

Poster Presentation Abstracts

Poster Session 1: Thursday, May 23 from 10:00 – 11:00 am in Exhibit Hall B

Poster #101

Study Approaches in Human Anatomy, Human Physiology, and A&P

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Educational research has identified three study approaches of students: deep, strategic and surface. Students who adopt a deep learning approach are described with the ability to relate new information to prior knowledge in a meaningful way. Surface learners focus on memorization and rote learning to remember facts. Whereas strategic learners are motivated by grades and vacillate between deep and surface approaches in order to be successful in class. Study approaches will be examined in three classes: human anatomy, physiology, and A&P, as they relate to academic performance and content retention.

Poster #102

Understanding Group Dynamics: Know the Characters in the Kingdom

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To discuss various personality types, we created animal character portraits representing specific qualities. Kingdomality Personality Profiles and historical portraits were examined to develop illustrations using an IPAD Paint program. Inspiration for each character comes from the loving bond I have fostered with animals since I was little ...watching the discovery channel or animal planet and volunteering at zoos and animal hospitals. Getting to know animals at a deeper level allows one to recognize that, much like humans, they are all individuals with their own unique personalities. "Until one has loved an animal, a part of one's soul remains un-awakened." – Anonymous.

Poster #103

Personality Types of Undergraduate Students and Pre-Health Majors: Future Healthcare Professionals Begin with Success in Anatomy & Physiology

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Personality types of undergraduate students were identified using the Kingdomality Personal Preference Profile Test by Bowles, Silvano and Silvano (2005). More than 75% of Pre-Health Majors belonged to "Emotional Helpers", one of the four major categories developed by the Test creators. Within this category, the Shepherds and White Knights were the most successful, and only those with the highest grades in this Anatomy and Physiology course were ultimately accepted into the healthcare profession of their choice. Our data suggest that personalities of many Pre-Health Majors favor entering healthcare professions. Individual strengths associated with their success are yet to be determined.

Poster #104

Identifying the Prevalent Personality Types and Individual Strengths in First Year Optometry Students: Implications for their Well-Being, Resilience and Academic Success as Future Healthcare Professionals

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First year Optometry students (N=315) identified their personality profiles using Kingdomality test (Bowles, Silvano and Silvano, 2005), and StrengthsFinder self-assessment test by reading the definitions of 34 strengths (Rath, 2007) and choosing five most reflective of their personality. Kingdomality testing revealed the following distribution: 75% Emotional Helpers, 14% Logical Challengers, 6% Realistic Maintainers, and 5% Creative Explorers. Self-assessment showed the overall most common strength is Empathy, and the least common one is Maximizer. Each personality type was associated most frequently with the following strength: Emotional Helpers - Empathy, Logical Challengers - Analytical, Realistic Maintainers - Strategic, Creative Explorers - Adaptability.

Poster #105

The Art of Creating a Neuroanatomy Companion

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Many students enrolled in Health Professions programs learned about the nervous system in Anatomy and Physiology. Knowledge of basic neuroanatomical terms is crucial to their understanding of clinical cases. To be successful as future healthcare professionals, students must appreciate the beauty and complexity of the external, as well as the internal morphology of the brain, brainstem and spinal cord. To promote active learning, we are developing a workbook designed to help students review key concepts. By creating drawings with a memorable, aesthetic quality, our innovative Neuroanatomy Companion reinforces student's understanding and retention of essential material while making learning more enjoyable.

Poster #106

Complete Brain & Spinal Cord Removal with Dural Sac & Dorsal Root Ganglia Intact

Ashley Aslo, ashleysaslo@gmail.com

Having a brain and spinal cord prosection with the dural sac and dorsal root ganglia still intact is a tool that can be used when teaching neuroanatomy at a range of different levels, from undergraduate to professional education. It can be difficult to remove these structures from the body without damaging them. This poster will highlight the dissection techniques used to complete the removal of these structures as well as elicit conversation for improvement of this technique so it can be replicated.

Poster #107

Osteoporosis: Porous Bone Disease and Reduction in Bone Mass A Simple Educational Model

Lakshmi Atchison, Chestnut Hill College, latchiso@chc.edu

Sponsored by MaLa Scientific

Osteoporosis is a progressive bone disease leading to porous bones, bone mass reduction, and susceptibility to high risk for fracture. An educational model is presented using two human diagrams rolled into tubes representing a) a normal/healthy individual, or b) one with disease/osteoporosis. The disease/osteoporosis individual is illustrated with pores. When the two tubes are positioned vertically and identical weights are placed on top, the normal/healthy individual will remain steady, whereas the disease individual with pores will collapse and fall like a person with osteoporosis. This simple demonstration shows the seriousness of osteoporosis that causes an individual to easily fracture and fall.

Poster #108

Cooperating to Clear Up Muddiest Points: Effects on Performance in Under-Represented Groups

Nancy Barrickman, Salt Lake Community College, nancy.barrickman@slcc.edu

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Research shows that performance in community college anatomy courses is significantly lower than other courses, and Evidence-Based Instructional Practices (EBIPs) may improve student outcomes. The purpose of this study was to investigate how EBIPs impacted outcomes for Salt Lake Community College students who identified as first-generation

or underrepresented minorities. Students identified their “muddiest points” regarding concepts covered during a two-week period, and the concepts were incorporated into cooperative, in-class quizzes. Student performance was tracked on exam questions that assessed comprehension of these concepts. Results inform best practices for teaching and learning in community college human anatomy and physiology courses.

Poster #109

The Physiology of Mythical Creatures: A Pedagogical Tool for Teaching Normal A&P

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Active learning enhances understanding and retention. Students were more engaged when faculty used disease states or disorders of normal function in beings such as Greek mythological creatures, science fiction characters or popular icons (superheroes), with the character serving as a familiar ‘hook’. In this study, students were asked to focus on normal anatomy and physiology and propose modifications which enhance human capabilities in the fictional creatures/characters. The efficacy of this approach was tested using several active learning methods: individual student homework questions, in class polling and small group scenario analysis or case study presentations.

Poster #110

Student Perceptions of Microscope Comfort and VARK assessment Do Not Predict Laboratory Practical Scores

Emily Bradshaw, University of Central Florida, emily.bradshaw@ucf.edu

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Student confidence and knowledge of their specific learning style may predict performance in the classroom. If so, then early assessments can determine which students may need more guidance. Students were asked at the beginning of a microscope based, upper level histology course to rate their comfort level with using a microscope and to complete a VARK survey to determine their learning style. Responses were grouped into low, moderate, or high confidence. Student performance on a practical based lab exam was compared between confidence groups and between different learning styles. Neither confidence levels nor learning style was correlated with student scores.

Poster #111

Preparing Students for Gross Anatomy Practical Examinations

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To enhance learning of structures and to prepare students for laboratory practical exams, we utilize two review methods. First, physical therapy students participate in a round robin review. Students divide into two groups. Group A students remain at their lab table demonstrating anatomical structures, while Group B students rotate through tables for peer instruction. Roles are then reversed. Secondly, undergraduate students participate in mock practicals. Structures are pinned; students identify the structures in writing. These methods allow for repetition and assessment of knowledge retention prior to exams. We will survey students regarding their perceptions of these methods.

Poster #112

Does Word Root Knowledge Impact Course Performance in Undergraduate Human Anatomy?

Patricia Brady, Johnson & Wales University, tricia.m.brady@gmail.com

We typically ask students to learn word roots early in their study of A&P with the belief that understanding word roots will aid in course performance. How rigorously has this hypothesis been tested? I will present data gathered on student performance in sections of Human Anatomy where word root study was embedded throughout the course compared to a control group that had no specific focus on learning word roots. Of particular interest is addressing performance in under prepared students. Comparison across groups of students in programs with different admission criteria are evaluated to examine this question. This is a preliminary study – collaborators welcomed!

Poster #113**Enhancing Supplemental Instruction Sessions with Adaptive Courseware Diagnostics and HAPS Teaching Tips****Carol Britson, University of Mississippi, cbritson@olemiss.edu**

An advantage of using adaptive courseware to support course objectives in Human A&P is the ability to link various elements of the courses (e.g., lecture, lab, supplemental instruction (SI) sessions, online homework, group study, and self-study) with a consistent platform. Diagnostic data were used to prepare a weekly report for SI leaders in which I wrote short explanations of where students were making errors in using their knowledge and provided HAPS Teaching Tips to help students prevent similar errors in the future. SI leaders used the diagnostics to deliver a personalized learning experience that has been well-received by students.

Poster #114**Oaks to Arteries: Principle-based Reasoning Varies with Physiological Context****Jack Cerchiara, University of Washington, cerchiaraj@gmail.com****Co-Author(s): Emily Scott, University of Washington, scottemi@uw.edu, Jenny McFarland, Edmonds Community College, jmcfarla@email.edcc.edu, Mary Pat Wenderoth, University of Washington, mpw@uw.edu**

In physiology, experts reason using disciplinary principles that span different contexts. We predicted that the students' principle-based reasoning would differ depending on the type and amount of context in a question. To test this, we gave students context-free, animal-context, animal context-heavy, plant-context, and plant context-heavy questions. Seventy-percent of students used principle-based reasoning in context-free, compared to 56% in animal context-heavy questions. In plant scenarios, 75% of students had sophisticated reasoning, greater than what was observed in animal scenarios. We demonstrate that the context of questions influences the level of reasoning students bring to solving problems.

Poster #115**Developing learning progressions in undergraduate physiology****Jennifer Doherty, University of Washington, doherty2@uw.edu****Co-Author(s): Emily Scott, University of Washington, scottemi@uw.edu, Jack Cerchiara, University of Washington, jackc44@uw.edu, Jenny McFarland, Edmonds Community College, jmcfarla@email.edcc.edu, Mary Pat Wenderoth, University of Washington, mpw@uw.edu**

To gain expertise in a physiology is to appropriately use fundamental principles. However, students often rely on factual recall rather than principle-based reasoning to solve problems. We used learning progressions as a theoretical framework to better understand how undergraduates develop principle-based reasoning in physiology, focusing on the principles of flux and mass balance. We developed two learning progressions that describe the many ideas students hold as they progress towards mastery. Instructors can use our learning progressions to tailor instruction to ideas students find challenging and in ways that shift student reasoning from primarily factual recall towards principle-based reasoning.

Poster #116**Novel and Inexpensive Method to Clean Anatomical Models****Carol Britson, University of Mississippi, cbritson@olemiss.edu**

Have the hands of time been unkind to your anatomical models? Replacing models just because they are dirty and grimy is fiscally and environmentally irresponsible, but what can you do when your models are in otherwise good condition AND all attempts at conventional cleaning have been unsuccessful? Before and after examples of models cleaned with inexpensive denture cleaning tablets and an overnight soak will be presented along with new models. Can you tell the difference?

Poster #117**Development of a Project Based Learning (PBL) Course – “Interdisciplinary Perspectives on Malaria”****Nalini Broadbelt, MCPHS University, nalini.broadbelt@mcphs.edu**

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This presentation will provide key information on the development of a project based learning (PBL) course. The major areas that will be addressed are (1) how to select a topic for a PBL course, (2) selection of relevant course content to fulfill the objective, (3) the course goals asked of the students, as well as the overall outcome goals, and (4) support needed from the university to get this project into the curriculum. In addition the communication strategy used by three faculty in different disciplines in order to bring the course together to be taught next semester.

Poster #118

Use of Student-Created Video Resources to Enhance Science Practical Skills Training

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Increasing academic diversity and student numbers has challenged traditional delivery of core practical skills. Utilising Objective Structured Practical Examinations (OSPE's), time spent delivering science practical skills has been reduced substantially. However, student-developed short video resources utilised before and after the practical class has enabled more effective use of practical class time. VLE data demonstrated high video utilisation and attainment was not adversely impacted. Feedback from anatomy, physiology and sport science students has been very positive. These results suggest that larger, diverse practical classes can be trained in a consistent and effective manner by using student-created video resources.

Poster #119

Bringing Science to Life – Teaching Metabolism through Augmented Reality

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We have developed an augmented reality application that allows the abstract processes involved in food digestion and metabolism to be visualised, thereby providing interactive and tangible models of the processes involved. Additionally the augmented reality experience was blended with physical documentation that allowed the integration of key concepts and ideas alongside the modelled content. This is the first app that we have developed in this way to aid in our teaching, and it is hoped to be the beginnings of a new way of learning conceptual processes in many areas of the life sciences.

Poster #120

Connecting the CNS to the PNS: Using Prosections to Teach Neuroanatomy

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Students often fail to see the connection between the central nervous system and the peripheral nervous system. As educators, we wanted to find a way to make this more transparent. To help students see the big picture, we have dissected a brain, spinal cord, optic nerves, eyes, cauda equina, brachial and lumbosacral plexus all as one prosection. The difficulty in doing this dissection is there currently isn't a set of guidelines for the whole project. Therefore, we have created a detailed guide for removing the CNS and PNS as one prosection to clearly display the intricate human neurological system.

Poster #121

Maria's Marathon: A Scalable Case Study For Use in the Undergraduate Classroom

Megan Sherbenou, Colorado Mesa University, msherbenou@coloradomesa.edu

This case study was developed to be delivered in-class to lower-division human anatomy and physiology students. The case study explores muscle fiber content, cardiovascular, and some respiratory effects of physical exercise. Specifically,

we step through the effects different types of athletic training on muscle physiology and health, and then how drugs might mimic or impair training effects. This case study was designed and piloted to be used in a variety of classroom settings, including very large undergraduate classrooms. Thus, learning objective can be assessed through a series of multiple choice questions via clicker or Scantrons.

Poster #122

Twitter, Evolution, Human Anatomy and Tinbergen: A Class Case Study

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Undergraduate anatomy labs rarely have curricular time to answer the “why” questions students ask: Why do we have an appendix? Why does cranial nerve XI enter and exit the skull? Why are humans susceptible to lower back pain and knee injuries? Using a modified version of Tinbergen’s 4 questions, an upper-level undergraduate course was developed to assist students with answering these “why” questions. Using the case study approach for anatomy review, live-tweeting and a final research poster as assessment, this course represents a committed approach to including evolutionary history into anatomy education.

Poster #123

Manifestation of Sexual Minority Identity in First-Year Medical Students

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How do sexual minority medical students navigate their first year of medical school? How do their sexual identities affect this learning environment and wellness? Two theories about underrepresented individuals offer general perspectives to social experiences. Queer theory establishes that sexual identity is a vital part of the human experiences, while minority stress theory indicates that minorities experience higher levels of stress in situations than their majority counterparts. How can these theories be used to be proactive and supportive of sexual minority students? This qualitative research examines first-year sexual minority medical students at Indiana University School of Medicine–Bloomington as they experience encounters with peers, instructors and LGBTQA+ specific curriculum. This research was approved by the Indiana University Institutional Review Board (IRB # 1810842950). Each sexual minority medical student volunteer completed 2 interviews about their experiences and were observed during a classroom activity. Thematic analysis of field notes and interview transcripts was performed. Five major themes of identity manifestation were identified and will be discussed in this poster: Advocacy, Representation, Ignorance/Disrespect, Heteronormativity, and Humor. A model for manifestation of LGBTQA+ identity in medical school is also proposed using the tenets of queer and minority stress theories. Understanding the unique experience of sexual minority medical students may provide instructors with more tools to better assist students during a major life transition.

Poster #124

Participation in Outreach Activities Enhances Undergraduate and Graduate Education

Leslie Stone-Roy, Colorado State University, leslie.stone-roy@colostate.edu

Experiential and service-learning benefit university students, and community outreach can provide both. Science-related outreach programs also may deepen student understanding of specific topics. At Colorado State University, students can volunteer to help with university led “Brain Awareness Week” activities at local middle and high schools. Participation in these events allows students to learn more about neuroscience, experience teaching in a small group format, and interact with younger students. Opportunities to create new stations or manage and train other volunteers are also available. Each of these experiences provides valuable learning opportunities that enhance university student education.

Poster #125

Does Screen Time affect the Academic Performance of University Students?

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To gather data for our study, we will invite students to participate in an anonymous online survey that was approved by our Institutional Review Board (IRB). Participants will be asked about their current GPA and GPA from past years depending on how long they have been in college. Other questions will cover different aspects of usage of electronic devices and how much time students spend on average per day using them. Our goal is to receive 700-750 completed surveys. Our poster will report on initial results of the study.

Poster #126

Research Critique and Poster Assignment

Justin Ulbright, Whitworth University, julbright@whitworth.edu

The skills of reading, understanding, and relaying health-related scientific research should be cultivated in students taking anatomy and physiology courses. This poster presents a two-part assignment where students locate an original research article, then give a written summary and critique of the article. Following the completion of the written summary, a poster presentation is given. The student learning outcomes are to 1) identify important information within the article, 2) formulate an original and insightful critique, 3) demonstrate professional writing mechanics, 4) deliver a presentation of the articles major points, and 5) adhere to all formatting requirements.

Poster #127

Roadblocks to Student Learning About Evolution - Cognitive and Cultural Challenges

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Student understanding of evolution is tenuous and challenged by several cognitive biases. Teleological reasoning is one such cognitive bias shown to disrupt student ability to learn about evolution. Teleological reasoning is the cognitive tendency to explain natural phenomena by their purpose, rather than by natural forces. This can lead students to assume that all traits are adaptations that evolved toward a prescribed endpoint. Therefore, students do not acknowledge the importance of trait variation, genetic drift, and gene flow in evolution. The current study presents data demonstrating that specifically interrogating students' biases in an evolution course improves student learning about evolution.

Poster #128

Wake up! Engaging Verbal and Nonverbal Autism Spectrum Elementary School Students in the Anatomy Academy Service-Learning Environment

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Children with autism flourish in a learning environment augmented by the presence of paraprofessional teachers and an engaged learning curriculum. We have developed Anatomy Academy, a community outreach service-learning program in which pre-professional students serve as paraprofessionals – Mentors – to teach concepts of anatomy, physiology and nutrition that inform and inspire their students to adopt a healthy lifestyle. We report that children with ASD become highly engaged in the Anatomy Academy learning environment as a result of a synergistic combination of interaction with caring and inspired Mentors, and an engaged curriculum teaching the wonders of the human body.

Poster #129

The Use of Virtual Reality Anatomy Resources in Undergraduate Anatomy and Physiology Education

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The Pennsylvania State University Hazleton Library and Biology Department collaborated to use Virtual Reality (VR) software and hardware in the Fall 2018 Anatomy course. The Hazleton campus does not have access to a cadaver lab, and dissection opportunities are limited. VR apps allow dissection of all organ systems. While previous research has reported pedagogically beneficial experiences related to VR used in Anatomy, preliminary findings from our study showed students did not feel the virtual dissection helped them to learn the structures despite a slight increase in exam scores from the previous year when VR technology was not available.

Poster #130

Evolution of a New Laboratory Experience in PSL 311L: Gastric Motility from Mouth to Anus.

John Zubek, Michigan State University, zubekjoh@msu.edu

Goals: The goal of this laboratory experience is to expose students to the many challenges the gastrointestinal system encounters during the course of food breakdown and motility. Rationale: Student laboratory experiences often focus on the digestive and absorptive aspects of the gastrointestinal system. While these are important, this comes at the expense of understanding how proper chewing, swallowing and gastric motility relate to one's overall systemic health. Lab station activities include: Mastication, Mock dental filling, Swallowing, Dysphagia, Smooth muscle activity, Longitudinal smooth muscle contribution to peristalsis, and Understanding defecation.

Poster Session 2: Thursday, May 23 from 2:15 – 3:15 pm in Exhibit Hall B

Poster #201

High Impact Experience in the Biomedical Sciences: Short-Term Study Abroad in Madrid & Paris

Emily Bradshaw, University of Central Florida, emily.bradshaw@ucf.edu

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Short-term study abroad courses have a variety of benefits including increased student retention, improved critical thinking skills, and a greater appreciation for the history of science and other cultures. This project describes a short-term study abroad course, "Icons of Neuroscience." Eight students from a university attended a nine day trip to Madrid, Spain and Paris, France to see historical laboratories of Santiago Ramón y Cajal, Jean-Martin Charcot, Marie Curie, and Louis Pasteur. The development of a study abroad trip, overall experiences of students, and suggestions for faculty members interested in designing a similar trip will also be discussed.

Poster #202

Novel and Economical Shoulder Model for Bursae Injections

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The numerous synovial joints and bursae of the shoulder are the site of many sports injuries and often require specialized training to diagnose and inject. An injection into any of the bursae of the glenohumeral joint can cause permanent damage if performed incorrectly. Teaching models for shoulder injections are expensive and can be inaccessible for small programs. Our goal was to create an ultrasound compatible, cost-effective shoulder model to be used for demonstration and teaching purposes. We gathered qualitative data from licensed instructors to analyze the usefulness of our model in practice.

Poster #203

Challenges Encountered When Integrating Case Studies Across a Foundational Anatomy and Physiology Sequence

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Our majors take a 3-course introductory sequence (Anatomy, Physiology 1 & 2). One challenge is students often see these as isolated experiences and fail to recognize how concepts fit together within and across courses. Students can also have difficulty appreciating the real-world relevance of concepts. To address this, we began developing two integrative, interrupted case studies following one patient with celiac disease and another experiencing stress across the courses. These allowed us to address key learning objectives in the courses. We will discuss preliminary pre/post and student attitudes data, along with challenges that surfaced with broader faculty implementation.

Poster #204

Assessment of Student Use of Learning Tools

Pat Clark, IUPUI, patclark@iupui.edu

Students usually have a variety of study tools available, but what do they actually use? And do they change what they use as they progress through the semester? If instructors want to help direct their students towards more effective resources, they must first know what students think is effective for them. Students in a non-major sophomore level physiology course were surveyed prior to each of 5 exams to determine what they identified as their key study tools and if their used changed over the semester.

Poster #205

Production of Interactive Pelvis Plastinates

Mark Cook, University of Minnesota, cookx072@umn.edu

The anatomy of the pelvis is complex and difficult to visualize from conventional two-dimensional anatomy pictures. Advancements in the development of novel educational innovations, such as three-dimensional (3D) computer models, have helped many students understand the organization of the pelvic region. However, cadaveric dissection remains the "gold standard" for understanding the construct of the human body and its variations. Pelvic dissections are relatively difficult and time-consuming and student's dissections are often incomplete. In this study, an innovative cadaveric dissection technique is described in which the pelvic bones, ligaments, viscera, blood vessels and nerves can be removed and plastinated separately to provide the student with an interactive pelvic model experience.

Poster #206

Metacognition and Science Identity in Anatomy Labs

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This project sought to investigate how attention to improving student metacognition in a cadaver-based anatomy course can benefit their science identity and exam scores. Aspects of intervention included, but were not limited to, metacognition presentations, metacognitive-based review sessions, as well as post-exam reflection worksheets. A group of students enrolled in Northern Illinois University's cadaver-based functional anatomy course were included in the study. Both the control and treatment groups had the same lecture instructor, teaching assistant, lecture format, and laboratory protocol. The students' sense of science identity was measured before and after the introduction of metacognition instruction and activities. Four unit exam scores were collected throughout the course of the semester. Initial data analysis shows that although metacognition instruction does not have a large impact on science identity, it does positively affect exam scores even with a limited sample size. Apart from content illustrated by the poster presentation, attendees will also have the opportunity to learn more about and view resources utilized in the study, including various exercises and worksheets.

Poster #207

Using Student Response Systems to Improve the Effects of Cooperative Learning in Anatomy and Physiology Students at a Community College

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We are investigating whether Student Response Systems (SRS) use to facilitate group discussion increases exam scores. Many studies regarding SRS use rely on anecdotal reports to determine their effectiveness, this comparative study will elucidate empirical results of SRS usage (i.e., exam scores with and without the use of SRS). Most studies citing an improvement in class scores related to SRS use are actually introducing and measuring the use of active learning techniques. This study will compare the use of an active learning technique, with and without the use of SRS, to determine if SRS use increases student exam scores.

Poster #208

Ceci N'est Pas Un Crâne: the Influence of Contemporary Art Styles on Medical Diagrams from 2000 BCE to Present Day

Julie Doll, Midwestern University, jdoll@midwestern.edu

Throughout history, art has been used to record events, ward off spirits and honor gods, and demonstrate scientific concepts. Anatomists and artists have a long, complex relationship with both parties consulting each other still today. Art schools hire anatomists to ensure their representations of the body are accurate and education companies hire artists to create comprehensible images. As a result, medical diagrams reflect the artistic era in which they were created. A group of undergraduate students was instructed in recognizing anatomical features in art and traveled to the Louvre and Musee d'Orsay to locate specific works of art discussed.

Poster #209

Hybrid Virtual Kinesiology Laboratory Module Improves Students' Understanding of Integrative Musculoskeletal

Anatomy and Exercise Physiology Concepts

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Digital learning tools have become increasingly popular in anatomical education. Virtual dissection tables can prove especially useful and cost effective for institutions that do not have access to cadaveric material. This study explored the curricular implementation of a hybrid virtual kinesiology lab module with undergraduate anatomy and physiology students at a liberal arts college. The module included a virtual dissection of back and upper and lower extremity muscles and an exercise physiology component using the Wingate and accumulated oxygen deficit tests. Students were administered pre- and post-tests. Initial results indicate positive increases in students' performance between pre- and post-tests.

Poster #210

Solve the Case! Case-Based Cumulative A&P Review as a Penultimate Learning Activity

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Opportunities that support creative, engaging teamwork can make learning fun. We created a case-based instruction session with groups of students working through a series of cases. Cases chosen from a variety of sources were standardized by re-formatting into a one-page document. Each case focused on one organ system but also illustrated a specific connection between at least two organ systems. When possible, cases also included physical exam and laboratory data for interpretation. For efficient grading, a one-page answer sheet was utilized. Our hope was that this activity would encourage review in a fun and relatively low-stress environment.

Poster #211

To Poll or Not to Poll? Assessing the Impact of Interactive Polling Versus Group Discussion on Student Engagement and Learning

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Active learning is known to promote student depth of knowledge, engagement in the classroom, and retention in the sciences. The purpose of this project was to compare the effectiveness of two different active learning strategies: 1) problem-based learning using interactive polling of individual students interspersed in between brief lectures 2) team-based learning using group discussions after an in-class hands on activity that illustrates a physiological concept. Targeted learning objectives were assessed by ranking exam questions using Blooms taxonomy on separate exams and again on a cumulative final exam. The effectiveness of each strategy was determined by student performance on exams.

Poster #212

Stature Estimation from Facial Anthropometry of Igbo People in Abakaliki, Southeast Nigeria

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The study estimates the height of Igbo people in Abakaliki, Nigeria from their facial parameters. The facial length; nasal length, breadth; bizygomatic diameter of a sample of 669 males and 331 females whose age-range falls within 12 years to 45 years were measured with a pair of metal spreading calipers. The bizygomatic diameter showed stronger correlation ($r = 0.55$) with stature ($p < 0.01$) and gives better prediction of stature than others. This could be useful in forensic investigations. KEY WORDS: Bizygomatic diameter, Facial length, Nasal length, Nasal breadth, Abakaliki, Stature.

Poster #213

Use of a Bookend Think-Pair-Share EBIP in a Community College Human Physiology Class to Improve Scores and Academic Self-Efficacy

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Pre-clinical community college physiology students have difficulty with causal reasoning and interpreting data. Evidence-based instructional practices (EBIPs) (e.g., think-pair-share) have been shown to improve performance and may address this gap. The purpose of this NSF-funded (CAPER) study was to investigate the impact of a bookend, think-pair-share technique on student sense of academic self-efficacy, anxiety and performance, as assessed by surveys and performance on exam questions. Specifically, we asked a question, allowed students to answer, taught the concept, and repeated the question, allowing time for think-pair-share and class discussion. Both quantitative and qualitative results will be presented as available.

Poster #214

iPad Use for A&P Lab Practical Exams Does Not Have a Negative Impact on Scores

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iPad technology provides a new platform for test taking. We asked whether the use of iPads with Respondus lockdown browser for test taking in Human Anatomy and Physiology I Labs would have a negative effect on practical exam scores. All students were administered a standard visual lab practical with stations displaying anatomical models or histology slides on microscopes. We compared grades of one cohort of students who took paper practical exams (n=173) to a cohort of students who used iPads (n=132) to record their answers. We found that using iPads for lab practicals did not lower average exam scores.

Poster #215

The Influence of Healthy Eating Habits on the Academic Performance of University Students

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The biannual national youth risk behavior study has shown that health behavior has an impact on the academic performance of high school students. The National College Health Assessment focuses on factors that can be stressful for students, but doesn't look at dietary choices or academic performance. Study participants will be asked about their current GPA and GPA from past years in addition to questions about their eating habits. Our goal is to receive 700-750 completed surveys. College students have control over their nutrition, which is why the results of our study will be important for efforts to educate university students about the benefits of healthy eating habits.

Poster #216

Distance Learning and a Flipped Classroom in Gross Anatomy

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There is an ever expanding need for well trained health professionals to provide quality health care to the underserved regions in the state of Kentucky. In order to address this need, the College of Medicine and the College of Allied Health at the University of Kentucky have established external campuses in different regions around our state to train medical professional students. Gross anatomy is a core course in the curriculum of the Physician Assistant program at the University of Kentucky. The current gross anatomy course is comprised of didactic lectures, formative feedback activities, and a full dissection laboratory experience. Historically for students on external campuses, didactic lectures have been provided by using basic distance learning technology. The instructor would lecture from the campus in Lexington Kentucky and the students would watch the lectures in a classroom on the external campus. For laboratory session the instructor would travel to the external campus to conduct the laboratory. Since spring 2015 we have employed a variant of a flipped classroom model to teach the gross anatomy course to Physician Assistant students on the external campus in Morehead Kentucky. Here we report the organization of the current gross anatomy course, how a flipped classroom model can be used in conjunction with distance learning technology, our experiences using this approach, and student feedback.

Poster #217**Use of Lasers to Identify Delicate Structures in the Human Anatomy Laboratory****Kelton Friedel, Weber State University, keltonfriedel@mail.weber.edu****Co-Author(s): Thomas Odenwalder, Weber State University, thomasodenwalder@weber.edu, Brian Chung, Weber State University, brianchung@weber.edu**

Identifying cranial nerves and other central nervous system structures can be particularly challenging and is often done through numbered pins. However, the pinning method is destructive to these delicate structures. We worked in collaboration with our Engineering college to develop a multi-articulate laser pointer apparatus specifically for use in these situations for quizzes and exams. A number of lasers could then be aimed at specific anatomic structures and activated by students sequentially. This innovative, non-destructive, low-cost and collaborative design allowed a single cadaver to be used for multiple quizzes and exams throughout the semester.

Poster #218**How Painted Bones Aid Undergraduate Students in Learning the Human Skeletal System****Shelby Geilmann, Weber State University, shelbygeilmann@mail.weber.edu****Co-Author(s): Maya LeeMaster, Weber State University, mayaleemaster@mail.weber.edu, Brian Chung, Weber State University, brianchung@weber.edu**

Effectively and efficiently teaching the various structures on skeletal bones is a challenge for undergraduate laboratory teaching assistants. Since bone structures are often unmarked on most models, we painted these surface features to aid our undergraduate laboratory instructors and their students. Instructors were surveyed about their teaching experience with painted versus unpainted bones. Student quizzes and exams from previous semesters were compared to determine if painted models aided in learning. Our preliminary evidence indicates that while the student lab instructors preferred teaching with the painted models, there was not a significant difference of student scores.

Poster #219**Do Student Grades Truly Reflect Their Skill Set?****Tejendra Gill, University of Houston, tgill@uh.edu**

Students in Human Anatomy and Physiology labs earn their grades by performing different activities. In general, student performance is assessed based on, (i) Physical examination of body system, organs, and tissues (models and slides), (ii) Physiology experiments and dissections, (iii) Hands-on practical exams, and (iv) Online quizzes. Students get an opportunity to utilize their specific skill set(s) to maximize their performance. Analysis of the student grades on various activities reveals that a majority of students score high on the hands-on activities than on the online portion. It is, therefore, imperative that delivery of hands-on and online components is well balanced to allow the students to not only perform well on the tests but also gain and retain the information over long term.

Poster #220**Fats are Friends, not Foes****Bridgit Goldman, Siena College, bgoldman@siena.edu**

Lipids are an integral component of our bodies. The myriad forms of lipids allow them the versatility to perform countless functions including maintenance of cellular integrity, flow of proper neural conduction, efficient fuel storage, and cell signaling. Proper anatomical structure is needed for optimal physiological function and requires a diet composed of lipids of the right kind and in the correct quantity. Here we present how dietary lipids are incorporated into our anatomy which can either help or hinder our physiology. Our goal is to link basic biochemical facts with emerging data on how dietary lipid source, state of oxidation, and conformation influence the overall health of humans.

Poster #221**Muddiest Undergraduate Human Anatomy Practical Items: An Evaluation of Undergraduate Human Anatomy Practicals for Most Missed Items.****Camryn Hawkins, The Ohio State University, hawkins.432@osu.edu**

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For most undergraduate human anatomy courses with a cadaver lab, student's study items on prosected cadavers, and their anatomical knowledge is tested through a laboratory practical examination. Often times, students struggle differentiating items of different tissue types that look similar (i.e. arteries, veins, and nerves). This study evaluated past practical examinations from the Anatomy 3300 Advanced Human Anatomy for Undergraduates course at the Ohio State University, to assess the items students struggled identifying most often.

Poster #222

Department Education Specialists in Integrative Physiology: A New Approach to Sustaining STEM Transformations

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Over a 10-year span, the Department of Integrative Physiology was successful in improving undergraduate education through implementation of evidence based teaching approaches with the guidance of embedded Science Teaching Fellows (STFs). In 2011, external funding for STFs ended. Without the leadership, educational expertise, and support these unique individuals provided, a key question for IPHY was how to sustain and build on the progress that had been made. We highlight the process that our department took to formally adopt the use of internally supported Department Education Specialists (DEs) as a way to sustain curricular reform efforts.

Poster #223

Pre-Health Professions Students' Knowledge of and Attitude toward Holistic Medicine Practices

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There is a lack of studies looking into the knowledge of and attitude towards holistic medicine practices among undergraduate students in the health professions in the United States.

Our survey asks about participants' general attitude towards holistic medicine, which practices they are familiar with, whether they expect to learn about holistic medicine practices in their major, and which practices they plan on integrating into their future careers as health professionals. We are hoping to receive 300-350 completed surveys.

The results will show whether teaching holistic medicine practices should be added to the curriculum for health professions or, if they already are in the curriculum, whether they need to receive more attention.

Poster #224

Visualizing Cervical Effacement and Dilation: A Balloon Activity

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During pregnancy, the cervix is long, thick and resistant to stretch thereby helping to retain the fetus in the uterus. For birth to occur, contractions of the uterine muscle cause cervical effacement, in which the cervix thins and retracts upward into the uterus. Longer, more frequent, and more intense uterine contractions cause the cervix to dilate from ~0.3cm diameter to a diameter of ~10cm to allow the fetus to pass into the birth canal. The poster describes an active learning activity using a balloon and ping-pong ball to help students to visualize and distinguish between the concepts of effacement and dilation of the cervix.

Poster #225

Community College Anatomy and Physiology Education Research

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The Community College Anatomy and Physiology Education Research (CAPER) project is a NSF funded program that aims to promote evidence based instructional methods, such as guided inquiry and cooperative group learning. Participants first engage in the HAPS I course Introduction to Education Research Methods, where individualized classroom research projects are designed. Next, instructors implement their research projects within the community colleges. And finally, each instructor publishes their results by presenting a poster at the HAPS Annual Conference and submits manuscript to the HAPS Educator. Along the way, all the instructors have support from mentor and experts in education research.

Poster #226

Photogrammetry as a Method for Producing Interactive 3D Digital Models of Laboratory Specimens

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Photogrammetry is a technique that generates an interactive three-dimensional (3D) models from a series of photographs. This method can be used in a cost-efficient manner with a variety of free or low-cost software options, digital photography with common mobile phones, and standard laptop computers. Additionally, little expertise is necessary. The proposed application is to provide students ubiquitous access to interactive digital models of the same plastic lab models, organ specimens, or cadaveric specimens used in the laboratory.

Poster #227

Flipping the Classroom: Nursing Students' Performance and Satisfaction in an Anatomy and Physiology Course

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The aim of this study was to determine the impact of a flipped-classroom method on learning outcomes and satisfaction of nursing students in an anatomy and physiology (A&P) course. Flipped classroom approach was used in teaching the respiratory system with 49 first-year students at College of Nursing, Oman. Students' mean scores of the respiratory system items in the final examination have improved significantly after a flipped classroom method compared to a control group. Moreover, students were satisfied with the flipped classroom. Flipped classroom approach is a valuable teaching strategy that can improve students' performance and satisfaction in an A&P course.

Poster #228

Educating and Employing Undergraduate Students as Lab Assistants in Graduate-Level Gross Anatomy Courses

Karen Kelly, Milligan College, klkelly@milligan.edu

The MSOT and MSPAS programs at Milligan College, a small liberal arts college in east Tennessee, have anatomy courses that include dissection of anatomical gift donors. Since 1998, we have been educating undergraduate science majors to act as lab assistants in these courses. Their responsibilities include prosection, demonstration of the prosections to the graduate students, and guiding those students through the dissection process. They are paid for their work and receive course credit. Professors, lab assistants, graduate students, and the college all benefit from this program as well as the graduate programs these lab assistants often enter.

Poster #229

Does a Critical Review of Scientific Literature Improve Student Skills?

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Critical thinking is a necessary skill needed by students to be successful in their careers as future healthcare professionals. There are several unique approaches that can be used by faculty to increase the students' skills. In

lecture, activities designed to use current events and relate them to scientific material have helped students to think more critically about scientific current events portrayal in the media. This poster will present data on several variables that contribute to student success.

Poster #230

Using infographics to revitalise a physiology communication skills assessment

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Poster assignments challenge students to deliver clear and detailed scientific information. Infographics can communicate complex concepts in simple graphical form to broad audiences. Students presented a physiology project using an infographic online and in print form. Students chose the topic, used free software and were invited to complete an anonymous questionnaire on the experience. Feedback suggests that simplifying the science was challenging but this format encouraged greater thought and critical analysis of their own work, communicating complex concepts more effectively than traditional posters. This approach has revitalised a physiology project assignment, enthused students and broadened communication and transferable skills.

Poster #231

"Mini OSPE" practicals to prepare students for examinations involving human subjects

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OSPEs (objective structured practical examinations) are common in medical education, and have been adopted into honours sport science teaching, developing skills linked to time management and interaction with patients/volunteers. Interaction with volunteers is important in Sport Science, because interaction with volunteers is an integral part of research. A simplified OSPE measuring volunteers' blood pressures was introduced to third year teaching to provide earlier exposure to such experiences. Proper technique, interaction with "volunteers" and professionalism are the main assessment criteria. Student feedback illustrates that, despite initial anxieties, the exercise is perceived as useful and helps build confidence interacting with people.

Poster Session 3: Friday, May 24 from 9:45 – 10:45 am in Exhibit Hall B

Poster #301

Writing to Learn: Editing Anatomical Content in Wikipedia

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Recently, the number of students at both the graduate and undergraduate level editing Wikipedia grew steadily. This rise, driven by Wikipedia's educational tools, the increased focus on writing as a vehicle for deep learning in STEM, and an emerging focus on effective science communication led to significant growth in Wikipedia's biological content. This presentation utilizes examples from three semesters of an upper division comparative anatomy course to demonstrate how student editing of Wikipedia not only improves its anatomy-based content, but is also a potentially highly effective teaching tool.

Poster #302

Skeletal Muscular System Coverage in Undergraduate Human Anatomy and A&P Courses, Part I: General Instructional Trends in Muscular System Coverage

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Anatomical content coverage across undergraduate human anatomy and A&P courses is widely variable. A previous study by Saladin (2008) assessed muscle coverage (n~20) via self-report in response to a listserv question. Given the need for a more global understanding of the content taught in undergraduate anatomy courses, we prepared a muscular system survey for which the data provide that identification of muscles is taught more frequently than actions, followed by innervation. We also present which muscles are taught with greater frequency (e.g., sternocleidomastoid is the most frequently taught muscle of the head and neck region).

Poster #303

Skeletal Muscular System Coverage in Undergraduate Human Anatomy and A&P Courses, Part II: Comparisons Between U.S. and International Institutional Coverage

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Previous studies assessing differences in muscular system coverage have been limited due to small sample sizes and incomplete representation. This poster summarizes and compares general trends observed in muscular system coverage between stand-alone anatomy and A&P courses based in the U.S, and those taught internationally. Comparative data analysis provides that both U.S and international stand-alone anatomy and A&P courses tend to require students to learn specific muscles and compartments of general regions (i.e. upper limb). However, U.S. courses place less emphasis on specific body regions, one specific example being the hand.

Poster #304

Skeletal Muscular System Coverage in Undergraduate Human Anatomy and A&P Courses, Part III: Comparisons Between Stand-alone Human Anatomy and A&P Courses

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Undergraduate anatomy and A&P courses vary in depth and breadth of skeletal muscle system coverage, yet little data has been collected about these differences. To address this data deficit, the authors developed a skeletal muscular survey (presented at HAPS 2018) and received complete responses from 115 anatomy and 143 A&P courses. When comparing stand-alone anatomy versus A&P courses, both were similarly likely to teach specific muscles and

compartments across broad muscular regions. However, anatomy courses required students to identify more specific muscles in each region than A&P courses. Additional data comparisons between these two types of courses will be presented.

Poster #305

Skeletal Muscular System Coverage in Undergraduate Human Anatomy and A&P Courses, Part IV: Comparisons Between Community Colleges and Four-year Universities

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In response to the need for a more thorough understanding of the content taught in undergraduate anatomy (and A&P) courses across various institutions, a muscular system survey allowed Anatomy faculty to report the extent to which they discuss skeletal muscles in their courses. This poster compares muscular system coverage trends between community college (n~90) and four-year university (~130) Anatomy (and A&P) courses. In general, there are more similarities in content coverage than differences. Yet one difference found is that community colleges more frequently teach muscles via compartments paired with grouped actions.

Poster #306

Factors Influencing Osteoarthritis and Preventative Treatment Recommendations for People with Traumatic Transtibial Amputation: A Systematic Review

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Long-term lower extremity prosthetic use has been linked to secondary conditions, including osteoarthritis of the intact limb. The purpose of this review is to determine strategies for reducing the incidence of osteoarthritis in individuals who have undergone traumatic unilateral transtibial amputations. The literature supports the following recommendations: loading the intact joints, weight distribution training, cardiovascular training and weight management, and the use and reevaluation of appropriate prostheses. Therefore, a perioperative exercise routine, regular follow up rehabilitation, and regular prosthetic evaluation may be recommended. Further evidence is needed to evaluate the outcomes of these preventative strategies.

Poster #307

The Effect of Negatively Worded Stems on Item Difficulty and Discrimination

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Flawed multiple choice questions, such as those with negatively worded stems (i.e., questions including not or except), are quite common on assessments in health-related professional programs and may influence student performance. The purpose of this study is to determine if there is a difference in item difficulty and discrimination on medical histology questions with negatively worded stems compared to positively worded stems. To achieve this, seven histology exams from the 2017-2018 school year were analyzed. Results of this study should guide instructors in writing multiple choice questions that are well designed and follow current question writing guidelines.

Poster #308

Tutorial Anatomy Podcasts as Study Aids

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Harper College anatomy students are challenged with limited lab time and conflicts that reduce the necessary hands-on experience with lab models to master the required knowledge. We produced video podcasts that display individual closeups of Harper's lab specimens with tutorials on the targeted information required for lab exams. These tutorials address the first two of three lab exams, which tend to define a student's final course grade and most strongly

contribute to attrition. They are posted for easy accessibility by students on all computers and mobile devices, allowing them to be more efficient learners during scheduled lab times.

Poster #309

Does Size Really Matter? A Comparison of Class Size and Student Outcomes in Introductory Physiology Courses

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It's often thought that small class size resulted in better student success. This study examined student outcomes for physiology courses of different sizes (30 students vs. 200+). Both courses were taught by the same instructor, using the same teaching and testing materials. Class size was the only significant variable. A pre-test determined all students had a similar knowledge base. Exam grades (overall and individual questions), lab grades, and final course grades were compared. These parameters showed no significant difference between the courses, with students showing similar levels of success and satisfaction. Class size may be far less significant than teaching methodology (eg. Case studies, inquiry-based) in determining student success.

Poster #310

Writing Higher Order Assessment Questions for an Undergraduate Anatomy Laboratory

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Basic Human Anatomy (A215) at Indiana University is a 200-level course with both laboratory and lecture portions. Students attend two labs per week and examine anatomical models, virtual microscopy, and cadaver demonstrations to learn relevant structures. Currently, students are assessed via four practical exams, each consisting of 40 purely identification questions. Instructors of A215 identified the need to include higher order questions on laboratory exams. A collaborative research group consisting of 2 undergraduate students, 2 graduate students, and 1 faculty member used current literature to guide the writing of higher order questions to be used on future A215 lab exams.

Poster #311

The Effects of Immediate Feedback on Success Rates of Anatomy and Physiology Students at a Community College

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We are investigating whether the immediate feedback provided by the use of Student Response Systems (SRS) increases student success as identified through exam scores. This comparative study will provide planned group discussions, a known effective teaching practice, to all students in a community college A&P course. One-half of the students will also utilize SRS. Evidence of any additive effect produced by the SRS will be examined by comparing unit exam scores between the SRS and non-SRS students.

Poster #312

Understanding Resource Use Related to Self-Regulation in an Introductory Physiology Course

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While actively learning, maximal success occurs when students set goals, enact strategies, monitor progress, control motivation, and reflect on their performance – in other words, they demonstrate self-regulated learning. In this work we leveraged NUDGE, a learning app created to promote self-regulated learning by sending prompts to students. This tool was used in a large introductory physiology course. Student surveys assessed their experiences using NUDGE and other resources. Results examine course performance in relation to student perceptions of resources and provide insight to the future use of resources to promote success in content and self-regulated learning in large, introductory physiology courses.

Poster #313

Using Drawing as an Active Learning Activity in Undergraduate Human Anatomy

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STEM students in large lecture courses encounter various difficulties including lower levels of engagement and course performance. To combat this, faculty employ active learning strategies as evidence suggests these strategies increase student retention, engagement, and lessen the achievement gap of underrepresented minorities. In SUU's Physiology and Anatomy courses, we are working toward implementing active learning components. Across two semesters, we gathered data from students to identify this strategies efficacy. One section of each class implemented activities focused on students drawing the content covered while the others remained a traditional lecture. Our poster presentation will report the implementation of this strategy.

Poster #314

Use of Mannequins to Aid in Teaching the Human Anatomy Laboratory

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Teaching anatomic surface regions and sense fields can be challenging, particularly for undergraduate teaching assistants. Rather than relying on unidimensional pictures, we employed fashion mannequins in our anatomy laboratory in effort to improve these lessons. Removable tape was used to identify body surface regions, after which, the tape was removed for quiz and exam purposes. Skin sense fields were identified through the use of different colored paints. Undergraduate lab instructors found these methods to be particularly helpful in conveying the information to their students. In conclusion, the use of mannequins provides a novel method to immerse students in anatomic pedagogy

Poster #315

KHFAC Nerve Blocking in Frog Sciatic Nerves

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Electrical nerve stimulation is an emerging treatment for muscular pain alleviation. Kilohertz frequency alternating current (KHFAC) nerve blocks have shown to effectively block the selected nerve with minimal adverse effects. Under certain conditions, a KHFAC block may provoke a depression of nerve conduction that persists post-treatment, perhaps due to an accumulation of metabolic products that inhibit immediate nerve conduction recovery. Our study will measure the concentration of metabolic products after nerve block to determine if the concentrations changes would warrant nerve deactivation. *Rana temporaria* were pithed and sciatic nerves placed between two stimulating electrodes to collect compound action potentials to compare nerve conduction blocks between experimental and control groups.

Poster #316

Wikipedia as a Resource for Teaching Human Anatomy

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Since its inception in 2001, the quality of Wikipedia entries has greatly improved to the point where entries for certain topics rival traditional encyclopedia entries in quality. To formally evaluate if Wikipedia could be used as a course resource for undergraduate human anatomy, I critically examined 968 anatomy Wikipedia entries on the basis of accuracy, nuance, clarity, and informativeness, and assessed coverage by comparing lists of high- and low-quality articles to course syllabi and HAPS Anatomy Learning Outcomes. Although there are a few subject areas where it excels, Wikipedia has a long way to go to replace an anatomy textbook.

Poster #317

Investigating the Domestication Syndrome: A Study for the Human Anatomy Laboratory

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Domestication Syndrome is the shared physical appearance of domesticated animals when compared to their wild relatives. Students compare the skulls of ancestral wolves to dogs, their domesticated counterparts, to determine the changes that characterize domestication. Students then examine and compare the skull of Neanderthal to that of a modern human for these same features to determine if domestication has shaped the evolution of modern humans as recent research has suggested. The exercise ends with an explanation on how modification of neural crest cells accounts for the characteristics of domestication and how self-domestication was advantageous in the development of human society.

Poster #318

The Anatomy of Lab: Factors Affecting, Causes of, and Student Motivations for Leaving Anatomy Lab Courses Early

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SUU has a cadaver based anatomy lab allowing students to attend multiple labs. Students, however, do not take advantage of this and leave lab early or do not attend additional review sessions. Early research suggests those who leave early score lower in the course than those who stay the whole time or those who come extra lab sessions. Extra attendance of these increases overall grades from .5% to .7% per session. To explore this, researchers administered a survey to identify the factors affecting their lives and the course. Our poster will present our continued efforts and results toward this.

Poster #319

"Meet the Patient": A Novel Case Based Teaching Format for the Basic Sciences

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Student evaluations suggest a preference for the involvement of real patients in case-based learning during preclinical medical education. In this study we evaluated student satisfaction and preferences regarding the participation of real patients in the pre-clinical Endocrine System course. 'Meet the Patient' interactive case sessions were structured around real patients, each with a different endocrine condition. We found that >90% students agreed or strongly agreed that these sessions helped better understand pathophysiology of disease processes, disease diagnosis, and management. In conclusion, real patient integration in preclinical medical education is a student preferred and effective method of solidifying key physiological concepts.

Poster #320

Spatial Visualization of Human Anatomy through Art

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This study examines whether technical drawing exercises can improve spatial visualization and therefore enhance anatomy education. First year medical students were separated into a control or art-training group. Those in the art-training group solved technical drawing worksheets during four art-sessions. A pre- and post-Mental Rotation Test (MRT) assesses changes in spatial visualization, the neurology lab and written exams assesses anatomy knowledge. Greater improvement in the MRT scores and better performance on neurology exams is expected for the students in the art-training group. Spatial visualization is utilized in learning anatomy may also be beneficial in certain surgical and radiological fields.

Poster #321

Impact of On-line and In-Class Activities on Class Average in Anatomy and Physiology in Nursing Students

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Anatomy and physiology are considered the foundational courses and essential components in medical, nursing and other health-related curriculum. Previous studies have discussed the indispensable importance of these courses, yet debates arise regarding the most effective teaching method and the impacts of these methods on students' knowledge improvement in these courses. Using an array of knowledge testing including on-line, in-class quizzes and student-interactive approaches, the present study reveals that these methods significantly increased their mean class average of mid-term and final examinations (P

Poster #322

A Potentially Lower-Cost Alternative to Cadaver Immersion Tanks for Long-Term Cadaver Storage

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Storage of prosected cadavers is challenging due to the size and costs of cadaver immersion tanks, and many programs resort to spraying wetting agent instead. We sought a lower cost alternative to immersion tanks by collaborating with our peer College of Engineering, Applied Science & Technology and we have designed a potentially viable, long-term cadaver storage unit that combines an automated fluid spray and recycling system on a presentation table that uses our current cadaver gurneys. This collaboration can be produced by engineering students as a Senior Project while coupling significant financial savings to ease of long-term cadaver storage.

Poster #323

Acting Out Negative Feedback in Hormone Pathways

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We created a kinesthetic learning activity in a 1000-level Anatomy & Physiology lab to enhance student's understanding of negative feedback pathways in the endocrine system. Students were assigned roles as a hormone or gland in one of three different hormone pathways in which they had to move throughout the room to stimulate or inhibit secretion of hormones from other glands. They then worked together to draw negative feedback loops and interpret mock animal experiments based off of their learning activity. This activity helped student relate negative feedback pathways to lecture material and gave them a better understanding of the endocrine system.

Poster #324

An Acute Bout of Exercise Improves Mood and Enhances Trust

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We examined if a brief session of exercise elevates mood or judgments of the trustworthiness of others. Thirty female subjects each completed two trials, only one of which involved 20 minutes of moderate exercise on a stationary bicycle. At the conclusion of the twenty minutes, subjects completed a brief Profile of Mood States and judged the trustworthiness of ten faces in photos. Participants demonstrated higher levels of positive moods and lower levels of negative moods with exercise. Judgments of the trustworthiness of others were also higher in the exercise condition. Participants' mood scores correlated with their trust scores after exercise.

Poster #325

Physical Therapy and Regenerative Medicine: Current Knowledge and Future Prospects

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Pathologies affecting the central nervous system (CNS) leave patients with life-altering disabilities. Research demonstrates that regenerative medicine (RM) and physical therapy (PT) techniques can provide structural and functional improvements; however, there is limited research evaluating the combined approach. The purpose of the study was to evaluate the efficacy of using the combination of RM and PT and its impact on therapeutic outcomes for patients with CNS disorders. Using PubMed and Google Scholar, a systematic review was conducted and ranked using the Oxford Levels of Evidence. We surmised that combination of RM and PT could facilitate treatment of CNS injuries.

Poster #326

The One2One - Evaluating the Efficacy of a Structured Oral Assessment

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Structured oral exams result in better student examination scores, but there lacks quantitative evidence supporting knowledge retention, and student satisfaction with this format remains anecdotal. One2One Assessments, during which students present prepared answers to an evaluator, are anticipated to improve student retention of content while being positively rated by students. At semester's end, multiple choice questions will assess knowledge gained in the One2One as compared to control content. Student satisfaction will be rated using quantitative scales and thematic analysis. The One2One is a valuable tool in assessing student knowledge and results in positive student rating of the education tool.

Poster #327

Teaching A & P Abroad - Lessons for Working With ESL Students

Vicky Rands, Salt Lake Community College, vicky.rands@slcc.edu

Teaching Physiology to international students in China for 2 years, I learned a lot about use of the English language. Students from across the Far East and India attend Medical School in China where classes are taught in English. This mix of cultures with a variety of first languages emulates our classrooms in America. From funny mishaps to careful wording on test questions, this poster provides helpful suggestions about word use and accommodations for ESL students in your classroom.

Poster #328

The Cardiovascular Effects of Digitalis on Rana Temporaria after Photoperiod Acclimatization

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Currently, there is no diversity in Digitalis administration for patients with congestive heart failure. And, although Digitalis is considered safe, it has a very narrow therapeutic window. Light exposure, which is required for vitamin D synthesis and calcium reabsorption, for these patients has not been studied to date. Dosage diversity may be required for people living in areas of the country with shorter/longer days in order to achieve therapeutic efficacy. Our study will test the efficacy of Digitalis after a photoperiod acclimatization to determine if the therapeutic dose would require adjustment with lower light exposures. Rana temporaria were pithed and the heart sutured to collect heart contractility data and then compared to the control group.

Poster #329

Using Science Literacy to Increase K-12 Participation Across Diverse Populations

Amanda Rosenzweig, arosen1818@aol.com

Science Teacher Technology Training (ST3) focuses on providing meaningful experiences in sciences, across all age groups, with emphasis on Anatomy and Physiology. A large focus of ST3 focuses on developing science teachers' knowledge, skills, and providing them the tools to implement STEM lessons in the K-12 classroom. Educators are the key to improving students understanding of STEM and fostering the student's interest. ST3 helps provide the additional resources to carry out innovative ideas that benefit the students, increase their participation in sciences. Student

success in science will increase, if they can develop content knowledge and have hands-on experiences.

Poster #330

Does Cooperativity in Groups Enhance Metacognition and Self-Efficacy Among Students in Human Anatomy & Physiology Class that Lead to Less Anxiety and Better Performance in Tests?

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Students enrolling in Anatomy and Physiology courses, especially in community colleges, are often underprepared in many different aspects and have lower course completion rates. This study, undertaken under the NSF funded CAPER project, addressed question whether mandated group study would enhance student self-efficacy and improve student performance during the semester and in the semester-end final exam. The methodology followed in this study during the Spring 2019 semester, and the results – both qualitative and quantitative– as obtained will be presented.

Poster #331

Influence of Student Preconceptions on Engagement and Learning in an Introductory Medical Science Course

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Transition from school to university requires adapting to self-responsible learning and establishing and maintaining engagement. Engagement is influenced by various personal/institutional parameters but also preconceptions. When students assume they have good knowledge about a subject it may negatively impact on engagement. They may not feel the need to study as hard and effectively for such topics. This is particularly relevant for subject areas which show discrepancies between scientific knowledge and public understanding since this can be full of misconceptions (i.e. nutrition). Identifying and highlighting preconceptions allowed us to increase student engagement and has improved learning outcomes.

Poster #332

Students Work in Groups to Create and Peer-Evaluate Newsletters Informing about Latest Developments Pertaining to Gut Microbiome Populations and Human Health

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A challenge with large undergraduate classes is the provision of opportunities to construct educational documents and obtain individualized feedback on those endeavors. While summative examinations assess knowledge, assignments involving research, critical thinking and self-reflection promote communication skills and creativity. For 4% of their final mark, students worked online (Brightspace) in groups of 5 to develop a newsletter containing educational information and latest developments linking gut bacterial populations to aspects of human health. One group member (Editor) compiled the final product. Following submission, each group evaluated and provided constructive feedback on a newsletter created by another group (1% of final grade).

HAPS Committee Posters

Can You DIG It? Diversity and Inclusion Taskforce Membership Survey

Kathy Burleson, Hamline University, kburleson01@hamline.edu

Co-Author(s): Diversity and Inclusion Goals Task Force Members

Who are HAPS members? How well does HAPS create inclusive environments? The Diversity and Inclusion Goals (DIG) Task Force plans to survey the HAPS membership to better understand who we are as an organization and identify areas of need. We will discuss our survey design and what the data will be used for, as well as provide an opportunity for members to give feedback. Informed by data from a broad membership base, our goal is to develop best practices, resources, and professional development for inclusive education in anatomy and physiology.

The HAPS Educator: Where to Publish Everything A&P

Kerry Hull, Editor in Chief, HAPS Educator Editorial Board, editor@hapsconnect.org

The HAPS Educator is the peer-reviewed journal of HAPS, publishing educational research articles, topic updates, and class-tested teaching techniques and activities. Come by the poster to see some of our latest articles and to learn about authorship and reviewing opportunities.

HAPS Fundraising Honor Roll

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Summary of the Activities of The Laboratory Safety and Animal Use Committee

Richard Simons, SUNY Schenectady County Community College, rrsimons60@gmail.com

Examples of the spread sheets used to gather data from committee members will be presented along with summaries of the data that has been collected.

Cadaver Use Committee

Cindy Wingert, Cedarville University, cwingert@hapsconnect.org

The HAPS Cadaver Use Committee recognizes that a significant population within the HAPS membership has very little or sometimes no cadaver dissection experience. In response to the perceived need/interest amongst the HAPS membership, the Cadaver Use Committee is developing a human cadaver dissection mentorship program. Specifically, we are soliciting member interest and need in this program. Additionally, we are looking to identify individuals that can serve as mentors. The role of the mentor will be better defined as we continue to collect information from the members through virtual town-hall meetings and a survey to determine member interest by location, limiting factors in cost, and the type of mentorship relationship that will provide the most value added. Long-term we would like this dissection mentorship program to fulfill the pillars of a faculty's academic career. Our goal is to develop a mentorship program that will not only enrich the quality of teaching, but also bolster faculty promotion, tenure, and service.