8-1-2003

Predicting Student Success in the Introduction to Animal Science Course at Western Kentucky University

Margaret Zoglmann
Western Kentucky University

Follow this and additional works at: http://digitalcommons.wku.edu/theses
Part of the Agriculture Commons, and the Education Commons

Recommended Citation
Zoglmann, Margaret, "Predicting Student Success in the Introduction to Animal Science Course at Western Kentucky University" (2003). Masters Theses & Specialist Projects. Paper 577.
http://digitalcommons.wku.edu/theses/577

This Thesis is brought to you for free and open access by TopSCHOLAR®. It has been accepted for inclusion in Masters Theses & Specialist Projects by an authorized administrator of TopSCHOLAR®. For more information, please contact topscholar@wku.edu.
PREDICTING STUDENT SUCCESS IN THE INTRODUCTION TO ANIMAL SCIENCE COURSE AT WESTERN KENTUCKY UNIVERSITY

A Thesis
Presented to
The Faculty of the Department of Agriculture
Western Kentucky University
Bowling Green, Kentucky

In Partial Fulfillment
Of the Requirements for the Degree
Master of Science

By
Margaret Susan Zoglmann

August 2003
PREDICTING STUDENT SUCCESS IN THE INTRODUCTION TO ANIMAL SCIENCE COURSE AT WESTERN KENTUCKY UNIVERSITY

Date Recommended: August 29, 2003

Director of Thesis:

[Signature]

Kenneth Stalder

Dean, Graduate Studies and Research

Date: 9/2/03
## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>II. REVIEW OF LITERATURE</td>
<td>4</td>
</tr>
<tr>
<td>Student Outcomes Assessments</td>
<td>4</td>
</tr>
<tr>
<td>High School Predictors</td>
<td>6</td>
</tr>
<tr>
<td>Gender Predictors</td>
<td>7</td>
</tr>
<tr>
<td>Demographic Predictors</td>
<td>8</td>
</tr>
<tr>
<td>Youth Organization Involvement Predictor</td>
<td>9</td>
</tr>
<tr>
<td>Learning Styles</td>
<td>10</td>
</tr>
<tr>
<td>III. MATERIALS AND METHODS</td>
<td>13</td>
</tr>
<tr>
<td>IV. RESULTS</td>
<td>16</td>
</tr>
<tr>
<td>V. DISCUSSION</td>
<td>21</td>
</tr>
<tr>
<td>VI. SUMMARY</td>
<td>31</td>
</tr>
<tr>
<td>VII. APPENDIX</td>
<td>34</td>
</tr>
<tr>
<td>LITERATURE CITED</td>
<td>55</td>
</tr>
</tbody>
</table>
### LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Course outcomes subjective assessment</td>
<td>34</td>
</tr>
<tr>
<td>2. Demographic assessment</td>
<td>38</td>
</tr>
<tr>
<td>3. Least squares means (± Standard Error) for Average Beginning Assessment, Average Ending Assessment, Average Improvement, Initial Day Test Score, Last Day Test Score, Test Improvement, Final Test Score, and Final Average for students categorized by high school involvement in 4-H, FFA, before enrolling in Animal Science 140 at Western Kentucky University</td>
<td>42</td>
</tr>
<tr>
<td>4. Least squares means (± Standard Error) for Average Beginning Assessment, Average Ending Assessment, Average Improvement, Initial Day Test Score, Last Day Test Score, Test Improvement, Final Test Score, and Final Average for students categorized by whether they were in-state or out-of-state and enrolled in Animal Science 140 at Western Kentucky University</td>
<td>43</td>
</tr>
<tr>
<td>5. Least squares means (± Standard Error) for Average Beginning Assessment, Average Ending Assessment, Average Improvement, Initial Day Test Score, Last Day Test Score, Test Improvement, Final Test Score, and Final Average for students categorized by gender and enrolled in Animal Science 140 at Western Kentucky University</td>
<td>44</td>
</tr>
<tr>
<td>6. Least squares means (± Standard Error) for Average Beginning Assessment, Average Ending Assessment, Average Improvement, Initial Day Test Score, Last Day Test Score, Test Improvement, Final Test Score, and Final Average for students categorized by whether they enrolled in Animal Science 141 (Introduction to Animal Science Laboratory) and enrolled in Animal Science 140 at Western Kentucky University</td>
<td>45</td>
</tr>
<tr>
<td>7. Least squares means (± Standard Error) for Average Beginning Assessment, Average Ending Assessment, Average Improvement, Initial Day Test Score, Last Day Test Score, Test Improvement, Final Test Score, and Final Average for students categorized by their animal experience and enrolled in Animal Science 140 at Western Kentucky University</td>
<td>46</td>
</tr>
</tbody>
</table>
8. Least squares means (± Standard Error) for Average Beginning Assessment, Average Ending Assessment, Average Improvement, Initial Day Test Score, Last Day Test Score, Test Improvement, Final Test Score, and Final Average for students who originated from different size communities and enrolled in Animal Science 140 at Western Kentucky University ........................................... 47

9. Least squares means (± Standard Error) for Average Beginning Assessment, Average Ending Assessment, Average Improvement, Initial Day Test Score, Last Day Test Score, Test Improvement, Final Test Score, and Final Average for students categorized by number of accumulated hours at Western Kentucky University and enrolled in Animal Science 140 at Western Kentucky University ........................................... 48

10. Coefficient of correlation between subjective measures (Average Beginning Assessment, Average Ending Assessment, Average Improvement) and objective measures (Initial Test Score, Last Day Test Score, Test Improvement, Final Test Score, Final Average, and Laboratory Grade) of knowledge and performance for students in Animal Science 140 at Western Kentucky University ........................................... 49

11. Coefficients of correlation between subjective and objective measures of animal science knowledge and pre-college performance scores for students enrolled in Animal Science 140 at Western Kentucky University ........................................... 50

12. Coefficient of correlation between male subjective measures (Average Beginning Assessment, Average Ending Assessment, Average Improvement) and objective measures (Initial Test Score, Last Day Test Score, Test Improvement, Final Test Score, Final Average, and Laboratory Grade) of knowledge and performance for students in Animal Science 140 at Western Kentucky University ........................................... 51

13. Coefficient of correlation between female subjective measures (Average Beginning Assessment, Average Ending Assessment, Average Improvement) and objective measures (Initial Test Score, Last Day Test Score, Test Improvement, Final Test Score, Final Average, and Laboratory Grade) of knowledge and performance for students in Animal Science 140 at Western Kentucky University ........................................... 52

14. Coefficients of correlation between male subjective and objective measures of animal science knowledge and pre-college performance scores for students enrolled in Animal Science 140 at Western Kentucky University ........................................... 53
Coefficients of correlation between female subjective and objective measures of animal science knowledge and pre-college performance scores for students enrolled in Animal Science 140 at Western Kentucky University
Student predictors may be useful to universities in determining students’ future success in college courses. The students enrolled in Introduction to Animal Science (ANSC 140) at Western Kentucky University participated in the study. The students completed identical subjective and objective assessments at the beginning and the end of the semester they were enrolled in the course. Students ranked their knowledge of course matter on a scale of 1 to 100 for each of the 49 course outcomes. Additionally, students completed a demographic survey at the beginning of the course. The final student knowledge assessment tool was a 50 question multiple-choice exam that covered topics discussed in the course.

Completed demographic surveys provided the information needed to determine how the students performed in the course based a variety of predictor categories (gender, involvement in youth agriculture organizations, community size of hometown, previous animal experience, credit hours already completed, and geographic location of the student’s hometown). Whether or not the student was enrolled in Introduction to Animal Science Laboratory (ANSC 141) was recorded and utilized to determine the influence the lab had on student success in the lecture course (ANSC 140). Other potential predictors included the students’ high school grade point average, high school percentile rank in
graduating class, and ACT™ scores (Iowa City, IA) (Composite, Math, English, Reading, and Science) received.

Student involvement in 4-H or FFA significantly (P<0.05) affected the average beginning assessment (ABA), average ending assessment (AEA), and initial test score (ITS). The final average (FA) scores of out-of-state students were significantly (P<0.05) higher than those of in-state students. The ABA, AEA, ITS, and last day test score (LDTS) were significantly (P<0.05) higher for males than females. Students enrolled in laboratory had significantly (P<0.05) higher AEA, average improvement (AI), ITS, LDTS, final test score (FTS), and FA. The type of animal experience the student had prior to enrolling in ANSC 140 had a significant (P<0.05) effect on the ABA and FTS. The students with cattle involvement had the highest scores on the ABA and FTS. However, students who had previous experience with exotic animals had the lowest scores on the ABA and FTS. The community size of the student’s hometown and the number of hours completed prior to enrolling in ANSC 140 did not play a significant role in the scores the students received in the course.

Coefficients of correlation were calculated for a host of variables examined in this study. A strong negative correlation (r = -0.77) between the ABA and AI was found and is indicative of confidence improvement on the subjective assessments. There was a strong positive relationship found between the FA and FTS (r = 0.86). The relationship between the high school predictors (high school grade point average, high school percentile rank in graduating class, and ACT score) and the subjective and objective assessments were low.
Chapter 1
INTRODUCTION

In today’s society, some type of postsecondary education is almost a necessity in order for people to attain their career and financial goals. The need for higher education degrees has resulted in an increasing number of students enrolled in colleges and universities. Consequently, there has been an increase in the diversity of students with respect to learning abilities and learning styles. This diversity has created new challenges for college professors as they attempt to accommodate the educational needs and the learning styles for all students. In the past, students who attended college tended to be only those with outstanding academic records. The situation has changed as more students continue to be encouraged to attend college.

A baccalaureate degree is becoming a crucial asset to those desiring to play a role in the field of agriculture and its associated industries. Therefore, agricultural educators at colleges and universities have an obligation to prepare students for the challenges facing a dynamic agricultural industry. The lack of prior farm experience among students pursuing degrees in agriculturally related fields has led to numerous challenges for instructors of agricultural programs.

Arguably, the role of the university and its faculty and staff is to prepare students for their future careers and ultimately their economic goals. The courses offered in agricultural programs must allow students the opportunity to attain the knowledge needed for the increasingly technical field. Ideally, the programs of study in agriculture should be similar across universities for students to be competitive for employment in the global agricultural industry or in preparing for further education in graduate or professional school. The knowledge attained by the student should have the breadth and depth to
address issues in various agricultural fields or pursuit of an agriculturally related graduate program. Students should be aware of the academic expectations at institutions of higher education and the strategies the university and their faculty utilize to assist them in meeting their academic and career goals.

A method of determining the success of an academic program is to develop a set of outcomes that are expected for students enrolled in an agricultural program. The outcomes must be clearly defined and a curriculum designed to provide students the opportunity to achieve those outcomes. To accurately assess the outcomes, a method of measurement must be clearly established.

Evaluation of course outcomes may be either subjective, objective, or both. The subjective form of evaluation allows students to self-evaluate their knowledge of various topics at any point in the course. The subjective evaluation may be given at the beginning and the ending of the class. The objective form of evaluation is usually a traditional form of testing course topics. The objective evaluation sets the list of course outcomes into a multiple-choice question format for the student to answer. The questions are used as a pre- and post-test to compare students’ progress during a semester-long course.

An outcomes based program should also include a clear set of outcomes for each class in the curriculum. Some method(s) of outcomes assessment is/are needed to evaluate the progress of individual students in each class. One method to assess a course’s outcomes is to measure student level of competence at the beginning and the end of the semester.
Universities and colleges must fulfill their role in preparing students for their future success. The evaluation used to assess how well students are succeeding in a particular college course or program should be well prepared, and the information attained from the assessment should be useful to the faculty and administration in the evaluation of courses and curriculum.
Chapter 2
REVIEW OF LITERATURE

Student achievement predictors may be useful to the university in predicting student success in university courses. The predictors used in past studies have included high school grades, standardized test scores (Brashears and Baker, 2003), background of the students, involvement in youth organizations (Ball et al., 2001), gender (Bridges et al., 2002), and preferred learning style of the students (Garton et al., 2000). The predictors may interact to influence student performance in college courses. However, the universities may improve their retention rate and allow students to learn more efficiently by looking at other predictors.

Student Outcomes Assessment

Student outcomes assessments have been utilized by some colleges and universities in recent years. Outcomes assessment data use began in the 1980s as a tool for universities and colleges to evaluate their programs and to aid in finding new ideas to improve the academic programs (National Center for Education Statistics, 1997). Outcomes assessments are not only used to evaluate courses and programs at colleges and universities but also to show the public the value colleges and universities are providing to students and society (National Center for Education Statistics, 1997). Assessments are generally used for two reasons: grading students to show their achievement and evaluating the success of programs (Haury, 1993).
Evaluating student learning is not only important to the university administering the education but also to the public and policymakers. The purposes of student outcomes assessment according to the National Center for Education Statistics (1997) are as follows:

1. allow policymakers, accreditation associations, and consumers to receive the information needed to determine how effective the educational programs are at the universities and colleges,
2. let the public know how its money is being utilized for postsecondary education,
3. allow local, state, and national officials to receive information needed for making accurate decisions for postsecondary policy,
4. allow universities and colleges information on how they can improve their programs and allow them information on planning their courses,
5. inform employers of how postsecondary education is preparing students for employment, and
6. allow for high school graduates and their families to receive information needed to make an accurate decision on which college or university to attend.

Student outcomes assessments are most useful when the material being evaluated is relevant to the course (Hjelm and Baker, 2001). The assessment should be designed to evaluate the knowledge, skills, and abilities of the students (Hjelm and Baker, 2001).
High School Predictors

The academic ability that students show in high school can be used to predict performance in collegiate courses and programs. The majority of US colleges and universities utilize a student’s high school grade point average and percentile ranking in high school graduating class as admissions criteria (Garton et al., 2001). High school rank in class was found to have a strong relationship with the student’s cumulative grade point average in college \((r=0.675)\) (Brashears and Baker, 2003). Another predictor of student success is the score received on the American College Test (ACT) or Scholastic Aptitude Test (SAT) (Brashears and Baker, 2003). The ACT™ or SAT™ provide an indication of a student’s natural ability and how well prepared he/she is to start college (Bridges and Casavant, 2002). Garton et al. (2000) found positive correlations of .56 and .55 between the student’s ACT™ scores and high school grade point average in 1997 and 1998, respectively. The ACT™ scores also were positively related to high school class rank \((r=0.54\) in 1997 and \(r=0.50\) in 1998). The study showed that the relationship between college cumulative grade point average and high school grade point average \((r=0.61\) in 1997 and \(r=0.57\) in 1998) and high school class rank \((r=0.52\) in 1997 and \(r=0.49\) in 1998) was strong. The study also showed that about 39 percent of the difference in the cumulative grade point average of the students could be explained by the ACT™ score and the high school grade point average (Garton et al., 2000). The high school grade point average alone accounted for about one-third of the differences in the students’ cumulative grade point average for their first year of college (Garton et al., 2000).

In addition to using high school grade point average and ACT™ or SAT™ scores, there are several other high school experience factors that may explain how well students
will perform in the university environment. The student’s ability to write well written
essays that are strong in their content may be a predictor of how well the student will
succeed in college (The College Board, 1997). The student’s participation in advanced or
honors courses in high school may lead to preparing the student to be more successful in
college courses. Extracurricular activities may also play a role in how the student will
perform in college courses (The College Board, 1997). The students high school grades,
ACT™ or SAT™ scores, writing ability, and extracurricular involvement combined may
account for 25 percent or more of the differences between students in college
achievement (The College Board, 1997).

Gender Predictor

The make-up of agricultural programs at colleges and universities based on
gender has been changing to include a larger percentage of women. A Texas A&M
University study indicated that the enrollment changed from 51 percent women in 1986
to 59 percent women in 1996 (Cleere et al., 2002). Along with the increased percentage
of women enrolled in colleges comes some differences in the success of males and
females and in the way they learn. Bridges and Casavant (2002) showed that women tend
to do better on essay type exams; whereas, men tend to excel on multiple choice exams.
The learning rate of men and women tends to be similar (Bridges and Casavant, 2002).
However, males tend to perform better on the SAT™ and the ACT™ than women.
Bridgemon and Wendler (1991) found that men’s scores on the mathematics portion of
the SAT™ were significantly higher (p<.05) when compared to the scores of women.
The study also showed that women had a significantly higher (p<.05) grade point average
in high school than the male students. The gender score differences on the mathematics portion of the SAT™ may be explained by the test being based only on those individuals planning to attend college, more women than men taking the SAT™, and finally the test content may result in score differences found between men and women (Bridgemon and Wendler 1991).

Demographic Predictor

Experience of a student in his/her field of study may help the performance of that student in the major courses. Prior student knowledge will allow them to use their skills in learning new information (Osman and Hannafin, 1994). Students majoring in agriculture with prior agricultural experience or have completed secondary agriculture education courses may have a higher retention rate at the college or university when compared to students without agriculture experience (Garton et al., 2000). Prior experience and education in agriculture is thought to be the best predictor in determining whether a student will stay at the university and receive an agricultural degree (Garton et al., 2001).

In agricultural programs at universities in the United States, a wide variety of demographical backgrounds are found among students. The students come from rural areas as well as cities of various sizes. According to Deppe (2002), the city size of the student’s hometown played a role in how they performed on the multiple-choice exam administered at the end of the semester in the Introduction to Animal Science course. The geographical location of the student’s hometown may have an effect also on the way the student learns (Hoover and Marshall, 1998). According to Raven et al. (1993), there are
geographical differences in how agriculture is taught. Student age, however, did not appear to have any affect on student performance (Miller, 1998). In distance education where videotape classes are utilized, there is a large diversity of people who enroll in courses at universities located throughout the United States. The students who earned A’s in the videotape classes tended to be male, older, and were employed in agriculture or an agriculture related field (Miller, 1998).

Youth Organization Involvement Predictor

Involvement of the student in youth organizations such as 4-H or FFA can be used by colleges and universities as a predictor of student performance and retention. A student’s involvement in 4-H or FFA can impact numerous educational outcomes including student achievement, skill attainment, and student retention (Ball et al., 2001). The lack of experience in agriculture can be compensated for by involvement in 4-H or FFA for some students. Ball et al. (2001) reported those students who participated in one of the two agriculture youth organizations had a higher mean cumulative grade point average at the end of their freshman year when compared to those students who did not participate (3.1 vs. 2.6). The students that were very active in FFA demonstrated that they had more knowledge of animal science topics at the beginning of the semester than those students who were very active in 4-H and those who were not active in either of the youth organizations (Deppe, 2002). Significantly more students who participated in 4-H or FFA returned for their sophomore year of study. The students who were not involved in agriculture youth organizations had an 83.8 percent retention compared to 94.3 percent retention of students who were involved (Ball et al., 2001).
The previously mentioned studies indicate the importance of involvement in the youth organizations in student academic performance and retention and leads to an important duty for University Agricultural programs. The universities should continue offering agriculture education as a degree option for students. The training that individuals receive in agriculture and extension education will allow them to be qualified to assist future agricultural students (Ball et al., 2001).

Learning Styles

The learning style of a student is defined as “the characteristic cognitive, affective, and psychological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment” (Honeyman and Miller, 1998). Learning styles are different among students and fall into two types: field-dependent learning and field-independent learning. Students who are field dependent learners are typically not as good at solving problems and have a more global perspective. They tend to learn information better when it is related to a real life experience. Structure is an important part of their learning environment. Typically, the more structure they have, the more successful they are in their classes. The students who prefer the field-independent learning styles see things more analytically and like to work on projects and study by themselves. They also prefer to make their own structured environment (Garton et al., 2000).

Even though a student prefers a specific learning style, he/she may not show all the characteristics that define that learning style (Honeyman and Miller, 1998). The learning style of a student is dependent on how the student approaches a task and on
personality behaviors (Hoover and Marshall, 1998). In a study conducted at the University of Missouri College of Agriculture (Garton et al., 2000), 73 percent of the students preferred the field-independent style while 27 percent preferred field-dependent learning style in the classes participating in the study. In 1998, 62.5 percent of the students preferred field-independent; whereas, 37.5 percent preferred the field-dependent learning style (Garton et al., 2000). Those students who preferred a field-independent learning style showed a tendency to perform better academically than those who preferred field-dependent (Garton et al., 2000). According to Hoover and Marshall (1998), the majority of students majoring in animal science and pre-veterinary medicine prefer the field-independent learning style.

The geographical location from which a student comes may play a role in the type of learning style the student prefers. Students who attended high school in the southern part of the United States have a tendency to be more field-dependent learners than do students from the western and central United States (Hoover and Marshall, 1998). Those students who attended high school in a rural location tended to be more field-dependent thinkers than did those who attended school in city or suburban areas (Hoover and Marshall, 1998).

The learning style used by a professor to teach a course can have an effect on the course outcomes of students with different learning styles (Honeyman and Miller, 1998). When the learning style of the student and the learning style used to teach the class is the same, the student tends to perform better in the course. However, in an overall course outcome, the performance of students was highest when the professor used a combination
of field-dependent and field-independent methods when teaching the course (Honeyman and Miller, 1998).

The learning style preferred by the student may account for a portion of the knowledge the student acquires in the course. Determining which learning style individuals prefer could aid professors of college courses in identifying students who may have difficulty in their class and in implementing teaching strategies to allow them to perform better (Garton et al. 2001).
Chapter 3
MATERIALS AND METHODS

The purpose of this study was to evaluate and assess predictors of students' performance in an introductory animal science class. Students enrolled in the Introduction to Animal Science course (ANSC 140) at Western Kentucky University (Bowling Green) voluntarily participated in the study. The introductory course is a requirement for all students majoring in Agriculture. The data for this study were collected during eight semesters and twelve sections of the course from 1999 to 2003. Two sections of the course are taught in the fall and one in the spring. A total of 649 students completed the beginning evaluation, ending evaluation or both parts of the evaluation that provided the data for this study.

The beginning evaluations were completed by the students during the first or second class meetings. The evaluation consisted of three parts: a subjective course outcomes assessment, a demographic questionnaire, and an objective multiple choice test. The course outcomes evaluation (Table 1) allowed the student to assess his/her prior knowledge of topics to be discussed in the course. The evaluation consisted of 49 course outcome statements that were to be addressed during the semester. The students rated their knowledge of each statement with a number ranging from 1 to 100 with 1 being the least prior knowledge and 100 being very knowledgeable about the subject. A demographic survey (Table 2) was attached to the answer sheet of the outcomes assessment. The survey was completed by the student and contained multiple choice questions about his/her background, the number of college hours completed by the student, his/her prediction on the degree of difficulty of the course, the expected grade from the course and his/her agricultural area of interest. The final portion of the initial
evaluation was a multiple-choice test. The test was made up of fifty multiple-choice questions that addressed topics on the course outcomes list. The test was another form of predicting student’s prior knowledge of animal science.

The final evaluation of the student was completed on the day of the final exam. The evaluation consisted of the same three parts. The student’s course outcomes evaluation was completed in the same manner as it was at the beginning of the course and evaluated how much confidence the students had in the knowledge attained during the semester. The multiple-choice test (LDTS) included the same fifty questions on the initial and the final exam in all semesters.

The study also included the evaluation of grades received in the course. The score the student received on all one hundred questions (including the standard fifty question test) was recorded. The final average (FA) recorded for each student was calculated by the following: 30 percent on class quiz average, 20 percent on each of two hour examinations (40 percent total), and 30 percent on the final course examination.

The Introduction to Animal Science Laboratory (ANSC 141) is required for all Animal Science and Pre-veterinary students but is an elective for students studying other Agriculture disciplines. The laboratory course provides students an opportunity to get hands-on experience with topics discussed in the lecture course (ANSC 140). The grades of those who participated in laboratory were recorded. The ANSC 140 FA scores of students who completed ANSC 141 were compared to those who only took the lecture course (ANSC 140).

The high school predictors of college success were also recorded for the students. The predictors included the student’s high school grade point average (HSGPA), high
school percentile rank (HSPILE) in graduating class, and the ACT™ scores. The ACT™ scores were evaluated using each component of the test (English, mathematics, reading, and science) and the composite score the student received.

Some of the students who participated in the study only completed either the beginning evaluation or the ending evaluation. The students missing the ending evaluation dropped the course at some point during the semester. The students without the beginning evaluation either added the course after the evaluation was given or were absent on the day the evaluation was completed. The data from these students were not used in the statistical analyses of this study.

The statistical analysis was conducted using SAS (2001). The least square means and standard errors were calculated for all the dependent variables. The correlations and regressions were calculated for the following: average beginning assessment (ABA), average ending assessment (AEA), average improvement (AI), average percent improvement (API), initial test (IT), test improvement (TI), percent test improvement (PTI), last day test (LDT), final test (FT), final average (FA), lab grade (LG), ACT™ components, high school percentile rank in class (HSPILE), and the high school grade point average (HSGPA). The ACT components included English (ENG), mathematics (MATH), reading (READ), science (SCI), and composite score (COMP). The means were separated using the Least Significant Difference (LSD) Mean Separation test at a (P<0.05) significance level. To determine regression and correlation differences between males and females for various traits separate analyses were conducted by gender.
Chapter 4
RESULTS

The effect of involvement in the youth organizations, 4-H and FFA, on assessment scores are shown in Table 3. Students who were very active members in both 4-H and FFA rated their knowledge highest (P<.05) at both the beginning of the semester (47.0 versus overall mean of 30.1) and the ending of the semester (74.8 versus overall mean of 73.0) as indicated on the subjective assessments (ABA and AEA). Students who were FFA members but did not judge themselves as active and the students who were not a member of either organization compared to the other students rated their opinion of knowledge on course topics the lowest at the beginning of the semester with scores of 27.0 and 28.1, respectively. The opinions of the students who were involved in both 4-H and FFA but were not active had more variation in their scores than the other students at the beginning of the semester (SE = 7.58). The students who were FFA members but were not involved had a significantly (P<0.05) lower opinion of their knowledge on the average ending assessment (59.0) when compared to other students included in the study. Despite the differences on the subjective assessments based on student involvement, there were no significant perceived knowledge improvement differences based on the level of involvement in the youth organization. Numerically, however, the students that were very active members in both 4-H and FFA had the lowest amount of improvement on the AEA compared to the score received on the ABA.

The students who were very involved in 4-H and FFA scored significantly higher (P<0.05) on the ITS than all groups except the non-active members of both organizations (39.9 versus group mean of 35.9). The students who were either not a member of either organization or were FFA members but were not active performed the lowest on the
initial day test with scores of 33.1 and 32.8, respectively. Despite the differences on the ITS, the students did not perform significantly different on the last day test, the final test or the final average (P>0.05).

Students were classified as in-state or out-of-state based on the information given on the demographic survey. Table 4 shows the assessment differences based on in-state and out-of-state classification of students. Subjective and objective test scores were not significantly different (P>0.05); however, FA was significantly (P<0.05) higher for out-of-state students.

The effect of student’s gender on assessment scores is shown in Table 5. The males in the course rated their knowledge of course topics higher when compared to females at the beginning (36.4 vs. 31.0) (P<0.05) and the ending (71.8 vs. 66.4) (P<0.05) of the course. However, the average improvement on the subjective assessments was not significantly (P>0.05) different between males and females. Males scored significantly (P<0.05) higher than females on the ITS and LDTS. However, male and female students improved at the same rate. Despite the differences on the ITS and LDTS, scores on the FTS and FA were not significantly different (P>0.05) between males and females.

Table 6 shows the differences in assessment scores for students who were enrolled in the Introduction to Animal Science Laboratory and those who were not. The students rated their knowledge similarly (34.2 vs. 33.3) on the ABA (P>.05). However, the students who were enrolled in the laboratory rated their knowledge about the course topics significantly higher (P<0.05) at the end of the semester (72.8 vs. 65.4) when compared to students who were not enrolled in the laboratory. The average improvement
on the subjective assessments was significantly higher (P<0.05) for students enrolled in laboratory than for those students not enrolled (40.4 vs. 32.9).

The students who enrolled in laboratory scored significantly higher (P<0.05) on the initial and last day tests when compared to students not enrolled in the laboratory. They, however, improved on the objective tests at the same rate despite whether they were or were not enrolled in laboratory. The students in laboratory scored significantly higher (P<0.0001) on the final test (63.9 vs. 57.5) and had a higher (P<0.0001) FA (74.3 vs. 65.7) than students who were not enrolled.

The effect that the student’s previous animal experience had on the assessment scores are in Table 7. The students having dairy and beef cattle experience ranked their knowledge significantly higher (P<0.05) on the beginning assessments when compared to students with only companion animal experience. Though not statistically significant (P>0.05), the students with cattle experience numerically ranked their knowledge of course outcomes higher on the average ending assessment. The students with cattle experience also scored significantly higher (P<0.05) on the final test when compared to students with other types of prior animal experience. The students with only exotic animal experience scored significantly lower (P<0.05) on the final test than the other students included in the study. However, the FA achieved for the course was not significantly affected (P>0.05) by previous animal experience.

Tables 8 and 9 show the effects of the location and WKU accumulated credit hours on the assessment scores. There were no significant differences (P>0.05) for any of the assessments based on the location of the student’s home. The number of hours
completed by the student prior to enrolling in Animal Science 140 did not play a significant (P<0.05) role on how the students performed.

The coefficients of correlation between the assessments are shown in Table 10. Overall, the correlations were low when comparing the types of assessments. There was a strong negative correlation (r=-0.77) between the average beginning assessment and the average improvement. The final average had a higher correlation with the final test score than with the last day test score (r=0.86 vs. 0.71). There was a moderately strong correlation (r=0.60) between the final average and the lab grade.

The coefficients of correlation between assessments and high school predictors are shown in Table 11. The relationships between the subjective assessments and the ACT™ scores, high school percentile rank, and high school grade point average were low. However, the correlations were higher between the objective assessments and the ACT™ scores, high school percentile rank, and high school grade point average.

The correlation by gender between the various assessment items are shown in Tables 12 and 13. Similar correlations for the assessments were found for males and females. The correlations within each gender classification are similar to the relationships that exist when the values were calculated across genders.

The correlations between the high school predictors and assessments based on gender are shown on Tables 14 and 15. The differences between the subjective assessments and high school predictors are low, and the differences between the related correlations are low when compared by gender. However, the correlations are numerically higher when comparing the objective assessments and high school predictors for females than males. The correlations between the final test score and the composite
ACT™ score was higher for females than males with values of \( r = 0.61 \) and 0.42, respectively. There was a higher relationship in the overall final average for the course and the composite ACT™ score for females than males (\( r = 0.54 \) compared to 0.42). The correlation between the lab grade and the high school predictors of high school grade point average and high school percentile rank in graduating class were higher for females. The relationship between the high school percentile rank in class and lab grade was 0.63 for females and 0.46 for males. The correlation between high school grade point average and lab grade was 0.55 for females and 0.37 for males.
Chapter 5
DISCUSSION

The results of this study demonstrate that various demographics factors influence student’s academic performance. Gender, high school involvement, student type, laboratory enrollment, and animal experience all had a significant effect on the scores of one or more of the assessment tools. Additionally, high school achievement and ACT scores were evaluated to determine their role in predicting student academic performance through an introductory course. Previous studies including Garton et al. (2000), Bridges and Casavant (2002), Hoover and Marshall (1998), and Ball et al. (2001) have examined the relationship between predictors and have found variable results.

According to the results of the present study, student gender does play a role in subjective and objective assessment performance (Table 5). In the present study scores, multiple choice exams differed between genders. The present findings closely follow those previously reported by Bridges and Casavant (2002) who showed that males outperformed females on multiple choice exams. In the present study, males not only scored higher on the objective tests but also subjectively self-assessed their knowledge higher. It appears that males thought they had more understanding of the course subject matter than females. A plausible explanation for these results could be that males may have had more previous experience with agriculture and related topics than have the females. Despite the gender assessment score differences, women and men had similar rates of improvement on the subjective self-assessment administered at the beginning and at the end of the semester. The study demonstrated similar learning rates among males and females. The results of the present study are in agreement with those previously reported (Bridges and Casavant, 2002) that indicated that males and females have similar
rates of course knowledge improvement. Student gender was not a significant source of
variation for FTS or the FA received in the course. Male and female FA score differences
may have resulted from differences in performance on other testing instruments (either
quizzes or hourly exams) administered throughout the semester. The quizzes and hour
exams are fill-in-the blank, short answer or essay type exams on which the females must
have excelled the males in performance. Bridges and Casavant (2002) found that females
had superior performance on these type exams. Furthermore, males may not study as
regularly due to their perceived course subject matter knowledge. Differences may also
be explained by the fact that the females study the topics discussed in the course more
than do males.

The youth organizations, 4-H and FFA, teach young people about agriculture and
the agriculture industry. Table 3 shows the significant effect of the involvement of the
students in 4-H and FFA on the students’ perception of their knowledge of topics to be
discussed in the Introduction to Animal Science course. The students ranked their
knowledge differently relative to their involvement in activities as a high school student;
however, the students’ knowledge ranking improved at the same rate. Prior agricultural
experience gained through 4-H and FFA activity may have allowed students to score
higher on the initial day test score. These results coincide with the knowledge that prior
experience with a subject addressed in a course helps students learn information
presented (Osman and Hannafin, 1994). Despite the fact that the involvement did affect
their opinion of how much they knew, the participation in 4-H and/or FFA did not
translate into higher scores on the objective tests at the end of the semester. The results of
the present study do not agree with those previously reported where students involved in
the youth organizations had higher grade point averages when compared to those students not involved in the organizations (Ball et al., 2001). The explanation for this difference in results could be due to the fact that students from the present study who had prior agricultural experience thought they possessed more knowledge on subjects presented throughout the course, and hence, they did not study as much or as regularly as students without prior experience or involvement in the youth organizations. This outcome could be desirable when considering that instructors want students to be able to succeed in the course regardless of their level of previous experience prior to enrollment in the course.

Students attend Western Kentucky University from Kentucky and from many other states as well. In this study, approximately twenty percent of the students enrolled in ANSC 140 are from states other than Kentucky. The educational systems of different states vary with respect to their methods of addressing various topics such as math, chemistry, etc., and the amount of emphasis placed on these topics. The students in this study were grouped into two categories: in-state students and out-of-state students (Table 4). The students from states other than Kentucky had higher FA scores than the students from Kentucky. The difference in final average consists of a variation of one letter grade for the students. This may indicate that students who attended WKU from other states and completed ANSC 140 may have had a broader understanding of the topics discussed throughout the course. The difference could be due to the types of educational system (including agriculture education) in the other states. A study presented by Hoover et al. (1998) showed that students from different geographical locations may have different learning styles, which may affect retention and their learning of the material addressed in the course. An explanation for the difference found in the FA scores could be due to a
difference in the population number for each category. Additionally, admission requirements for out-of-state students may be more stringent and hence, out-of-state students may have higher academic ability when compared to in-state students.

The students enrolled in the Introduction to Animal Science Laboratory are typically students that are pursuing an area of emphasis in Animal Science or Pre-veterinary Medicine. These students tend to be more interested in the subjects being addressed in the course and study the information more rigorously when compared to other students. Additionally, Pre-Veterinary students understand the importance of maintaining a high grade point average in order to gain entrance into Veterinary Medicine schools. Table 6 shows that laboratory enrollment was found to have a significant effect on student performance in the lecture course (ANSC 140). At the end of the semester, the students who participated in the laboratory subjectively self-ranked their knowledge on topics discussed in the course higher, and their rate of improvement was higher when compared to students who were not enrolled in the laboratory. They also scored higher on the objective evaluations in the course. The students enrolled in the laboratory outperformed the other students in the overall course. The differences found in the final average could be due to the scores attained on the final test, but the students may have had superior quiz and hour exam scores which were administered throughout the semester. The reinforcement of lecture topics that occurs in the laboratory likely explains the higher scores of those students enrolled in laboratory when compared to the scores received by students who were not enrolled in laboratory. The students also had the opportunity for hands-on experience of topics discussed in the classroom setting. The hands-on experience is a method of field-dependent teaching which has been shown to be
a superior learning tool for those students who learn better when information is presented in real life scenarios (Garton et al., 2000). However, the scores of students enrolled in the laboratory may be biased upward due to the fact that laboratory enrollees may have higher academic ability, are more interested in animal science, or are more determined to succeed in order to advance their careers. The data demonstrates that it would be beneficial for all students to enroll in ANSC 141 in order to improve their performance in the lecture course.

The students were placed into categories based on their responses on the demographic survey and specifically their experience with different types of animals. The categories included companion animals, the various types of traditional farm animals, and exotic animals. Average beginning assessment and final test score were significantly different depending on the type of previous animal experience the students had (Table 7). The students with the most cattle experience subjectively ranked their knowledge of course outcomes at the beginning of the course significantly higher (P<.05) than the students with experience with other animals. The students who had experience with exotic animals scored their knowledge of Animal Science the lowest (P<.05) based on the average beginning assessment. There were only nine students who had exotic animal experience; therefore the small sample size distracts from the meaning of this difference. The students with farm animal experience scored higher on the final test than students having other types of animal experience. The differences observed may be related to the fact that the majority of the information covered in the course pertains to farm animals and is also the basis for the course outcomes. The relationship of the types of prior animal experience and student success has not been addressed in previous studies. The present
study indicates that students having farm animal experience may have an advantage in the course when compared to students that do not have farm animal experience or that have experience with other types of animals.

A previous study involving a subset of the data used in the present study demonstrated that the number of hours the student had accumulated at Western Kentucky University was a significant source of variation on the scores received on both subjective and objective assessments (Deppe, 2002). However, in the present study, Table 9 shows that the number of credit hours did not play a role in how the students perceived their knowledge on course topics or how they performed on the tests given in the course. Freshmen were found to perform at the same rate as the upperclassman in the course. The reason behind the differences may be that the freshman enrolling in the course may have had more agricultural experience and they are studying more for the course. Study sessions have been added for the course throughout the semester in more recent years. The majority of those attending the study sessions are freshman where additional help is provided regarding the topics discussed in the course. The addition of study sessions may have allowed the freshman to perform at a similar rate as upperclassmen.

Student performance in the course was not affected by the type of environment (rural or large city setting) of the students (Table 8). In the data accumulated prior to this study, those students from small communities did not perform as well on either the subjective or objective assessments as the other students (Deppe, 2002). An explanation could be that the previous results relied on small numbers for some of the community size subclasses, and once more data was accumulated, the differences were not as great or increased variation occurred when additional data was added. The effects of a student’s
hometown community size on collegiate agricultural academic performance were not found in any prior studies.

The relationships between the types of assessments used throughout the study may determine which ways are effective in testing the knowledge of the students. The relationships between the assessments administered in this course are shown on Table 10. The strong negative correlation between ABA and AI shows that students did improve in their perception of knowledge attained in the course. Along with that observation, the moderate negative correlation between ITS and TI also shows that students improved in their objective assessments. However, the difference in correlations seem to indicate those students that scored low on the subjective assessments improved more than the students did on the objective tests. For the course to be considered successful in teaching course topics the students should increase their knowledge from the beginning to the end of the semester. The relationship between the LDTS and FTS showed that those students who did well on the first fifty questions of the final exam score also did well on the exam in its entirety. The strong positive correlation for FTS and FA demonstrates that the score the student received on the final strongly affected the final average the student would receive. Since the relationship between FTS and FA was higher than that of LDTS and FA, it may be assumed that the last 50 questions of the final exam more accurately covered topics discussed in the course. The relationship between the Lab Grade and FA was moderately strong, indicating that students who decided to enroll in the laboratory received higher final averages. The relationship between the Lab and FA may also indicate that the topics discussed in the laboratory closely followed the information in the lecture course which in turn likely enhances the student’s learning.
The relationship between the high school predictors and the assessments used in the study as shown on Table 11 overall were low. When examining the correlations overall, the performance of the student could not be accurately predicted based on any of the high school predictors. However, the correlations seem to suggest higher predictive ability when measuring the relationship between the objective assessments and the high school predictors when compared to the relationship between the subjective assessment and the high school predictors. The high school predictors of ACT™ scores and high school grade point average were found to be positively correlated in a study reported by Garton et al. (2000). The ACT™ scores were also related to high school class rank (Garton et al., 2000). Since the ACT™ is an objective evaluation tool the correlations with the objective assessments administered in this course were expected to be high. High school grade point average and percentile rank in their high school graduating class are highly correlated with the objective assessment measures. This could be due to the fact that many of the high school scores received are objective test scores. The expected results based on previous data would be that the score the students received on the ACT™ and their performance in high school would be highly related to how students perform in college courses (Brashears and Baker, 2003). Along with this, Garton et al. (2000) reported that the high school grade point average of the student may account for one-third of the differences in the student’s first year cumulative grade point average. The results of the present study do not agree with the previously completed studies. In the present study high school predictors were of much less value. This seems to suggest that the high school evaluation tools are not good predictors of performance in ANSC 140.
The difference could be due to the majority of the students in ANSC 140 being freshman who have more freedom in college than they did in high school. They have new found freedoms and that means they have the decision as to whether they attend class and whether they study without the pressure from parents that they likely received while in high school. Additionally, the pace and difficulty of courses likely increases for many freshman whose study skills may not be as good as they need to be for success at the collegiate level.

The correlations were determined within each gender and shown on Table 12 and 13. The correlations were not very different. The relationship between the assessments was very similar to that of the correlations for the whole class. The closeness between the correlations shows that the relationship between the assessments was not different whether they were completed by male or female students.

Tables 14 and 15 show the relationships between the high school predictors and the assessments administered throughout the semester within each gender classification. The values for both genders for the subjective assessments and the high school predictors were low and indicative of a very small relationship between self-assessed student knowledge of animal science and performance in high school and on the ACT. The correlations between the objective assessments and the high school predictors were higher for females than they were for the males indicating that the female scores may be more predictive of their performance in college courses when compared to the same male predictors. The differences could have resulted because females who perform well on the ACT™ also performed relatively well on the objective tests. It could be that
females prepare and study more for the ACT™ and also prepare at the same rate for the objective assessments in the course. Additionally, the ACT™ may be biased towards females in testing the level of knowledge the students have that will help them in their college careers.
Chapter 6
SUMMARY

The study was designed to predict student success in the Introduction to Animal Science course (ANSC 140) at Western Kentucky University. The data to be used for the study was collected from students enrolled in the course from the Fall of 1999 to the Spring of 2003. The students completed assessments at the beginning and the end of the semester. The assessments included a subjective course outcomes assessment, a demographic survey, and an objective multiple choice exam. The data were then analyzed separating the students by the answers they gave on the demographic survey.

The results of the study show that student involvement in youth agricultural organizations, gender, student type, animal experience of the student, and whether or not the student was enrolled in the Introduction to Animal Science Laboratory (ANSC 141) all had significant (P<0.05) effects on how the student performed on the assessments. The type of environment the student comes from and the accumulated number of WKU course hours did not have any significant effect on how the student performed on the assessments.

The ABA and AEA were significantly (P<0.05) different based on which category the student fell into for involvement in youth agricultural organizations and gender. However, the prior animal experience of the student only played a significant (P<0.05) role in how the students ranked their knowledge at the beginning of the semester. At the end of the semester, students that were enrolled in ANSC 141 ranked their knowledge significantly (P<0.05) higher than those students who were not enrolled.

The ITS was significantly different based on the categories the student belonged to for 4-H/FFA involvement, gender, and ANSC 141 enrollment. The 4-H/FFA
involvement had no significant effect on how the students performed on the LDTS. The gender of the student and whether the student was enrolled in ANSC 141 had no effect on how the student performed on the LDTS and FTS. The previous animal experience of the student played a role in how he/she performed on the final test.

There was a strong negative relationship found between the ABA and AI \((r = -0.77)\). The performance on the final test and the final average achieved was found to be strongly related with a correlation of 0.86. The scores achieved on the final test and the last day test were strongly correlated \((r=0.84)\). The relationships between the assessments when separated based on the gender of the student were not numerically different from the correlations of the entire population of the study.

The high school predictors of ACT™ score, high school grade point average, and high school percentile rank in graduating class were more accurate in the prediction of student success for females than for males. The correlations between the high school predictors and the assessments administered were higher for the objective assessments than they were for the subjective assessments. The ACT™ scores have the highest relationship with the FTS and FA.

The study was helpful in determining those factors that may influence how the student performs in the Introduction to Animal Science course. Study results revealed that some of the demographic information plays a role in how the student performs on one or more of the assessments. It also determined that the high school predictors do play a small role in predicting how the student will perform in the course.

Future studies may be used to address student performance throughout their entire educational experience at Western Kentucky University and the role of predictors in
determining student achievement. Some of the students completed only part of the assessments. A future study may address why some students do not complete all of the assessments, and also determine if any of the demographic or assessment information can provide any indication as to the likelihood that a student may drop the course sometime during the semester.

Investigating more thoroughly the preferred learning style of individual students may be helpful to professors in assessing teaching techniques. Since students have different learning styles it may be advantageous to incorporate a variety of teaching methods. Pinpointing the learning style of individual students may aid professors in identifying students who could benefit from some special interventions. The challenge for the college professor is to teach in such a way to accommodate students with a variety of learning styles.
Table 1 Course Outcomes Subjective Assessment

Please rate your knowledge on each statement below by scoring yourself on a scale of 1-100 on the answer sheet.

After completing the course students will be able to:

1. Write and converse about animal science and the animal industries of the US using appropriate terminology.
2. Give the scientific classification of all species of farm animals, dogs, and cats.
3. Give the correct names for animals of different sexes and age groups for each farm animal species.
4. Describe the animal demographics of the US and the world.
6. Describe the structure (segments) of the food animal industries of the US.
7. Describe the digestive systems of each farm animal species.
8. Describe rumination and the major differences between ruminant and non-ruminant digestion and metabolism.
9. Name the basic classes of nutrients, describe the basic chemical composition of each and explain the role of each in animal nutrition.
10. Explain the general concept of metabolism (catabolism and anabolism).
11. Describe commonly occurring metabolic disorders and infectious diseases of farm animals.
12. Describe and characterize the forage crops most commonly used for pasture, hay, and silage.
13. Describe and classify the common feedstuffs used for supplying nutrients to livestock.
14. Describe the normal reproductive phenomena of each farm animal species.
15. Contrast the fundamental differences in the life cycles among domestic animal species.
16. Identify male and female farm animal reproductive organs and describe the functions of each.

17. Explain the endocrine control of reproduction, lactation, and other basic physiologic functions in farm animals.

18. Describe lactation curves and milk composition for each farm animal species.

19. Describe the differences between colostrums and normal milk.

20. Describe the basic concepts of immune system function.

21. Explain mammary gland structure and function using the dairy cow as a model.

22. Describe the domestication of animals.

23. Describe the processes of evolution, artificial selection and the development of types, breeds, and synthetic lines of farm animals.

24. Recognize and describe the major breeds of beef cattle, dairy cattle, horses, sheep, and swine.

25. Describe livestock breed associations and give their primary and secondary functions.

26. Explain the basic concepts of qualitative and quantitative inheritance in farm animals.

27. Calculate the fractional breed composition of progeny resulting from mating parents of different breed composition.

28. Explain the mating systems that may be utilized by livestock producers and the expected results of each.

29. Explain inbreeding depression and hybrid vigor and the effects of each upon animal performance.

30. Describe commonly used records system utilized in the dairy and livestock industries.

31. Explain the use of EPDs and PTAs in farm animal improvement programs.

32. Explain the role of molecular genetic concepts in livestock selection programs.
33. Describe the use of recombinant DNA technology in animal science and list the major biotechnological accomplishments that have become commonly used in the animal industries.

34. Name the parts of the beef animal, dairy cow, horse, pig, and sheep.

35. Name the wholesale cuts and the major retail cuts of beef, pork, and lamb carcasses.

36. Describe the reasons for cooking meat, the major methods of meat cookery and the ideal methods of cooking common retail cuts.

37. Recognize the major muscles present in retail cuts taken from near the backbone.

38. Describe differences in tenderness among retail cuts of meat and discuss the reasons why these differences occur.

39. Name and describe the classes of market animals for each livestock species.

40. Describe USDA inspection and grading of carcasses and list the criteria for determining the grades of beef, pork, and lamb carcasses.

41. Describe growth curves in livestock and relate differential patterns of growth to weight as slaughter, carcass composition, and carcass quality.

42. Describe changes in dressing percent and carcass composition as animals grow and develop from birth to maturity.

43. Describe growth and composition differences among the sexes of cattle, swine, and sheep.

44. Give industry average feed conversion ratios for each species of meat animals and describe reasons for differences within and among species.

45. Calculate feed conversion ratios using growth and feed consumption data.

46. Discuss the major food safety issues relating to foods of animal origin.

47. Describe the nutritional attributes of the common foods of animal origin and relate the perceived health problems that result from consumption of these foods.
48. Provide production goals and compare those goals to industry averages for each farm animal species.

49. Describe the organizations that support, promote, and oppose animal agriculture.
Table 2 Demographic Assessment

50. My gender is ...
   a. Male
   b. Female

51. I am considered ...
   a. An international student.
   b. A domestic out-of-state student.
   c. A domestic in-state student.

52. I consider myself to be a ...
   a. Food animal oriented student.
   b. Non-food animal oriented student.

53. How many transfer hours do you have at this point?
   a. 0-12
   b. 13-32 from a 2 year program or AP
   c. 13-32 from a 4 year program
   d. over 32 from 2 year program or AP
   e. over 32 from a 4 year program

54. How many hours credit do you have at WKU?
   a. 0
   b. 16-32
   c. 32-64
   d. >64

55. My primary animal experience is with (pick one only) ...
   a. Companion Animals (dogs, cats)
   b. Exotic Animals (including birds, reptiles)
   c. Dairy animals
   d. Horses
   e. Beef
   f. Sheep
   g. Swine
   h. Other species not fitting above categories

56. The predominant environment I am from is best described as ...
   a. Rural farm or ranch.
   b. Rural acreage (part-time farm or ranch)
   c. Small community (<1,000 people)
   d. Medium community (1,000-10,000 people)
   e. Large community (10,000-100,000 people)
   f. Very large city (>100,000 people)
57. My future career plans of future interests after I receive my BS degree are ...
   a. Production agriculture (farm, management, home farm, etc.)
   b. Veterinary medicine, large animal interests.
   c. Veterinary medicine, small animal interests.
   d. Sales and marketing of agri-products.
   e. Meats or foods industry.
   f. Public service. (teaching, extension, government, etc.)
   g. Business management.
   h. Graduate school.
   i. Other or I don’t know yet

58. I consider the following to best describe my activities in 4-H and FFA ...
   a. Not a member of either organization.
   b. Member of 4-H- not active
   c. Member of 4-H- very active
   d. Member of FFA- not active.
   e. Member of FFA- very active
   f. Member of both 4-H and FFA- not active.
   g. Member of both 4-H and FFA- very active

59. My major area of interest is ...
   a. Animal Science
   b. Dairy Science
   c. Equine Science
   d. Ag education
   e. Ag business
   f. Turf Management
   g. Environmental science.
   h. Horticulture
   i. Agronomy- soil science.
   j. Agronomy- plant science.
   k. Pre-veterinary
   l. Non-agriculture

60. I expect my grade in this course will be an ...
   a. A
   b. B
   c. C
   d. D
   e. F

61. I expect this course to be ...
   a. Really easy or not challenging
   b. Easy
   c. Moderately difficult
   d. Difficult
   e. Very difficult or very challenging

62. What is your age?
   a. <20
   b. 20-25
   c. 25-30
   d. 30-40
   e. >40
63. Which animal products do you regularly consume?
   a. None            e. Chicken
   b. Beef           f. Eggs
   c. Pork          g. Dairy products
   d. Lamb

64. Which statement best describes your position concerning tobacco?
   a. Tobacco production should be outlawed.
   b. Tobacco should be classified as an illegal drug such as marijuana.
   c. Production of tobacco is an honorable profession, but use of tobacco products should be outlawed in public and for anyone under the age of 18.
   d. Production of tobacco is an honorable profession, and the use of and promotion of tobacco products should be free from governmental regulation.

65. Which statement best describes your position concerning genetically altered foods?
   a. Genetically altered plant and animal products should not be legal for human consumption.
   b. Genetically altered plant and animal products should be available for human consumption, but must be labeled as such.
   c. Genetically altered plant and animal products should be handled similar to other food products with no labeling to distinguish them from other foodstuffs.
   d. Genetically altered plant and animal products should not be produced because of potential for “upsetting nature’s balance” of “normal” plants and animals.

66. Which statement best describes your position concerning animal rights/ welfare?
   a. Animals have similar rights to humans.
   b. Animals have no rights.
   c. The government should establish strict rules about handling and managing animals.
   d. Animals should be treated humanly and managed in a manner to optimize the economics of production.

67. Which statement best describes your position on protecting the environment?
   a. All agriculture should become sustainable by using only “organic” farming practices.
   b. Herbicides, pesticides, and antibiotics should be legal if used according to label directions.
   c. Every farmer should be held liable for acts of environmental pollution.
   d. Because of the need for food, agricultural production should be maximized regardless of the environmental effects.
68. Which best describes your position on “factory” farming?
   a. Food should be produced in the most efficient manner regardless of size of operation.
   b. Size of farming operations should be restricted.
   c. Family farms should be encouraged by the government by providing production subsidies to “smaller” operations.
   d. Tax breaks should be used to encourage “family farms” to remain in business.

69. Which of the following will be the most important consideration of your prospective employer?
   a. GPA
   b. Communication skills
   c. Work experience
   d. Leadership potential
   e. Work ethic
   f. Willingness to move
   g. My own contribution to my educational expenses

70. What do you expect your annual starting salary to be after graduation from college? ________________
Table 3. Least squares means (± Standard Error) for Average Beginning Assessment, Average Ending Assessment, Average Improvement, Initial Day Test Score, Last Day Test Score, Test Improvement, Final Test Score, and Final Average for students categorized by their high school involvement in 4-H or FFA before enrolling in Animal Science 140 at Western Kentucky University

<table>
<thead>
<tr>
<th>Activities</th>
<th>n</th>
<th>ABA ±SE</th>
<th>AEA ±SE</th>
<th>AI ±SE</th>
<th>ITS ±SE</th>
<th>LDTS ±SE</th>
<th>TI ±SE</th>
<th>FTS ±SE</th>
<th>FA ±SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not a member</td>
<td>242</td>
<td>28.10±c</td>
<td>4.45±c</td>
<td>66.98±b</td>
<td>3.72±c</td>
<td>39.87±b</td>
<td>5.71±c</td>
<td>33.09±c</td>
<td>2.08±c</td>
</tr>
<tr>
<td>4-H Member - Not Active</td>
<td>31</td>
<td>29.18±bc</td>
<td>6.30±b</td>
<td>69.66±ab</td>
<td>4.76±bc</td>
<td>41.58±b</td>
<td>7.47±bc</td>
<td>33.85±bc</td>
<td>2.88±bc</td>
</tr>
<tr>
<td>4-H Member - Very Active</td>
<td>28</td>
<td>32.28±bc</td>
<td>6.71±bc</td>
<td>69.48±abc</td>
<td>5.59±bc</td>
<td>35.22±b</td>
<td>8.86±bc</td>
<td>33.55±bc</td>
<td>3.07±bc</td>
</tr>
<tr>
<td>FFA Member - Not Active</td>
<td>58</td>
<td>26.97±c</td>
<td>5.41±c</td>
<td>58.95±c</td>
<td>4.37±c</td>
<td>34.97±c</td>
<td>6.78±c</td>
<td>32.77±c</td>
<td>2.47±c</td>
</tr>
<tr>
<td>FFA Member - Very Active</td>
<td>147</td>
<td>36.31±b</td>
<td>4.95±b</td>
<td>68.12±b</td>
<td>4.06±b</td>
<td>34.81±b</td>
<td>6.23±b</td>
<td>36.60±b</td>
<td>2.30±b</td>
</tr>
<tr>
<td>4-H and FFA Member - Not Active</td>
<td>19</td>
<td>33.44±abc</td>
<td>7.58±b</td>
<td>68.38±abc</td>
<td>5.97±c</td>
<td>36.38±c</td>
<td>9.50±c</td>
<td>34.92±abc</td>
<td>3.38±b</td>
</tr>
<tr>
<td>4-H and FFA Member - Very Active</td>
<td>82</td>
<td>47.01±a</td>
<td>5.43±a</td>
<td>74.27±a</td>
<td>4.35±a</td>
<td>28.48±a</td>
<td>6.76±a</td>
<td>39.90±a</td>
<td>2.50±a</td>
</tr>
</tbody>
</table>

Means within a column with different superscripts are different (P<.05)

1Average Beginning Assessment = ABA
2Average Ending Assessment = AEA
3Average Improvement = AI
4Initial Test Score = ITS
5Last Day Test Score = LDTS
6Test Improvement = TI
7Final Test Score = FTS
8Final Average = FA
Table 4. Least squares means (± Standard Error) for Average Beginning Assessment, Average Ending Assessment, Average Improvement, Initial Day Test Score, Last Day Test Score, Test Improvement, Final Test Score, and Final Average for students categorized by whether they were in-state or out-of-state and enrolled in Animal Science 140 at Western Kentucky University

<table>
<thead>
<tr>
<th>Student Type</th>
<th>n</th>
<th>ABA 1 ±SE</th>
<th>AEA 2 ±SE</th>
<th>AI 3 ±SE</th>
<th>ITS 4 ±SE</th>
<th>LDTS 5 ±SE</th>
<th>TI 6 ±SE</th>
<th>FTS 7 ±SE</th>
<th>FA 8 ±SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Out-of-State</td>
<td>104</td>
<td>34.12</td>
<td>5.15</td>
<td>71.27</td>
<td>4.17</td>
<td>34.84</td>
<td>2.38</td>
<td>63.11</td>
<td>2.52</td>
</tr>
<tr>
<td>Domestic In-state</td>
<td>510</td>
<td>33.45</td>
<td>4.57</td>
<td>66.91</td>
<td>3.69</td>
<td>35.24</td>
<td>5.66</td>
<td>36.52</td>
<td>2.13</td>
</tr>
</tbody>
</table>

Means within a column with different superscripts are different (P<.05)

1 Average Beginning Assessment = ABA
2 Average Ending Assessment = AEA
3 Average Improvement = AI
4 Initial Test Score = ITS
5 Last Day Test Score = LDTS
6 Test Improvement = TI
7 Final Test Score = FTS
8 Final Average = FA
Table 5. Least squares means (± Standard Error) for Average Beginning Assessment, Average Ending Assessment, Average Improvement, Initial Day Test Score, Last Day Test Score, Test Improvement, Final Test Score, and Final Average for students categorized by gender and enrolled in Animal Science 140 at Western Kentucky University

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>ABA(^1)</th>
<th>AEA(^2)</th>
<th>AI(^3)</th>
<th>ITS(^4)</th>
<th>LDTS(^5)</th>
<th>TI(^6)</th>
<th>FTS(^7)</th>
<th>FA(^8)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
</tr>
<tr>
<td>Male</td>
<td>337</td>
<td>36.44(^a)</td>
<td>71.77(^a)</td>
<td>3.77</td>
<td>36.94</td>
<td>5.78</td>
<td>37.28(^a)</td>
<td>2.15</td>
<td>63.92(^a)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25.61</td>
<td>3.76</td>
<td></td>
<td>61.88</td>
<td>2.29</td>
<td>70.92</td>
<td>2.65</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>293</td>
<td>31.03(^b)</td>
<td>66.41(^b)</td>
<td>3.91</td>
<td>36.36</td>
<td>6.01</td>
<td>34.08(^b)</td>
<td>2.25</td>
<td>60.80(^b)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25.38</td>
<td>3.94</td>
<td></td>
<td>59.57</td>
<td>2.40</td>
<td>69.04</td>
<td>2.79</td>
<td></td>
</tr>
</tbody>
</table>

Means within a column with different superscripts are different (P<.05)

\(^1\)Average Beginning Assessment = ABA
\(^2\)Average Ending Assessment = AEA
\(^3\)Average Improvement = AI
\(^4\)Initial Test Score = ITS
\(^5\)Last Day Test Score = LDTS
\(^6\)Test Improvement = TI
\(^7\)Final Test Score = FTS
\(^8\)Final Average = FA
Table 6. Least squares means (± Standard Error) for Average Beginning Assessment, Average Ending Assessment, Average Improvement, Initial Test Score, Last Day Test Score, Test Improvement, Final Test Score, and Final Average for students categorized by whether they enrolled in Animal Science 141 (Introduction to Animal Science Laboratory) and enrolled in Animal Science 140 at Western Kentucky University

<table>
<thead>
<tr>
<th>Enrollment Status</th>
<th>n</th>
<th>ABA(^1) ±SE</th>
<th>AEA(^2) ±SE</th>
<th>AI(^3) ±SE</th>
<th>ITS(^4) ±SE</th>
<th>LDTS(^5) ±SE</th>
<th>TI(^6) ±SE</th>
<th>FTS(^7) ±SE</th>
<th>FA(^8) ±SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrolled</td>
<td>297</td>
<td>34.17 ±4.69</td>
<td>72.79(^a) ±3.88</td>
<td>5.94 ±3.88a</td>
<td>37.43±2.18</td>
<td>64.92±2.22</td>
<td>26.25 ±3.85</td>
<td>63.92±2.36</td>
<td>74.28±2.75</td>
</tr>
<tr>
<td>Not Enrolled</td>
<td>333</td>
<td>33.30 ±4.74</td>
<td>65.39(^b) ±3.79</td>
<td>32.92(^b)</td>
<td>33.93(^b)</td>
<td>24.74 ±3.84</td>
<td>57.53(^b)</td>
<td>26.25 ±3.84</td>
<td>65.68(^b)</td>
</tr>
</tbody>
</table>

Means within a column with different superscripts are different (P<.05)

\(^1\)Average Beginning Assessment = ABA
\(^2\)Average Ending Assessment = AEA
\(^3\)Average Improvement = AI
\(^4\)Initial Test Score = ITS
\(^5\)Last Day Test Score = LDTS
\(^6\)Test Improvement = TI
\(^7\)Final Test Score = FTS
\(^8\)Final Average = FA
Table 7. Least squares means (± Standard Error) for Average Beginning Assessment, Average Ending Assessment, Average Improvement, Initial Day Test Score, Last Day Test Score, Test Improvement, Final Test Score, and Final Average for students categorized by their animal experience and enrolled in Animal Science 140 at Western Kentucky University

<table>
<thead>
<tr>
<th>Animal Experience</th>
<th>n</th>
<th>ABA(^1)</th>
<th>AEA(^2)</th>
<th>AI(^3)</th>
<th>ITS(^4)</th>
<th>LDTS(^5)</th>
<th>TI(^6)</th>
<th>FTS(^7)</th>
<th>FA(^8)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
</tr>
<tr>
<td>Companion Animals</td>
<td>250</td>
<td>28.56(^c) 4.53</td>
<td>69.50 3.43</td>
<td>40.34 5.17</td>
<td>36.08 2.13</td>
<td>64.41 1.69</td>
<td>26.87 3.50</td>
<td>61.43(^{bc}) 2.06</td>
<td>70.44 2.41</td>
</tr>
<tr>
<td>Exotic Animals</td>
<td>9</td>
<td>20.99(^{bc}) 10.40</td>
<td>34.62 8.02</td>
<td>42.68 12.89</td>
<td>29.16 4.59</td>
<td>53.54 5.85</td>
<td>21.76 7.32</td>
<td>51.71(^d) 5.15</td>
<td>68.73 11.36</td>
</tr>
<tr>
<td>Dairy Animals</td>
<td>57</td>
<td>40.63(^{ab}) 5.60</td>
<td>74.34 4.20</td>
<td>31.90 6.52</td>
<td>38.57 2.57</td>
<td>65.71 2.60</td>
<td>27.77 4.18</td>
<td>65.76(^{ab}) 2.63</td>
<td>72.61 3.04</td>
</tr>
<tr>
<td>Horses</td>
<td>103</td>
<td>32.50(^{bc}) 4.77</td>
<td>72.41 3.63</td>
<td>39.77 5.55</td>
<td>37.21 2.21</td>
<td>64.33 1.92</td>
<td>26.13 3.67</td>
<td>64.41(^{abc}) 2.19</td>
<td>70.12 2.54</td>
</tr>
<tr>
<td>Beef</td>
<td>143</td>
<td>38.17(^{ab}) 4.70</td>
<td>74.70 3.59</td>
<td>35.63 5.47</td>
<td>37.56 2.19</td>
<td>66.10 1.81</td>
<td>27.92 3.65</td>
<td>65.63(^{c}) 2.17</td>
<td>73.00 2.53</td>
</tr>
<tr>
<td>Sheep</td>
<td>12</td>
<td>30.07(^{bc}) 8.24</td>
<td>65.83 6.55</td>
<td>34.70 10.45</td>
<td>37.14 3.82</td>
<td>51.66 4.60</td>
<td>13.44 6.32</td>
<td>57.39(^{cd}) 3.96</td>
<td>71.89 4.52</td>
</tr>
<tr>
<td>Swine</td>
<td>18</td>
<td>27.34(^{bc}) 7.47</td>
<td>67.89 5.63</td>
<td>36.08 8.86</td>
<td>35.05 3.34</td>
<td>66.41 4.14</td>
<td>30.42 5.50</td>
<td>62.06(^{bcd}) 3.68</td>
<td>69.58 4.23</td>
</tr>
<tr>
<td>Others Not Named</td>
<td>4</td>
<td>36.66(^{abc}) 13.12</td>
<td>54.24 15.46</td>
<td>33.37 24.89</td>
<td>36.94 5.76</td>
<td>61.08 11.93</td>
<td>22.47 13.90</td>
<td>53.25(^{abcd}) 9.98</td>
<td>58.77 5.85</td>
</tr>
</tbody>
</table>

Means within a column with different superscripts are different (P<.05)

\(^{1}\)Average Beginning Assessment = ABA  \(^{5}\)Last Day Test Score = LDTS
\(^{2}\)Average Ending Assessment = AEA  \(^{6}\)Test Improvement = TI
\(^{3}\)Average Improvement = AI  \(^{7}\)Final Test Score = FTS
\(^{4}\)Initial Test Score = ITS  \(^{8}\)Final Average = FA
Table 8. Least squares means (± Standard Error) for Average Beginning Assessment, Average Ending Assessment, Average Improvement, Initial Day Test Score, Last Day Test Score, Test Improvement, Final Test Score, and Final Average for students who originated form different size communities and enrolled in Animal Science 140 at Western Kentucky University

<table>
<thead>
<tr>
<th>Environment</th>
<th>n</th>
<th>ABA^1 LSM ±SE</th>
<th>AEA^2 LSM ±SE</th>
<th>AI^3 LSM ±SE</th>
<th>ITS^4 LSM ±SE</th>
<th>LDTS^5 LSM ±SE</th>
<th>TI^6 LSM ±SE</th>
<th>FTS^7 LSM ±SE</th>
<th>FA^8 LSM ±SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural Farm or Ranch</td>
<td>203</td>
<td>30.25 4.73</td>
<td>66.78 3.89</td>
<td>39.93 5.99</td>
<td>35.85 2.21</td>
<td>63.87 2.27</td>
<td>25.83 3.82</td>
<td>60.55 2.38</td>
<td>69.46 2.75</td>
</tr>
<tr>
<td>Rural Acreage</td>
<td>102</td>
<td>33.53 5.15</td>
<td>69.63 4.18</td>
<td>37.13 6.46</td>
<td>35.47 2.38</td>
<td>64.16 2.56</td>
<td>27.32 4.03</td>
<td>62.02 2.57</td>
<td>69.30 2.97</td>
</tr>
<tr>
<td>Small Community (&lt;1000)</td>
<td>54</td>
<td>34.02 5.63</td>
<td>67.81 4.47</td>
<td>35.35 6.96</td>
<td>35.43 2.58</td>
<td>60.40 2.84</td>
<td>23.94 4.34</td>
<td>60.42 2.79</td>
<td>68.04 3.20</td>
</tr>
<tr>
<td>Medium Community (1,000-10,000)</td>
<td>126</td>
<td>30.29 5.20</td>
<td>67.63 4.21</td>
<td>36.84 6.52</td>
<td>33.30 2.38</td>
<td>61.04 2.49</td>
<td>27.50 4.09</td>
<td>59.39 2.61</td>
<td>69.41 3.02</td>
</tr>
<tr>
<td>Large Community (10,000-100,000)</td>
<td>89</td>
<td>33.67 5.30</td>
<td>68.45 4.24</td>
<td>35.69 6.52</td>
<td>36.80 2.44</td>
<td>62.04 2.53</td>
<td>25.01 4.18</td>
<td>62.88 2.58</td>
<td>73.10 3.00</td>
</tr>
<tr>
<td>Very Large City (&gt;100,000)</td>
<td>40</td>
<td>40.65 6.84</td>
<td>74.24 5.48</td>
<td>34.96 8.72</td>
<td>37.24 3.11</td>
<td>62.64 3.75</td>
<td>23.35 5.33</td>
<td>59.10 3.37</td>
<td>70.56 3.83</td>
</tr>
</tbody>
</table>

Means within a column with different superscripts are different (P<.05)

^1Average Beginning Assessment = ABA
^2Average Ending Assessment = AEA
^3Average Improvement = AI
^4Initial Test Score = ITS
^5Last Day Test Score = LDTS
^6Test Improvement = TI
^7Final Test Score = FTS
^8Final Average = FA
Table 9. Least squares means (± Standard Error) for Average Beginning Assessment, Average Ending Assessment, Average Improvement, Initial Day Test Score, Last Day Test Score, Test Improvement, Final Test Score, and Final Average for students categorized by number of accumulated hours at Western Kentucky University and enrolled in Animal Science 140 at Western Kentucky University

<table>
<thead>
<tr>
<th>WKU Hours</th>
<th>n</th>
<th>ABA(^1)</th>
<th>AEA(^2)</th>
<th>AI(^3)</th>
<th>ITS(^4)</th>
<th>LDTS(^5)</th>
<th>TI(^6)</th>
<th>FTS(^7)</th>
<th>FA(^8)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
<td>LSM ±SE</td>
</tr>
<tr>
<td>0-16</td>
<td>262</td>
<td>32.97</td>
<td>4.73</td>
<td>69.88</td>
<td>3.90</td>
<td>37.58</td>
<td>5.97</td>
<td>64.97</td>
<td>2.38</td>
</tr>
<tr>
<td>32-64</td>
<td>111</td>
<td>33.76</td>
<td>5.38</td>
<td>66.79</td>
<td>4.32</td>
<td>34.54</td>
<td>6.68</td>
<td>60.61</td>
<td>2.62</td>
</tr>
<tr>
<td>&gt;64</td>
<td>85</td>
<td>32.69</td>
<td>6.04</td>
<td>68.86</td>
<td>4.79</td>
<td>37.65</td>
<td>7.47</td>
<td>62.75</td>
<td>3.02</td>
</tr>
</tbody>
</table>

Means within a column with different superscripts are different (P<.05)

1Average Beginning Assessment = ABA
2Average Ending Assessment = AEA
3Average Improvement = AI
4Initial Test Score = ITS
5Last Day Test Score = LDTS
6Test Improvement = TI
7Final Test Score = FTS
8Final Average = FA
Table 10. Coefficient of correlation between subjective measures (Average Beginning Assessment, Average Ending Assessment, Average Improvement) and objective measures (Initial Test Score, Last Day Test Score, Test Improvement, Final Test Score, Final Average, and Laboratory Grade) of knowledge and performance for students in Animal Science 140 at Western Kentucky University

<table>
<thead>
<tr>
<th></th>
<th>ABA</th>
<th>AEA</th>
<th>AI</th>
<th>ITS</th>
<th>LDTS</th>
<th>TI</th>
<th>FTS</th>
<th>FA</th>
<th>Lab Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABA²</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AEA³</td>
<td>.29a</td>
<td></td>
<td>.39a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AI⁴</td>
<td>-.77a</td>
<td></td>
<td></td>
<td>.39a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITS⁵</td>
<td>.21a</td>
<td>.17a</td>
<td>-.12a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LDTS⁶</td>
<td>.08c</td>
<td>.27a</td>
<td>.11a</td>
<td>.38a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TI⁷</td>
<td>-.10b</td>
<td>.12a</td>
<td>.20a</td>
<td>-.38a</td>
<td>.71a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FTS⁸</td>
<td>.10b</td>
<td>.34a</td>
<td>.13a</td>
<td>.42a</td>
<td>.84a</td>
<td>.51a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FA⁹</td>
<td>.10b</td>
<td>.40a</td>
<td>.17a</td>
<td>.35a</td>
<td>.71a</td>
<td>.43a</td>
<td>.86a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lab Grade</td>
<td>.02</td>
<td>.22a</td>
<td>.12c</td>
<td>.17a</td>
<td>.41a</td>
<td>.26a</td>
<td>.50a</td>
<td>.60a</td>
<td>1</td>
</tr>
</tbody>
</table>

¹ superscripts a, b, & c are different from zero at P<.01, P<.05, and P<.10 significance.
² Average Beginning Assessment = ABA
³ Average Ending Assessment = AEA
⁴ Average Improvement = AI
⁵ Initial Test Score = ITS
⁶ Last Day Test Score = LDTS
⁷ Test Improvement = TI
⁸ Final Test Score = FTS
⁹ Final Average = FA
Table 11. Coefficients of correlation between subjective and objective measures of animal science knowledge and pre-college performance scores for students enrolled in Animal Science 140 at Western Kentucky University

<table>
<thead>
<tr>
<th></th>
<th>English$^{10}$</th>
<th>Math$^{11}$</th>
<th>Read$^{12}$</th>
<th>Science$^{13}$</th>
<th>Composite$^{14}$</th>
<th>HSPILE$^{15}$</th>
<th>HSGPA$^{16}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABA$^2$</td>
<td>-.01</td>
<td>.01</td>
<td>.03</td>
<td>.04</td>
<td>.02</td>
<td>.04</td>
<td>.007</td>
</tr>
<tr>
<td>AEA$^3$</td>
<td>.15$^{a}$</td>
<td>.18$^{a}$</td>
<td>.14$^{a}$</td>
<td>.18$^{a}$</td>
<td>.17$^{a}$</td>
<td>.16$^{a}$</td>
<td>.16$^{a}$</td>
</tr>
<tr>
<td>AI$^4$</td>
<td>.08</td>
<td>.10$^{b}$</td>
<td>.03</td>
<td>.04</td>
<td>.06</td>
<td>.02</td>
<td>.06</td>
</tr>
<tr>
<td>ITS$^5$</td>
<td>.22$^{a}$</td>
<td>.29$^{a}$</td>
<td>.29$^{a}$</td>
<td>.30$^{a}$</td>
<td>.31$^{a}$</td>
<td>.21$^{a}$</td>
<td>.18$^{a}$</td>
</tr>
<tr>
<td>LDTS$^6$</td>
<td>.32$^{a}$</td>
<td>.44$^{a}$</td>
<td>.33$^{a}$</td>
<td>.38$^{a}$</td>
<td>.42$^{a}$</td>
<td>.34$^{a}$</td>
<td>.28$^{a}$</td>
</tr>
<tr>
<td>TI$^7$</td>
<td>.15$^{a}$</td>
<td>.20$^{a}$</td>
<td>.09$^{c}$</td>
<td>.14$^{a}$</td>
<td>.17$^{a}$</td>
<td>.19$^{a}$</td>
<td>.14$^{a}$</td>
</tr>
<tr>
<td>FTS$^8$</td>
<td>.42$^{a}$</td>
<td>.50$^{a}$</td>
<td>.41$^{a}$</td>
<td>.47$^{a}$</td>
<td>.52$^{a}$</td>
<td>.43$^{a}$</td>
<td>.38$^{a}$</td>
</tr>
<tr>
<td>FA$^9$</td>
<td>.39$^{a}$</td>
<td>.48$^{a}$</td>
<td>.38$^{a}$</td>
<td>.46$^{a}$</td>
<td>.48$^{a}$</td>
<td>.46$^{a}$</td>
<td>.41$^{a}$</td>
</tr>
<tr>
<td>Lab Grade</td>
<td>.31$^{a}$</td>
<td>.42$^{a}$</td>
<td>.32$^{a}$</td>
<td>.32$^{a}$</td>
<td>.38$^{a}$</td>
<td>.55$^{a}$</td>
<td>.47$^{a}$</td>
</tr>
</tbody>
</table>

$^1$superscripts a,b,&c are different from zero at P<.01, P<.05, and P<.10 significance
$^2$Average Beginning Assessment = ABA  
$^3$Average Ending Assessment = AEA  
$^4$Average Improvement = AI  
$^5$Initial Test Score = ITS  
$^6$Last Day Test Score = LDTS  
$^7$Test Improvement = TI  
$^8$Final Test Score = FTS  
$^9$Final Average = FA  

$^{10}$ACT™ English = English
$^{11}$ACT™ Math = Math
$^{12}$ACT™ Reading = Read
$^{13}$ACT™ Science = Science
$^{14}$ACT™ Composite = Composite
$^{15}$High school percent rank within class = HSPILE
$^{16}$High school grade point average = HSGPA
Table 12. Coefficient of correlation between male subjective measures (Average Beginning Assessment, Average Ending Assessment, Average Improvement) and objective measures (Initial Test Score, Last Day Test Score, Test Improvement, Final Test Score, and Laboratory Grade) of knowledge and performance for students enrolled in Animal Science 140 at Western Kentucky University

<table>
<thead>
<tr>
<th></th>
<th>ABA</th>
<th>AEA</th>
<th>AI</th>
<th>ITS</th>
<th>LDTS</th>
<th>TI</th>
<th>FTS</th>
<th>FA</th>
<th>Lab Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABA²</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AEA³</td>
<td>.34</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AI⁴</td>
<td>-.75</td>
<td>.36</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITS⁵</td>
<td>.23</td>
<td>.08</td>
<td>-.22</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LDTS⁶</td>
<td>.14</td>
<td>.17</td>
<td>-.005</td>
<td>.36</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TI⁷</td>
<td>-.08</td>
<td>.09</td>
<td>.16</td>
<td>-.43</td>
<td>.68</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FTS⁸</td>
<td>.20</td>
<td>.26</td>
<td>-.01</td>
<td>.39</td>
<td>.79</td>
<td>.47</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FA⁹</td>
<td>.22</td>
<td>.34</td>
<td>.01</td>
<td>.31</td>
<td>.69</td>
<td>.40</td>
<td>.86</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Lab Grade</td>
<td>.09</td>
<td>.04</td>
<td>-.07</td>
<td>.21</td>
<td>.30</td>
<td>.09</td>
<td>.49</td>
<td>.60</td>
<td>1</td>
</tr>
</tbody>
</table>

¹superscripts a, b, & c are different from zero at P<.01, P<.05, and P<.10 significance.
²Average Beginning Assessment = ABA
³Average Ending Assessment = AEA
⁴Average Improvement = AI
⁵Initial Test Score = ITS
⁶Last Day Test Score = LDTS
⁷Test Improvement = TI
⁸Final Test Score = FTS
⁹Final Average = FA
Table 13. Coefficients of correlation between female subjective measures (Average Beginning Assessment, Average Ending Assessment, Average Improvement) and objective measures (Initial Test Score, Last Day Test Score, Test Improvement, Final Test Score, Final Average, and Laboratory Grade) of knowledge and performance for students in Animal Science 140 at Western Kentucky University

<table>
<thead>
<tr>
<th></th>
<th>ABA</th>
<th>AEA</th>
<th>AI</th>
<th>ITS</th>
<th>LDTS</th>
<th>TI</th>
<th>FTS</th>
<th>FA</th>
<th>Lab Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABA²</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AEA³</td>
<td>.22ᵃ</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AI⁴</td>
<td>-.78ᵃ</td>
<td>.44ᵃ</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITS⁵</td>
<td>.16ᵃ</td>
<td>.28ᵃ</td>
<td>.003</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LDTS⁶</td>
<td>.04</td>
<td>.38ᵃ</td>
<td>.21ᵇ</td>
<td>.41ᵃ</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TI⁷</td>
<td>-.11ᶜ</td>
<td>.16ᵇ</td>
<td>.22ᵃ</td>
<td>-.33ᵃ</td>
<td>.73ᵃ</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FTS⁸</td>
<td>.02</td>
<td>.42ᵃ</td>
<td>.25ᵃ</td>
<td>.47ᵃ</td>
<td>.88ᵃ</td>
<td>.56ᵃ</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FA⁹</td>
<td>-.0009</td>
<td>.47ᵃ</td>
<td>.31ᵃ</td>
<td>.40ᵃ</td>
<td>.74ᵃ</td>
<td>.44ᵃ</td>
<td>.86ᵃ</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Lab Grade</td>
<td>.03</td>
<td>.36ᵃ</td>
<td>.23ᵃ</td>
<td>.16ᵇ</td>
<td>.48ᵇ</td>
<td>.35ᵃ</td>
<td>.50ᵃ</td>
<td>.61ᵃ</td>
<td>1</td>
</tr>
</tbody>
</table>

¹superscripts a,b,&c are different from zero at P<.01, P<.05, and P<.10 significance
²Average Beginning Assessment = ABA
³Average Ending Assessment = AEA
⁴Average Improvement = AI
⁵Initial Test Score = ITS
⁶Last Day Test Score = LDTS
⁷Test Improvement = TI
⁸Final Test Score = FTS
⁹Final Average = FA
Table 14. Coefficients of correlation between male subjective and objective measures of animal science knowledge and pre-college performance scores for student enrolled in Animal Science 140 at Western Kentucky University

<table>
<thead>
<tr>
<th></th>
<th>English 10</th>
<th>Math 11</th>
<th>Read 12</th>
<th>Science 13</th>
<th>Composite 14</th>
<th>HSPILE 15</th>
<th>HSGPA 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABA 2</td>
<td>.07</td>
<td>-.004</td>
<td>.10</td>
<td>.09</td>
<td>.07</td>
<td>.16 b</td>
<td>.11 c</td>
</tr>
<tr>
<td>AEA 3</td>
<td>.12 c</td>
<td>.08</td>
<td>.10</td>
<td>.13 c</td>
<td>.11</td>
<td>.12 c</td>
<td>.15 b</td>
</tr>
<tr>
<td>AI 4</td>
<td>-.02</td>
<td>.03</td>
<td>-.07</td>
<td>-.06</td>
<td>-.04</td>
<td>-.12 c</td>
<td>-.06</td>
</tr>
<tr>
<td>ITS 5</td>
<td>.17 a</td>
<td>.26 a</td>
<td>.23 a</td>
<td>.25 a</td>
<td>.26 a</td>
<td>.25 a</td>
<td>.19 a</td>
</tr>
<tr>
<td>LDTS 6</td>
<td>.24 a</td>
<td>.41 a</td>
<td>.20 a</td>
<td>.35 a</td>
<td>.36 a</td>
<td>.31 a</td>
<td>.20 a</td>
</tr>
<tr>
<td>TI 7</td>
<td>.10</td>
<td>.18 a</td>
<td>-.02</td>
<td>.13 c</td>
<td>.12 c</td>
<td>.15 b</td>
<td>.08</td>
</tr>
<tr>
<td>FTS 8</td>
<td>.32 a</td>
<td>.46 a</td>
<td>.26 a</td>
<td>.40 a</td>
<td>.42 a</td>
<td>.41 a</td>
<td>.33 a</td>
</tr>
<tr>
<td>FA 9</td>
<td>.34 a</td>
<td>.46 a</td>
<td>.26 a</td>
<td>.44 a</td>
<td>.42 a</td>
<td>.45 a</td>
<td>.38 a</td>
</tr>
<tr>
<td>Lab Grade</td>
<td>.23 b</td>
<td>.40 a</td>
<td>.25 a</td>
<td>.27 a</td>
<td>.31 a</td>
<td>.46 a</td>
<td>.37 a</td>
</tr>
</tbody>
</table>

1 superscripts a,b, & c are different from zero at P<.01, P<.05, and P<.10 significance
2 Average Beginning Assessment = ABA
3 Average Ending Assessment = AEA
4 Average Improvement = AI
5 Initial Test Score = ITS
6 Last Day Test Score = LDTS
7 Test Improvement = TI
8 Final Test Score = FTS
9 Final Average = FA
10 ACT™ English = English
11 ACT™ Math = Math
12 ACT™ Reading = Read
13 ACT™ Science = Science
14 ACT™ Composite = Composite
15 High school percent rank within class = HSPILE
16 High school grade point average = HSGPA
Table 15. Coefficient of correlation between female subjective and objective measures of animal science knowledge and pre-college performance scores for students enrolled in Animal Science 140 at Western Kentucky University

<table>
<thead>
<tr>
<th></th>
<th>English(^1)</th>
<th>Math(^1)</th>
<th>Read(^2)</th>
<th>Science(^3)</th>
<th>Composite(^4)</th>
<th>HSPILE(^5)</th>
<th>HSGPA(^6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABA(^2)</td>
<td>.02</td>
<td>.06</td>
<td>.05</td>
<td>.05</td>
<td>.06</td>
<td>-.02</td>
<td>-.04</td>
</tr>
<tr>
<td>AEA(^3)</td>
<td>.23(^a)</td>
<td>.30(^a)</td>
<td>.23(^a)</td>
<td>.25(^a)</td>
<td>.28(^a)</td>
<td>.21(^a)</td>
<td>.18(^a)</td>
</tr>
<tr>
<td>AI(^4)</td>
<td>.09</td>
<td>.15(^b)</td>
<td>.08</td>
<td>.12(^c)</td>
<td>.11</td>
<td>.13(^c)</td>
<td>.14(^b)</td>
</tr>
<tr>
<td>ITS(^5)</td>
<td>.37(^a)</td>
<td>.34(^a)</td>
<td>.42(^a)</td>
<td>.38(^a)</td>
<td>.43(^a)</td>
<td>.22(^a)</td>
<td>.19(^a)</td>
</tr>
<tr>
<td>LDTS(^6)</td>
<td>.40(^a)</td>
<td>.46(^a)</td>
<td>.46(^a)</td>
<td>.41(^a)</td>
<td>.49(^a)</td>
<td>.39(^a)</td>
<td>.36(^a)</td>
</tr>
<tr>
<td>TI(^7)</td>
<td>.16(^b)</td>
<td>.20(^a)</td>
<td>.17(^c)</td>
<td>.14(^c)</td>
<td>.19(^a)</td>
<td>.22(^a)</td>
<td>.19(^a)</td>
</tr>
<tr>
<td>FTS(^8)</td>
<td>.52(^a)</td>
<td>.54(^a)</td>
<td>.56(^a)</td>
<td>.53(^a)</td>
<td>.61(^a)</td>
<td>.46(^a)</td>
<td>.43(^a)</td>
</tr>
<tr>
<td>FA(^9)</td>
<td>.45(^a)</td>
<td>.50(^a)</td>
<td>.49(^a)</td>
<td>.47(^a)</td>
<td>.54(^a)</td>
<td>.47(^a)</td>
<td>.43(^a)</td>
</tr>
<tr>
<td>Lab Grade</td>
<td>.34(^a)</td>
<td>.43(^a)</td>
<td>.34(^a)</td>
<td>.34(^a)</td>
<td>.41(^a)</td>
<td>.63(^a)</td>
<td>.55(^a)</td>
</tr>
</tbody>
</table>

\(^1\) superscripts \(a, b, & c\) are different from zero at \(P<.01, P<.05,\) and \(P<.10\) significance
\(^2\) Average Beginning Assessment = ABA
\(^3\) Average Ending Assessment = AEA
\(^4\) Average Improvement = AI
\(^5\) Initial Test Score = ITS
\(^6\) Last Day Test Score = LDTS
\(^7\) Test Improvement = TI
\(^8\) Final Test Score = FTS
\(^9\) Final Average = FA

\(\text{ACT™ English} = \text{English}\)
\(\text{ACT™ Math} = \text{Math}\)
\(\text{ACT™ Reading} = \text{Read}\)
\(\text{ACT™ Science} = \text{Science}\)
\(\text{ACT™ Composite} = \text{Composite}\)
\(\text{High school percent rank within class} = \text{HSPILE}\)
\(\text{High school grade point average} = \text{HSGPA}\)
Literature Cited

Ball, A. L., B. L. Garton, and J. E. Dyer. 2001. Learning Communities and Agriculture Youth Organizations: Their Influence on College Agriculture Student’s Academic Performance and Retention. 28th Annual National Agricultural Education Research Conference.


Deppe, M.A. 2002. Methods to Evaluate and Predict Student Success in Introduction to Animal Science at Western Kentucky University.


