is formatted correctly. No grammatical, spelling or punctuation errors. All references, information and graphics are accurately documented in Polity Science format.</td>
<td>Memo contains all required components, but title page is not formatted correctly. Almost no grammatical, spelling or punctuation errors. Some references (information and graphics) are accurately documented, but not all are in Polity Science format.</td>
<td>Memo is missing some required components and title page is not formatted correctly. A few grammatical, spelling, or punctuation errors. Some references (information and graphics) are accurately documented, but not all are in Polity Science format.</td>
<td>Memo is missing many required components and title page is not formatted correctly. Many grammatical, spelling, or punctuation errors. Some references are not accurately documented.</td>
<td>Memo contains little or no required components. Many grammatical, spelling, or punctuation errors affect the memo's comprehensiveness. Many references are not accurately documented.</td>
</tr>
<tr>
<td><strong>Organization:</strong> Tone, Intro, and Concluding Statement (20%)</td>
<td>The tone is professional and scientific terms are used correctly. Word choice is precise. There is a clear, professional, interesting introduction that introduces the problem addressed by the memo. Information is very organized with well-constructed bullet points illustrating all potential reasons for the problem. There is a concise, complete, well-written concluding statement with excellent suggested measures to correct the problem.</td>
<td>The tone is generally appropriate, but some words or scientific terms are misspelled. Informative is occasionally precise. There is a professional, informative introduction that introduces the problem addressed by the memo, but not clearly. Information is less organized, with well-constructed bullet points illustrating potential reasons for the problem. There is a concluding statement that is generally complete and concise with some minor suggested measures to correct the problem.</td>
<td>The tone is generic and unprofessional. There are numerous errors with scientific terms. Word choice is occasionally precise. There is a professional introduction that introduces the problem addressed by the memo, but not clearly. Information is poorly organized, with well-constructed bullet points illustrating some potential reasons for the problem. There is a concluding statement, but it is overly broad with vague, unsupported measures to correct the problem.</td>
<td>There is little sense of urgency. There are numerous errors with scientific terms. Word choice is consistently generic. There is an introduction that does not adequately introduce the problem addressed by the memo. Information is organized, but bullet points and reasons are not well-constructed or well-argued.</td>
<td>There is little sense of urgency. There are numerous errors with scientific terms. Word choice is consistently generic. There is an introduction that does not adequately introduce the problem addressed by the memo. Information is organized, but bullet points and reasons are not well-constructed or well-argued.</td>
</tr>
<tr>
<td><strong>Quality of Information</strong> (25%)</td>
<td>Information clearly relates to the main problem. It includes specific supporting details and/or examples. Excellent discussion of why potential problems may or may not be the case with strong supporting evidence.</td>
<td>Information clearly relates to the main problem. It includes some supporting details and/or examples. Good discussion of why potential problems may or may not be the case with moderate supporting evidence.</td>
<td>Information clearly relates to the main problem. It includes no details or examples are given. Discussion of why potential problems may or may not be the case is not complete, but not focused on the case.</td>
<td>Information sometimes relates from the main problem. Discussion of why potential problems may or may not be the case is mostly incorrect or lacking specific details.</td>
<td>Information has little or nothing to do with the main problem. No discussion of why potential problems may or may not be the case.</td>
</tr>
<tr>
<td><strong>Figures</strong> (25%)</td>
<td>Figures include accurate data related to the reader's understanding of the problem and are formatted correctly (Polity Science). Including axis labels.</td>
<td>Figures include accurate data related to the reader's understanding of the problem and are formatted correctly (Polity Science). Some axis labels missing.</td>
<td>One or more figures are not include accurate data related to the reader's understanding of the problem and are not formatted correctly (Polity Science). Some axis labels are missing.</td>
<td>Some figures do not include accurate data, are not formatted correctly (Polity Science) do not have axis labels. OR do not add to the reader's understanding of the problem.</td>
<td>Figures are missing.</td>
</tr>
</tbody>
</table>
Findings

In POUL 3030 and 3150, students (n=14 and n=15, respectively) prepared a two-page typed executive summary based on the results of a semester-long lab project. Student strengths in this assignment were giving very general information on the importance, scale, and objectives of the local poultry industry. They were also good at finding information on the internet. Basic grammar, punctuation, organization and following detailed instructions on how the paper and graphs should be prepared were their weaknesses. In POUL 5050, 12 students had their poultry nutrition memo graded using the rubric previously shown. Students’ weaknesses included proof reading, grammar, and problem solving/critical thinking ability. There was also an attitude that writing was not a skill that needed to be developed. Similarly, the written lab reports in POUL 5140 showed students lacked the ability to write scientifically.

In POUL 5080, 8 students gave oral presentations on a poultry health topic; the table below outlines the assessment data. The students’ strengths included using showing clear visual aids and being able to integrate their text with the visual aids. However, their primary weakness was not sufficiently presenting unsolved problems associated with their topic.
How did you use findings for improvement?

In POUL 5140, written lab reports are due throughout the semester. Students progress with their writing as they are given feedback. This type of repetitive writing leads to improved writing by the end of the semester. In POUL 5050, the Auburn University Writing Center has been used for help. The large assignment has been broken down into several smaller components. To emphasize the importance of writing, the assignment will contribute more significantly to the final course grade. Rubrics are giving the students more direction with regard to expectations. Students improve by being forced to write more often. The department is therefore attempting to incorporate some type of writing into each course.

With respect to oral presentations, students received the rubric back which identified their strengths and weaknesses. Again, by incorporating oral presentations into multiple courses, the repeated practice improves this skill.

Assessment Method 2: Graduate Survey

Assessment Method Description

The generic OIRA graduating student survey asks students’ perceptions regarding their abilities in various areas. Two questions (8 and 9) inquire about communication skills. Scores range from 1 (little ability) to 4 (advanced ability). Being a commonly used assessment instrument, the survey is not shown here.

Findings

Students (n=6) who graduated during the 2013-14 academic year feel their ability to communicate in writing is slightly below an “intermediate ability” while their ability to communicate via oral presentations is ranked at slightly above “intermediate ability”. The data is shown in the subsequent table.
How did you use findings for improvement?

The department as a whole is working to emphasize written and oral communication skills. The importance of these skills will continue to be emphasized during advising sessions with the students as well as within formal classroom situations.

One curriculum change was recently made that will help the poultry science students with respect to writing skills. Poultry science students will now be required to take FDSC 1000 their freshman year, which contains a writing assignment. By incorporating writing earlier in the poultry curriculum, students will recognize its importance and begin refining their writing skills.

**Expected Outcome 8: 8-Problem Solving**

Students will be able to solve poultry science-related questions/problems.

**Assessment Method 1: Class work**

**Assessment Method Description**

Depending upon the course, problem sets, assignments, and/or specific questions on exams were used to assess student’s ability to solve poultry science problems. It is expected that this student learning outcome will eventually involve multiple courses.

One example of an assignment that includes a problem solving aspect is the memo required to be written in POUL 5050. The assignment appears below.
Problem Solving Memo

It is important to be able to summarize technical information and communicate the most salient findings to various groups within the industry and to do so in a piece of writing that is clear, easy to follow, and represents you as a professional. This assignment is designed to give you practice in just this skill by presenting you with a problem in the field of poultry nutrition and asking that you present one or more solutions to that problem based on your research of the scientific literature and your analysis. **Students are required to turn in five small assignments (statement of situation, potential causes, annotated bibliography, visual data, and analysis description) prior to the final draft. Each student will receive a check plus (minor revision), check (major revision), or check minus (rewrite or significant revisions). These assignments are not graded but are for your benefit in preparing the final draft. If you do not turn in one of these assignments on the due date, then you do not have the opportunity to turn in the final draft, which is worth 150 points. Therefore, it is important to turn in each assignment on the due date and you are highly encouraged to put significant effort in these assignments so I can provide helpful input before the final draft is due.**

Learning Objectives:
1. **Students will demonstrate their ability to analyze a real-world problem and recommend the best solution(s).**
2. **Students will synthesize the scientific research that informs their analysis and solution(s) in a logical way that can be understood by others in the poultry industry who are not scientists.**
3. **Students will utilize both written text and charts, graphs, or other visual materials to explain their analysis of the data they considered in arriving at the solution(s).**
4. **Students will present their analysis and solution(s) in the format of an executive memo using language that is professional and follows the usual conventions of Standard Written English.**

Examples of questions from poultry science exams that involve problem solving are shown below.
Findings

Quantitative data was not collected using the problem solving assignments nor exam questions. However, based on the 12 students completing the problem solving memo in POUL 5050 (qualitative data), it was observed that this is an area where students still have inadequacies.

How did you use findings for improvement?

For the current class, exam questions were reviewed so students would understand how to approach the problems in the future. The memo was returned with comments. In order to improve problem solving ability, more opportunities to solve problems should be presented by instructors.
Assessment Method 2: Graduate Survey

Assessment Method Description

The generic OIRA graduating student survey asks students’ perceptions regarding their abilities in various areas. One question (#5) inquires about the ability to “generate solutions to open-ended or ill-defined problems.” Scores range from 1 (little ability) to 4 (advanced ability). Being a commonly used assessment instrument, the survey is not shown here.

Findings

Students (n=6) who graduated during the 2013-14 academic year feel their ability to solve problems is slightly above “intermediate ability” (3.17).

![OIRA Survey Data (2013-14)]

How did you use findings for improvement?

Again, the student perceptions indicate that improvements can be made with respect to problem solving ability. One discussion item among the faculty with regard to the poultry science curriculum is the creation of a capstone course that would include a heavy problem solving component. However, a shortage of faculty is delaying pursuing this further at the current time.

Expected Outcome 9: 9-Professionalism

Students will demonstrate the ability to interact and communicate professionally with people in the poultry science industry.

Assessment Method 1: Internship evaluation

Assessment Method Description

Poultry science students are evaluated by their industrial internship supervisor using the rubric below. Supervisors rank various professional attributes of the intern using a rank from 1-5 (poor to superior). The evaluation sheet is shown below.
Eleven students completed their internships during the 2013-14 academic year. The distribution and average scores for each category are shown in the following table. Overall, scores ranged between good and superior. The two low points (which are still scored above “good”) were quality of work and leadership ability.

### Findings

Eleven students completed their internships during the 2013-14 academic year. The distribution and average scores for each category are shown in the following table. Overall, scores ranged between good and superior. The two low points (which are still scored above “good”) were quality of work and leadership ability.
How did you use findings for improvement?

Poultry science students appear to be modeling good professional behavior. Although scores are currently good, students are constantly reminded about the importance of professional behaviors. Professionalism is frequently discussed in the department’s Poultry Science Club. This club also gives opportunities for students to develop leadership skills. As students gain more educational and work experience, work quality should improve.

**Expected Outcome 10: 10-Broiler Production**

Students will be able to describe how broiler production differs from layers and turkeys.

**Assessment Method 1: Pre/post-testing**

**Assessment Method Description**

This learning outcome is assessed in the production course, POUL 3030. Pre- and post-testing was not conducted in this course during the 2013-14 academic year.

**Findings**

No data exist as of yet. It is expected that data will be collected Fall 2014 for this outcome when a new instructor teaches the production course (POUL 3030).

**How did you use findings for improvement?**

Data are unavailable upon which to make improvement suggestions.

**Assessment Method 2: Graduate surveys**

**Assessment Method Description**

Question 12 on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (broiler production). Scores range from 1 (little ability) to 4 (advanced ability). The survey instrument has been shown previously.
Findings

Six graduating seniors completed the OIRA survey during the 2013-14 academic year. In the general area of boiler production (question 12), students felt that their abilities were between intermediate and advanced (score of 3.33). Two nutrition-related questions (13 and 14) were the lowest scoring of this survey while processing (question 9) was the highest scoring.

<table>
<thead>
<tr>
<th>Question #</th>
<th>Topic</th>
<th>Little Ability</th>
<th>Basic Ability</th>
<th>Intermed. Ability</th>
<th>Advanced Ability</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>physiology</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>3.50</td>
</tr>
<tr>
<td>2</td>
<td>diseases</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>3.50</td>
</tr>
<tr>
<td>3</td>
<td>growth rate</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>4</td>
<td>feed conversion</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>5</td>
<td>health issues</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3.50</td>
</tr>
<tr>
<td>6</td>
<td>disease prevention</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3.33</td>
</tr>
<tr>
<td>7</td>
<td>nutrition</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3.17</td>
</tr>
<tr>
<td>8</td>
<td>integrated production</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>9</td>
<td>processing</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>3.83</td>
</tr>
<tr>
<td>10</td>
<td>husbandry</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>11</td>
<td>production regionalism</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3.00</td>
</tr>
<tr>
<td>12</td>
<td>broiler production</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3.33</td>
</tr>
<tr>
<td>13</td>
<td>nutrient function</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2.83</td>
</tr>
<tr>
<td>14</td>
<td>formulate diets</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2.67</td>
</tr>
<tr>
<td>15</td>
<td>embryonic development</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3.33</td>
</tr>
</tbody>
</table>

How did you use findings for improvement?

It appears, based on student perceptions, that they are confident in their ability with respect to this student learning outcome. However, without direct pre-test/post-data, making suggestions for improving student learning is premature.

Assessment Method 3: Graduation Exam

Assessment Method Description

A 40-question exam is given to graduating poultry science students to assess their global learning during their time in the program. The exam is administered by the department head. This evaluation tool was shown previously with the first student learning outcome. It is not repeated here.

Findings

During the 2012-13 academic year, students (n=13) scored an average of 80% on the exam with 92% of the students scoring a minimum of 70%. During the 2013-14 academic year, students (n=10) scored an average of 72% on the exam with 70% of the students scoring a minimum of 70%. For 2013-14, students struggled with questions related to processing, food safety, and table eggs.

Production practices were not identified as a weakness by the graduation exam.

How did you use findings for improvement?
The overall assessment plan will be shared with the new faculty member teaching our production course so she can begin to collect data regarding student learning.

**Expected Outcome 11: Husbandry**

Students will be able to explain the basic husbandry involved in raising commercial meat-type chickens for different market forms.

**Assessment Method 1: Pre/post-testing**

**Assessment Method Description**

Pre- and post-testing was not conducted in this course during the 2013-14 academic year.

**Findings**

No data exist as of yet. It is expected that data will be collected Fall 2014 for this outcome when a new instructor teaches the production course (POUL 3030).

**How did you use findings for improvement?**

Data are unavailable upon which to make improvement suggestions.

**Assessment Method 2: Graduate surveys**

**Assessment Method Description**

Question 10 on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (broiler production). Scores range from 1 (little ability) to 4 (advanced ability). The survey instrument has been shown previously and is not repeated here.

**Findings**

Six graduating seniors completed the OIRA survey during the 2013-14 academic year. In the general area of husbandry (question 10), students felt that their abilities were between intermediate and advanced (score of 3.67). Two nutrition-related questions (13 and 14) were the lowest scoring of this survey while processing (question 9) was the highest scoring.
How did you use findings for improvement?

It appears, based on student perceptions, that they are confident in their ability with respect to this student learning outcome. However, without direct pre-test/post-data, making suggestions for improving student learning is premature.

Assessment Method 3: Graduation Exam

Assessment Method Description

A 40-question exam is given to graduating poultry science students to assess their global learning during their time in the program. The exam is administered by the department head. This evaluation tool was shown previously with the first student learning outcome. It is not repeated here.

Findings

During the 2012-13 academic year, students (n=13) scored an average of 80% on the exam with 92% of the students scoring a minimum of 70%. During the 2013-14 academic year, students (n=10) scored an average of 72% on the exam with 70% of the students scoring a minimum of 70%. For 2013-14, students struggled with questions related to processing, food safety, and table eggs.

Production practices were not identified as a weakness by the graduation exam.

How did you use findings for improvement?

The overall assessment plan will be shared with the new faculty member teaching our production course so she can begin to collect data regarding student learning.

Expected Outcome 12: Integrated Production

Students will be able to describe the integrated poultry production systems for producing meat and eggs for human consumption.
**Assessment Method 1:** Pre/post-testing

**Assessment Method Description**

Pre- and post-testing was not conducted in this course during the 2013-14 academic year.

**Findings**

No data exist as of yet. It is expected that data will be collected Fall 2014 for this outcome when a new instructor teaches the production course (POUL 3030).

**How did you use findings for improvement?**

Data are unavailable upon which to make improvement suggestions.

**Assessment Method 2:** Graduate surveys

**Assessment Method Description**

Question 8 on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (integrated production). Scores range from 1 (little ability) to 4 (advanced ability). The survey instrument was shown previously.

**Findings**

Six graduating seniors completed the OIRA survey during the 2013-14 academic year. In the general area of integrated production (question 8), students felt that their abilities were between intermediate and advanced (score of 3.67). Two nutrition-related questions (13 and 14) were the lowest scoring of this survey while processing (question 9) was the highest scoring.

<table>
<thead>
<tr>
<th>Question #</th>
<th>Topic</th>
<th>Little Ability</th>
<th>Basic Ability</th>
<th>Intermed. Ability</th>
<th>Advanced Ability</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>physiology</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>3.50</td>
</tr>
<tr>
<td>2</td>
<td>diseases</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>3.50</td>
</tr>
<tr>
<td>3</td>
<td>growth rate</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>4</td>
<td>feed conversion</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>5</td>
<td>health issues</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3.50</td>
</tr>
<tr>
<td>6</td>
<td>disease prevention</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3.33</td>
</tr>
<tr>
<td>7</td>
<td>nutrition</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3.17</td>
</tr>
<tr>
<td>8</td>
<td>integrated production</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>9</td>
<td>processing</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>3.83</td>
</tr>
<tr>
<td>10</td>
<td>husbandry</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>11</td>
<td>production regionalism</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3.00</td>
</tr>
<tr>
<td>12</td>
<td>broiler production</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3.33</td>
</tr>
<tr>
<td>13</td>
<td>nutrient function</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2.83</td>
</tr>
<tr>
<td>14</td>
<td>formulate diets</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2.67</td>
</tr>
<tr>
<td>15</td>
<td>embryonic development</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3.33</td>
</tr>
</tbody>
</table>

**How did you use findings for improvement?**

It appears, based on student perceptions, that they are confident in their ability with respect to this student learning outcome. However, without direct pre-test/post-data, making suggestions for improving student learning is premature.
Assessment Method 3: Graduation Exam

Assessment Method Description

A 40-question exam is given to graduating poultry science students to assess their global learning during their time in the program. The exam is administered by the department head. The evaluation tool was shown previously with the first student learning outcome.

Findings

During the 2012-13 academic year, 13 students scored an average of 80% on the exam with 92% of the students scoring a minimum of 70%. During the 2013-14 academic year, students \( n=10 \) scored an average of 72% on the exam with 70% of the students scoring a minimum of 70%. For 2013-14, students struggled with questions related to processing, food safety, and table eggs.

Production practices were not identified as a weakness by the graduation exam.

How did you use findings for improvement?

The overall assessment plan will be shared with the new faculty member teaching our production course so she can begin to collect data regarding student learning.

Expected Outcome 13: 13-Production Practices

Students will be able to describe how production practices differ between meat-type chickens raised regionally, nationally, and internationally.

Assessment Method 1: Pre/post-testing

Assessment Method Description

Pre- and post-testing was not conducted in this course during the 2013-14 academic year.

Findings

No data exist as of yet. It is expected that data will be collected Fall 2014 for this outcome when a new instructor teaches the production course (POUL 3030).

How did you use findings for improvement?

Data are unavailable upon which to make improvement suggestions.

Assessment Method 2: Graduate surveys

Assessment Method Description

Question 11 on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (production practices). Scores range from 1 (little ability) to 4 (advanced ability). The survey instrument is shown below.

Findings

Six graduating seniors completed the OIRA survey during the 2013-14 academic year. In the general area of regional production practices (question 11), students felt that their abilities were
between intermediate and advanced (score of 3.00). Two nutrition-related questions (13 and 14) were the lowest scoring of this survey while processing (question 9) was the highest scoring. In comparing all the production-related questions (8, 10, 11, and 12), the regional differences in production practices appear to be the weakest area.

<table>
<thead>
<tr>
<th>Question #</th>
<th>Topic</th>
<th>Little Ability</th>
<th>Basic Ability</th>
<th>Intermed. Ability</th>
<th>Advanced Ability</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>physiology</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>3.50</td>
</tr>
<tr>
<td>2</td>
<td>diseases</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>3.50</td>
</tr>
<tr>
<td>3</td>
<td>growth rate</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>4</td>
<td>feed conversion</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>5</td>
<td>health issues</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3.50</td>
</tr>
<tr>
<td>6</td>
<td>disease prevention</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3.33</td>
</tr>
<tr>
<td>7</td>
<td>nutrition</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3.17</td>
</tr>
<tr>
<td>8</td>
<td>integrated production</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>9</td>
<td>processing</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>3.83</td>
</tr>
<tr>
<td>10</td>
<td>husbandry</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3.67</td>
</tr>
<tr>
<td>11</td>
<td>production regionalism</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3.00</td>
</tr>
<tr>
<td>12</td>
<td>broiler production</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3.33</td>
</tr>
<tr>
<td>13</td>
<td>nutrient function</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2.83</td>
</tr>
<tr>
<td>14</td>
<td>formulate diets</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2.67</td>
</tr>
<tr>
<td>15</td>
<td>embryonic development</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3.33</td>
</tr>
</tbody>
</table>

**How did you use findings for improvement?**

It appears, based on student perceptions, that they are confident in their ability with respect to this student learning outcome. However, without direct pre-test/post-data, making suggestions for improving student learning is premature. Of the four learning outcomes associated with production, this one is the weakest in the minds of the students.

**Assessment Method 3: Graduation Exam**

**Assessment Method Description**

A 40-question exam is given to graduating poultry science students to assess their global learning during their time in the program. The exam is administered by the department head. The evaluation tool was shown previously with the first student learning outcome. It is not repeated here.

**Findings**

During the 2012-13 academic year, 13 students scored an average of 80% on the exam with 92% of the students scoring a minimum of 70%. During the 2013-14 academic year, students (n=10) scored an average of 72% on the exam with 70% of the students scoring a minimum of 70%. For 2013-14, students struggled with questions related to processing, food safety, and table eggs.

Production practices were not identified as a weakness by the graduation exam.

**How did you use findings for improvement?**

The overall assessment plan will be shared with the new faculty member teaching our production course so she can begin to collect data regarding student learning.