H29 Experimental Vertebrate Taphonomy: An Experiential Active-Learning Experiment Design and Implementation Course for Forensic Physical Anthropology Education and Mentorship

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The goals of this presentation are to describe an undergraduate course in experiment design and implementation and inform as to the impact the course had on the students and instructor.

This presentation will impact the forensic science community by informing how course design can improve the content knowledge received by undergraduate forensic physical anthropologists about experiment design, as well as improve students' cognitive development so they are prepared to perform and implement conceptually more robust and useful experiments in their graduate careers.

Experiential active learning courses have the potential of cementing subject-specific content knowledge through solving authentic problems and developing student cognition by confronting students with achievable problems. An Experimental Vertebrate Taphonomy course is one method to teach experiment design concepts and stimulate transformative cognitive development by having students implement their own experiment designs.

Course Structure: The course is designed with two components; a discussion section three times a week for a total of three hours, and a laboratory section twice a week for a total of four hours. Discussion sections for the first half of the semester cover scientific behavior (e.g., ethics), experimental and historical science philosophy, and experiment design concepts. Laboratory section time is used to teach essential scientific skills such as how to perform literature searches, write and read scientific papers, write abstracts, make and give scientific talks, etc. To end the first half of the semester, the instructor designs an experiment to be performed by the entire class. The second half of the semester, students use discussion section time to write and edit papers or prepare and practice scientific talks. In the laboratory section, students implement experiments that they designed themselves.

Assessments: Students are graded on a take-home midterm and final, as well as an in-class midterm and final. The majority of course points are awarded for a submission-quality publication and a 15-minute oral scientific presentation. In addition, students are graded on a detailed written description of their proposed experiment that demonstrates their mastery of experiment design concepts, as well as a laboratory notebook that meets the professional standards of the National Institue of Health.

Samples: One of the greatest challenges of performing experimental taphonomic research is procuring samples in an ethical way that also provides researchers with statistically significant numbers of samples. Most universities have an ample supply of deceased laboratory mice, rats, or rabbits that are used for biological or biomedical research. If an animal resource center exists on campus they can be contacted and their dead can be procured for course use. During hunting season additional remains can be obtained from local meat processors, and juvenile remains can often be acquired from large farms during calving or lambing seasons. Lastly, fish remains can be either procured through legal fishing or from fish markets, and sometimes free heads are available after preparation for sale.

Qualitative Results: Students responded enthusiastically to the course, expressing sincere appreciation for the effort to engage them in authentic scientific research that could benefit their careers. Many students commented that the course was the most transformative they had experienced in college, since they were expected to perform science and treated like fellow scientists rather than "just undergrads." From the instructor's perspective, it was clear that students grew as independent scientists and in their capacity for future scientific endeavors. They all grew in their capabilities of developing and implementing experimental taphonomic research and three students expressed a desire to further their taphonomic research at the graduate level.

Quantitative Results: Four students presented their work orally at a student research symposium at Montana State University, giving them valuable presentation experience. In addition, one student continued her research and is presenting her work here at the AAFS annual meeting this year.

Conclusions: The course was a resounding success and accomplished five objectives: (1) students learned how to design and implement rigorous taphonomic experiments; (2) students performed authentic research which was shared with the greater scientific community; (3) students had a transformative learning experience that stimulated a long-term interest in (taphonomic) experimentation; (4) students and instructors alike were invigorated, making research and teaching fun and exciting in ways not anticipated before the course; and, (5) lastly, lasting friendships were developed and fostered in a supportive learning environment.

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Experiment Design, Taphonomy, Teaching

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