UMass Amherst's Educational Effectiveness Plan (EEP) provides departments with an ongoing structure for conducting systematic inquiry into the effectiveness of their efforts to support student success. Departments initially developed and submitted their EEP inquiry plans and evidence gathering strategies in spring 2018 and are asked to provide updates on their progress on a regular basis. EEP activity is also incorporated into the University's strategic planning process – with departments including their EEP progress and findings into their 2021 Strategic Planning Refresh. What follows is the department's most current reporting, as synthesized by the Office of Academic Planning and Assessment (OAPA).

Veterinary and Animal Sciences EEP

Identify the evidence you currently use (beyond GPA) to determine that your undergraduates have achieved the objectives you have for them.

Advisors track progression of students through hierarchal curriculum two times per year. Records are kept of all topics, credits, and mentors for all discovery-based research experiences and internships. We have a yearly Science Day for students to communicate their results via talks and posters. Department specific senior exit surveys are administered to seek feedback and to determine career plans and graduate or professional school admittances. We have also engaged analysis of student satisfaction according to the parameters in the university senior survey. UMetrx, SPIRE queries, and OIR are used to attempt to track students' progress through learning objectives.

Please describe the focus of your inquiry and explain why this inquiry is important to your department right now.

Line of Inquiry 2018: The curriculum in our majors and subplans is structured and hierarchal, with mastery of one learning objective being critical for mastery of the next. The focus of our inquiry is to determine and better understand the performance and movement of students between subplans of the Animal Science major (Animal Management, Biotech, and Equine Science) and the Pre-Vet major, out of the departmental majors, or out of the university on a student level. This question is crucial for an accurate determination of course capacity that calibrates student demand to resources, and to better prepare the "plan B" students who have either changed their mind about applying to vet school or are deferring their application. In addition, we would like to understand better the reasons why our total numbers of students in each class decrease from the entering freshman class to the graduating class, in order to increase student retention and completion of the learning objectives, leading to timely graduation.

Progress your department has made toward addressing your line of inquiry, and the types of evidence that you have collected to inform your inquiry.

As part of the 2018 EEP, the Department of Veterinary & Animal Sciences identified student retention as an increasing problem. Thus, tracking the progression of students through our majors became the focus of our department's line of inquiry. Since 2018, detailed records have been kept, documenting the dates students enter or leave our major and the department they change from or change into. After reviewing the compiled data, we have observed that the majority of students who leave our department are doing so fairly early in their academic career - either during the first or second year at the University. We find this to be a positive transition, as at this stage of a student's career they have had ample time to adjust to VASCI & the University and therefore have a strong sense of whether or not they are in the correct major. Data indicate that the majority of students who leave our department become Psychology majors. We find this to be a first choice for many students because they have begun working on the basic sciences that most CNS majors require; therefore it is generally a fairly seamless transition that does not require additional time to graduation.

Our department has made substantial changes, since what we described in the 2018 EEP, to determine (beyond GPA) whether our undergraduates are achieving SLOs and experiences integral to our curricula. We have implemented new laboratory-based courses including Canine Tumor Research Project and Fundamental Vertebrate Embryology, eight new equine didactic and practice courses in the new Equine Science concentration, a new IE course in Problem-Based Learning in Animal Health and Management, and the new BS-Vet Tech major with 15 new courses currently under accreditation review by the AVMA. These curricular changes share a focus on the assessment of student acquisition of essential skills in problem-solving, critical thinking, deductive reasoning, and function as a professional in a lab, clinical, or animal facility, beyond exams and grade point averages.

What are your department's next steps regarding your continuing and/or upcoming EEP line of inquiry?

We will focus on the introduction, practice and mastery of learning objectives for our students over their time here. In the next few years we will select a few fundamental topics that students in our majors must know. Once we have identified them, we will design a strategy to introduce them in a course(s) during the first one or two years on campus; second, students will master those topics both conceptually and practically; lastly, in the junior and senior years, we will prove for mastery. We will involve all faculty in selecting the main topics that we will use to implement our line of inquiry, and then recruit those faculty that will participate in the different stages of the program.

What are the Student Learning Objectives for your department or program(s)?

<u>B.S., Animal Science and Pre-Veterinary majors</u>

- Learning Objective 1: <u>Cellular and Animal biology</u>: Students will identify and define the role of the molecules that build cells, the foundations of cellular organization and communication, and the cellular assemblies that create the organs adapted to perform highly defined and required functions.
- Learning Objective 2: <u>Cellular and Animal Anatomy and Physiology</u>: Students will recognize the anatomy of a variety of species including limbs and organs and the function of these organs that is required to establish and maintain homeostasis of living animals. Students will learn and perform basic reactions catalyzed by enzymes that make possible cellular function and homeostasis.
- Learning Objective 3: <u>Animal Husbandry</u>: Students will identify different animals species, strains and breeds, the physiological and behavioral requirements for these species to thrive as well as how to the feed them including formulation of rations, how to breed and manage them to assure their well-being and productivity. Students will gain knowledge on the principles of immunization and will practice immunization along with other routine mgmt. procedures. Students will perform physical exams of a variety of species.
- Learning Objective 4: <u>Laboratory techniques and biotechnology</u>: Besides learning the basis of laboratories techniques used in clinics and common microbiological and biotechnology procedures, students will run these procedures and clinical tests.
- Learning Objective 5: <u>Scientific awareness</u>: Students will receive broad training in basic biological and physical sciences including upper-level coursework in genetics, immunology, reproduction and nutrition providing an emphasis on health-related technologies.
- Learning Objective 6: <u>Analytical skills</u>: Students will acquire basic knowledge in mathematics and statistics. Students will design trials to demonstrate advantages and disadvantages of treatment and procedures. Students will catalog and analyze information.
- Learning Objective 7: <u>Critical and ethical thinking/problem solving</u>: In addition to standard knowledge (fact-based), students are expected to develop abilities to gather information needed to address broad questions. Students will learn ethical use of animals for research and production.
- Learning Objective 8: <u>Communication</u>: Students will write a cover letter such as those required for a job application or for applying to professional schools, will prepare a professional CV, write a lab report; summarize the main points of a manuscript and prepare a professional presentation either from data in the literature or from their own collected information.

<u>B.S., Veterinary Technology</u>

- Learning Objective 1: Cellular and Animal biology: Students will identify and define the role of the molecules that build cells, the foundations of cellular organization and communication, and the cellular assemblies that create the organs adapted to perform highly defined and required functions.

- Learning Objective 2: Anatomy and Physiology: Students will identify and describe the basic anatomical structures and physiologic processes associated with tissues of all the major mammalian body systems. Students will demonstrate basic dissection skills and develop a vocabulary to effectively communicate information related to anatomy and physiology of each body system discussed.
- Learning Objective 3: Animal Husbandry: Students will recognize common domestic animal species and breeds and use common animal identification methods for these species. The student will understand and demonstrate husbandry, nutrition, therapeutic and dentistry techniques appropriate to various animal species.
- Learning Objective 4: Laboratory techniques: The student will demonstrate knowledge of proper handling, packaging and storage of specimens along with performing analysis of laboratory specimens.
- Learning Objective 5: Professionalism, Laws and Ethics: Students will follow and uphold applicable laws and the veterinary technology profession's ethical codes to provide high quality care to patients. Students will demonstrate professional conduct when dealing with clients, colleagues and the public. Students will learn ethical use of animals for research and address ethical concerns within the veterinary profession.
- Learning Objective 6: Analytical skills: Students will acquire basic knowledge in mathematics and statistics. Students will assess behavior, pain levels and therapeutic response to medications administered. Students will calculate dosages and administration rates of medications and solutions.
- Learning Objective 7: Communication: Students will demonstrate the ability to communicate in a professional manner in all formats - written, oral, non-verbal, and electronic.
- Learning Objective 8: Management of Veterinary Facilities: Students will participate in facility management utilizing traditional and electronic media and appropriate veterinary medical terminology and abbreviations.
- Learning Objective 9: Safe and effective animal handling and nursing care: Students will accurately restrain and handle the various species from laboratory animals to food animals. Students will administer enteral and parenteral medications, and acquire diagnostic specimens for various species according to the required essential skills for the CVTEA.

Experiential Goals
- Completion of a course-based laboratory
- Discovery-based research experience
- Career options seminar

Veterinary Department Graduate Student Learning Objectives
- Demonstrate a broad knowledge of the physiology and molecular biology of stem and other somatic cells and their organization into complex systems in vertebrates.
- Understand and implement scientific methodology. This includes:

- i) establish a scientific approach to answer pre-defined questions; ii) develop novel hypotheses/questions; iii) re-evaluate hypotheses based on new observations.
- Demonstrate capacity to innovate and expert knowledge in an ABBS sub-field such as gamete biology, developmental biology, Immunology and cancer biology. This also includes:
  - capacity to troubleshoot and implement methods for specific research
  - learn and apply quantitative skills
  - maintain an accurate scientific record
  - demonstrate time mgmt. and organization
- Build a professional skill set including:
  - effective communication with scientists (oral and written)
  - effective communication with non-scientists (oral and written)
  - collaborative and cooperative interactions
  - ethical and responsible practice of research
  - knowledge of career options/paths.
- Demonstrate capacity to lead a laboratory section of a course including:
  - prepare an introductory lecture for the laboratory
  - prepare exercises and assignments to evaluate the students' performance in the laboratory
  - grade assignments and provide feedback to students in the course.

Animal Biotechnology and Biomedical Sciences, M.S.
- Demonstrate a broad knowledge of the physiology and molecular biology of stem and other somatic cells and their organization into complex systems in vertebrates.
- Understand and implement scientific methodology. This includes:
  - establish a scientific approach to answer pre-defined questions
  - develop novel hypotheses/questions
  - re-evaluate hypotheses based on new observations.
- Understand and implement scientific methodology. This includes:
  - establish a scientific approach to answer pre-defined questions
  - develop novel hypotheses/questions
  - re-evaluate hypotheses based on new observations.
- Build a professional skill set including:
  - Effective communication with scientists (oral and written)
  - Effective communication with non-scientists (oral and written)
  - Collaborative and cooperative interactions
  - Ethical and Responsible practice of research
  - Knowledge of career options/paths.

Animal Biotechnology and Biomedical Sciences, Ph.D.
- Demonstrate a broad knowledge of the physiology and molecular biology of stem and other somatic cells and their organization into complex systems in vertebrates.
- Understand and implement scientific methodology. This includes
  - establish a scientific approach to answer pre-defined questions
  - develop novel hypotheses/questions
  - re-evaluate hypotheses based on new observations.
- Understand and implement scientific methodology. This includes:
  - establish a scientific approach to answer pre-defined questions
  - develop novel hypotheses/questions
  - re-evaluate hypotheses based on new observations.
- Build a professional skill set including:
  - Effective communication with scientists (oral and written)
  - Effective communication with non-scientists (oral and written)
  - Collaborative and cooperative interactions
  - Ethical and Responsible practice of research
  - Knowledge of career options/paths.
- Demonstrate capacity to lead a laboratory section of a course including:
  - Prepare an introductory lecture for the laboratory
  - prepare exercises and assignments to evaluate the student's performance in the laboratory
  - grade assignments and provide feedback to students in the course.