

ABSTRACTS

SECTION VII. STEM EDUCATION

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Paper Session

Thursday Afternoon 2:00 – 4:40 PM

KCC Room B

J. Wayne McCain, Presiding

1. 2:00 PM CREATING PODCASTS FOR PUBLIC EDUCATION. *Mel Blake*, University of North Alabama. Podcast offer a unique way to reach the general public about science. Typically, they are short audio files that describe news and information about science. At UNA Planetarium we have been contributing podcasts to the 365 Days of Astronomy podcasts. We have learned a lot about the process, from generating ideas for the podcasts, script writing and editing the audio files. We will describe some of the lessons learned about the process and encourage people to create their own podcasts.
2. 2:20 PM **u ASSESSING STUDENT PERCEPTIONS OF INTERNATIONAL TEACHING ASSISTANTS. *Rachel Rock*, Sarah Adkins, Jeff Morris, and Samiksha Raut, University of Alabama at Birmingham. The University of Alabama at Birmingham (UAB) is acclaimed for its student body diversity, with international students from over 90 countries comprising 5% of UAB's student body. Less attention is paid, however, to the downstream effects of the international students' assimilation. An ideal population with which to explore these effects are graduate students, who often teach or lead undergraduate lab classes. This IRB approved study investigated student perceptions of their international teaching assistants across different introductory STEM classes (Biology, Chemistry, Computer Science, and Physics) using mixed-methods. We investigated undergraduate attitudes of Graduate Teaching Assistants (GTAs), the effect GTAs have on the classes, and GTA's perceptions of themselves and their teaching style. Pre and post questionnaires (adapted from validated surveys from Fox and Fuselier) were administered to students at the start and end of their semester, respectively, and end-of semester focus group sessions were offered. Results from preliminary studies done in Introductory Biology II classes showed that over 50% of students had experience with classes led by International GTAs and 20% of those students cited communication failures as difficulties in the class. International GTAs, however, often cited that their accent and nationality had little effect on the student perceptions and class outcomes. Ongoing work is exposing similar discrepancies. This study is part of a larger effort to better understand student perceptions of international educators and translate lessons learned to inclusive educational environments for all.
3. 2:40 PM **u MALAYSIA AIRLINES FLIGHT 370 – A FAILURE OF RISK

MANAGEMENT? *Katherine Brewer*, Carter McCain, and J. Wayne McCain, Athens State University. The disappearance of Malaysia MH370 on March 8th, 2014 is widely viewed as one of the greatest mysteries in the history of aviation to date. Two-hundred and thirty-nine souls are lost and unaccounted for. What could have possibly caused a huge, modern-day passenger airplane to simply disappear into the night? What unusual circumstances were recognized that might point to what caused this event? Were proper risk avoidance measures in place and were these policies followed? What did the official accident report reveal and conclude? This paper addresses these questions and more, including what one prominent investigator has surmised is the most likely truth of what really happened. The accident review process was examined along with what might have been effective risk management techniques, all in the context of an aircraft safety and security course of study.

4. 3:00 PM **u STEMSAT1 - RADIO ASTRONOMY CUBESAT, AN UPDATE. *Collin Rogers McCain*, Calhoun Community College; J. Wayne McCain, Athens State University. Over the past two years, students and faculty from Athens State University, Calhoun Community College, the University of North Alabama, along with the Society of Amateur Radio Astronomers (SARA) have been studying the feasibility and initial mission planning for a radio astronomy CubeSat in a low-Earth orbit to study low frequency signals from space that do not reach Earth's surface due to blockage by our atmosphere. The mission would involve students from kindergarten through college-level in various scientific and management aspects of the flight from design, assembly, and launch through data gathering and analysis. This paper provides an update on progress since last year's report and shares future plans for this potentially STEM-rich, space-oriented project.
5. 3:20 PM **u MARS CHALLENGES - *INSITU* PLANT FARMING. *Amelia Claire McCain*, Athens Intermediate School; J. Wayne McCain, Athens State University. Challenges of the various Humans To Mars (HTM) programs, particularly those that involve extended stay time or even colonization, are mostly centered around providing the essential resources required for sustaining human life. One of the most critical resources is food. Recently, the Chinese rover landed on the far-side of the Moon sprouted cotton seeds as part of an on-board biology experiment. The sprouts later perished due to the extreme conditions on the lunar surface during the lunar 'night'. Mars offers many of the same obstacles including extreme temperature swings, high radiation exposure, and essentially a near vacuum atmosphere with only low levels of Carbon Monoxide. Martian regolith (soil) may not be suitable for germination and growth of typical food plants. This paper examines these difficulties with an emphasis on a comparison of Martian vs. Earth soil compositions and presents preliminary results of an initial attempt at growing plants with simulated Martian soil.
6. 3:40 PM LOW-RISK FORMATIVE ASSESSMENTS AS AN EARLY INDICATOR OF AT-RISK STUDENTS IN A HUMAN ANATOMY COURSE. *Drew Hataway* and T.W. Woolley, Samford University; *Connie Hataway*,

University of Alabama at Birmingham; and Mary Anne Garner, Judson College. Nationally, undergraduate students fail Anatomy and Physiology courses at some of the highest rates compared other courses at the undergraduate level. Formative evaluation guides future learning by assessing the quality of student achievement while the student is still in the process of learning. It serves to gauge student progress toward meeting instructional objectives with the intent of improving teaching and learning. The use of formative assessments was introduced in an undergraduate human anatomy course intended for students majoring in a variety of allied health fields. The assessments consisted of ten questions that mimicked the style and content of the summative assessments at the end of each unit. In response to the current debates related to formative assessments, immediately following administration the assessments were checked for accuracy and all correct and incorrect answers were discussed. Scores were not recorded as a separate assignment or quiz grade but rather as bonus points to be added to the summative assessment score in an effort to remove the stigma of quizzes and utilize the incentive of potential bonus points. The results suggest that at risk students can be identified before the first summative assessment through the use of formative assessment. Formative assessments, used as described in this abstract, have the potential to improve students' metacognitive abilities and increase learning.

4:00 PM **BUSINESS MEETING: Elect a Section Vice-Chair for the 2019-2021 term**

****u or **g** Denotes presentation entered in student competition as an undergraduate or graduate student, respectively.

SECTION VII: STEM EDUCATION

Poster Session

Thursday

KCC Atrium and Ballroom Foyer

Authors Set-up: Begins at 7:30 AM

Authors Present. 1:30 – 2:00 PM, Viewing and Judging

J. Wayne McCain, Presiding

1. THE INFRASTRUCTURE OF HEALTH INFORMATICS: LAYING THE TECHNOLOGY FOUNDATION. *David Robbins*, Samford University. Since practitioners of informatics generally enter the field with either domain or technology expertise already in hand, informatics educators face the challenge of constructively teaching to multiple skill levels simultaneously. This poster presents the redesign of an introductory course designed to enable students with diverse technology backgrounds to advance together, while simultaneously enabling those with minimal technical skills to develop confidence in their approach to the information technology foundations of informatics.
2. ****g** INTRODUCING THE RESEARCH ON STEM EDUCATION NETWORK. *Sarah Adkins*, Samiksha Raut, and Jeffrey Morris, University of Alabama at Birmingham. A growing body of research indicates making small learner-driven adjustments in the classroom can dramatically improve students' knowledge retention as well as their perception and investment in the sciences. Educational research in evidence-based teaching is crucial in assessing active-learning techniques, and therefore is essential in positively influencing teaching practices which benefit students, the university, and our society. However, there exist many gaps in accessibility of resources and opportunities for collaboration for interested educators. The Research on STEM Education Network (ROSE) exists as that platform to encourage collaboration and further research in STEM education. Like flowers bear seeds to expand their species, ROSE aims to: 1.) encourage cross-discipline discussions and collaboration of STEM education researchers and 2.) provide a platform for the dissemination of resources for STEM educational research. In practice, ROSE members (which include undergraduates, graduates, postdocs, staff and faculty) meet over journal club luncheons, invited seminar talks, and off-campus socials. ROSE makes available to its affiliates educational research information, including relevant education literature, links to national conferences and chances to network, funding opportunities, and information about IRB applications and human subjects research. ROSE chapters currently exist at the University of Alabama Birmingham, University of Texas El Paso, University of Alaska Fairbanks, Jefferson State Community College, and Birmingham-Southern College with growing success among members (e.g. conference presentations and publications). We invite interested educators to start their own chapter at their own universities to join the discussion around evidence-based education.
3. ****u** REFORMING PEER-LED LEARNING ASSISTANTS THROUGH

PROFESSIONAL DEVELOPMENT TRAINING IN A FRESHMAN

INTRODUCTORY BIOLOGY CLASS. *David Verhine, Gabby Richards, James Boyett, Sebastian Schormann, and Samiksha Raut, University of Alabama at Birmingham.*

National calls for undergraduate education reform have prompted the need towards active engagement practices in the classroom with an intent to decrease the attrition in Science Technology, Engineering and Mathematics (STEM) gateway courses. Besides, it has been very well recognized that peer-learning groups play a critical role in implementing active-learning practices in the classroom and beyond. Very few studies to date have explored the impact of these peer-led sessions in the light of pedagogical training imparted to the undergraduate peer learning assistants in a typical introductory biology class. This study therefore aims at exploring the effects of professional development on peer-led learning assistants. A mixed methods approach will be utilized to assess the efficacy of this professional training. We hope that findings from this study will enable us to make a recommendation to other educators on training their learning assistants in evidence-based practices as an effective way to reduce STEM attrition from gateway courses like freshman introductory biology classes.

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