FAST (Future Academic Scholars in Teaching) Fellowship Program Symposium-April 30, 2013

2012-2013 FAST Fellows and Agenda:

  9:30 Cameron Whitley
  9:55 Sumathi Venkatesh
  10:20 Felix Cheung
  10:45 Niroj Aryal
  11:10 Lisa Rebenitsch
  11:35 Emily Weigel
  12:00 Abigail J. Lynch
  12:25 Benchamaphorn Sombatthira
  12:50 Hovig Kouyoumdjian
  1:15 Hongli Gao

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Developing the Civic Minded Citizen: An Analysis of Curriculum Implemented Civic Engagement

FAST Fellow: Cameron Whitley, Sociology

Mentor: Scot Yoder, RCAH, Michigan State University

Both curricular and extra-curricular civic engagement opportunities are designed to build on students’ previous experiences, to connect them to their new environment, develop links between knowledge and practice, and foster post-graduate civic engagement behaviors. Increasingly universities are interested in incorporating civic engagement opportunities into the undergraduate college curriculum. This study seeks to discover how the implementation of a required civic engagement curricular component impacts students’ civic engagement attitudes and behaviors around three particular areas (environmental integrity, social responsibility and political engagement) and if engagement in a living-learning community has an impact on this relationship.

IRB# x13-094e/ APP# i043004
How does a term paper assignment for undergraduate students in dietetics improve their knowledge of cultural factors that affect food choices?

**FAST Fellow:** Sumathi Venkatesh, Department of Food Science and Human Nutrition

**Mentor:** Lorraine Weatherspoon, PhD, RD, Department of Food Science and Human Nutrition, Michigan State University

**Background:** As future professionals in dietetics, it is important for undergraduate dietetic students to understand the cultural factors that affect food consumption in various ethnic groups. The objective of this study is to determine students' knowledge of the dietary habits of a chosen ethnic group before and after completing a course term paper. It is expected that students will demonstrate an improvement in their knowledge of the dietary habits of the chosen ethnic group after completion of the term paper. **Methods:** Participants included 48 college students recruited from an undergraduate dietetics class at Michigan State University. As a course requirement, students interviewed an individual from an ethnic group other than their own to study the dietary habits and submitted their work in the form of a term paper along with the interview field notes. Assessments included pre and post surveys administered before and after term paper submission, respectively. In addition participants also completed a short evaluation of the term paper assignment on a five point scale ranging from strongly agree (1) to strongly disagree (5). Responses for pre-survey, post survey, and term paper were scored and compared. Mean scores were computed for the term paper evaluations. **Results:** Students received a higher score in the post-survey (vs. pre-survey) and perceived that their knowledge of the specific ethnic group that they chose for the term paper enhanced after completion of the assignment (mean 1.51 + 0.55). **Conclusions & implications:** From our surveys and based on student evaluations it was evident that the term paper assignment proved to be an informative learning exercise for the students, which positively impacted their knowledge of the cultural factors that influenced the dietary behaviors of an ethnic group. Our study emphasizes the significance of including cultural competency in educational settings, which will enhance students' ability to acknowledge and effectively interact across cultures.

IRB# x13-141e
The Effect of Color on Students’ Performance

FAST Fellow: Felix Cheung, Department of Psychology

Mentors: Joseph Cesario and Richard E. Lucas, Department of Psychology, Michigan State University

Previous research has shown that in a laboratory setting, participants who saw red prior to an IQ test performed significantly worse than participants who saw white, gray, or green. Furthermore, recent studies have found that red enhances performance on a detail-oriented task and blue enhances performance on a creativity task. These studies on color and psychological functioning have important implications in pedagogical settings because instructors oftentimes give tests using papers of different colors. The purpose of the current study is to 1) examine the extent to which colors influence students’ performance in a classroom setting and 2) whether the effect of colors differ by question types. The current study draws data from three exams in an introductory psychology class. Each exam consisted of four different forms, and each form was printed on papers of different colors to differentiate between forms. To test whether students’ performance differed by colors, an one-way ANOVA analysis was conducted, and the results showed no significant difference in students’ performance between exams of different colors. This finding is consistent across the three exams. To test the effect of color on different question types, two independent coders coded the exam questions using Bloom’s taxonomy. A regression analysis was conducted to test whether the effect of colors on students’ performance differ by question types. No significant difference was found. In short, the current study found that colors did not associate with students’ performance. The current study provides empirical evidence that in a classroom setting, administering tests of different colors does not influence students’ performance.

This project was not considered human subject research.
Flipped Classroom in Senior Level Engineering Class: Students’ Perceptions and Performance Evaluation

FAST Fellow: Niroj Aryal, Department of Biosystems and Agricultural Engineering

Mentor: Dr. Dawn Reinhold, Department of Biosystems and Agricultural Engineering, Michigan State University

Discrepancy between students’ learning style and the instructors’ teaching style can result in less effective learning and decrease students’ interest in the course. More importantly, limited class time is a major constraint to teaching several types of learners. Senior level engineering classes like BE 482: Diffuse Source Pollution Engineering have many design and quantitative problems based on conceptual and real case studies and therefore demand more individual attention of the instructor to facilitate students’ learning. Flipped (or inverted) classrooms can be used to solve these two problems. The flipped classroom moves lectures outside of classroom and brings in projects, case studies, discussions and assignments into the classroom. The flipped classroom focuses on cooperative learning, interactive engagement, ‘just-in-time’ teaching, problem-based learning, and other types of active learning to help students learn. The driving forces beyond flipped classroom are rapid development of technological innovations, and development of cognitive psychology. This project evaluated perceptions of students in BE 482 to the flipped classroom model and compared their performance to that of the prior year’s traditional class. Students of BE 482 in a flipped classroom in spring 2013 were surveyed multiple times to know about perceptions of students regarding flipped classroom at multiple stages and as a whole. Initial results suggest that students liked flipped classroom, and technology used in flipped classroom. Most students liked watching videos outside of classroom and doing case study, and questioning and answering inside classroom. However, the respondents had particular reservation for some in-class or pre-class activities. The project will compare performances of students in tests and assignments in spring 2013 with year 2010 when the class size was similar. If students’ learning is better, flipped classroom may be preferred instructional method in future.

IRB number: x12-1270e
Exploration of Group Projects for Different Demographics in CSE

FAST Fellow: Lisa Rebenitsch, CSE

Mentor: Dr. Owen, CSE, Michigan State University

Commercial software requires a team to produce. Any one project is too large, or will become too large, too be designed, created, and maintained by any one person. Therefore, programming as a team is an important skill for computer scientists to possess, but it a skill that is widely lacking. Computer science education literature reports great difficulty in groups projects. There are many potential areas for improvement of team projects in computer science. Demographics and typical project design is the area that this project explores in 300-400 level computer science courses. A student's actual group project scores are compared against their expected score given various demographics and group project design. Their expected scores are derived from their individual work scores or GPA. Some of the aspects under consideration in this study are ethnic group, year, number if people in project, and length of the project. Each set is examined for significant change between the expected and actual scores. Suggestions are made for future studies and group project designs.

The project was not considered human subject research.
How and why can knowledge of concepts in genetics improve student understanding of concepts in evolution?

FAST Fellow: Emily Weigel, Department of Zoology & Ecology, Evolutionary Biology, and Behavior Program

Mentors: Dr. Louise Mead and Dr. Terri McElhinny, Michigan State University

Evolutionary processes, while integral to all of biology, are often misunderstood. Unfortunately, the evolution misconceptions that undergraduate biology students hold are often variable, deeply rooted in student thinking, and frequently stem from students’ first encounters with evolutionary terms. Because such misconceptions can fundamentally impact a student’s understanding of evolution, it is important to understand what information (and misinformation) students obtain from courses prior to Evolution. This is particularly important with respect to Genetics classrooms, as Genetics courses are often a prerequisite and because the basic genetics concepts that underlie Evolution are first introduced within the Genetics classroom. This study (1) quantified the extent to which students who have taken Genetics retain and apply information to concepts in Evolution; (2) evaluated why specific fundamental concepts (if any) show differences between these courses; and (3) compared results from these courses for performance related to key genetics concepts as they relate to evolution. A 16-question assessment was created from the Genetics Assessment literature (GLAI, GeDI and the Genetics Assessment For Core Understanding) and course textbooks (Mastering Genetics and Mastering Biology). Questions are multiple choice, agree/disagree, and fill-in-the-blank formats, span all Bloom levels, and cover fundamental areas linked to documented misconceptions. This assessment was administered at three timepoints: at the end of Genetics (to establish a knowledge baseline), beginning of Evolution (to determine what information has been lost since taking Genetics,) and end of Evolution (to determine with what information students leave the course sequence). Overall and individual item performance were compared. These results show that undergraduate students harbor a number of deep misconceptions, of which only a portion may be corrected by taking Evolution. This research provides possible advantages of a Genetics-to-Evolution course sequence and a better understanding of how timing may influence the integration of material across areas of Biology.

IRB#x12-1182e
Learners and Learning Environments: Comparison of Cognition Level Between Lecture-based Classroom and Experiential Study Abroad Assessments

**FAST Fellow:** Abigail J. Lynch, Center for Systems Integration and Sustainability, Department of Fisheries and Wildlife

**Mentor:** William W. Taylor, Center for Systems Integration and Sustainability, Department of Fisheries and Wildlife, Michigan State University

Study abroad is often cited as a more transformative learning experience than a regular lecture-based classroom. But, there is little opportunity for paired comparison between experiential study abroad learning and lecture-based classroom learning. This study examines cognition level in essay assignments of three student cohorts enrolled in the same Michigan State University course, global issues in fisheries and wildlife (FW 481), taught in lecture-based classroom and experiential study abroad learning environments (classroom: 2010, 2012; study abroad: 2011). Student essay assignments were scored by cognition levels outlined in Bloom’s (1956) taxonomy of educational objectives. Bloom’s taxonomy is a classification of six cognition levels: knowledge and comprehension are considered lower order cognition levels; while application, analysis, synthesis, and evaluation are considered higher order cognition levels. Assessment of Bloom cognition levels for the student essay assignments were used to examine the following comparisons: 1) difference between cognition level between students the beginning and end of the course; 2) difference in cognition level between students with stated preference for active over lecture-based pedagogy; and 3) difference in cognition level between classroom and study abroad students. Mann-Whitney U tests were used to compare the means of the independent, rank-ordered Bloom assessments. This analysis addresses the commonly held assertion that experiential study abroad programs promotes higher order cognition (e.g., application, analysis, synthesis, and evaluation) with a paired, quantitative comparison of experiential and lecture-based learning environments. The outcomes of this research will demonstrate the importance of experiential learning to achieving higher order cognition in student essay assignments.

IRB #: i040801 (exempt)
Why do students come to class? : The Influences of Five Motives, Expectancy-Value and Demographic Factors in Attendance Rate and Study Habits.

FAST Fellow: Benchamaphorn Sombatthira, Department of Agricultural, Food, and Resource Economics

Mentor: Prof. Lindon J. Robison, Department of Agricultural, Food, and Resource Economics, Michigan State University

Background: There have been many discussions and debates on problems of student performance. The study behavior of college students and their motivations have been researched in several aspects. Allan Wigfield (2000) used the expectancy-value theory of motivation to explain that students' attitudes which related to their performance were developed and modified based on assessments about their beliefs and values on class. Robison et al. (2011) categorized five motives; own consumption, sharing, self-respect, belonging, and goodwill motive that influence individuals' choice. Objective: This paper investigated two linear regression models. The first model is the regression of five motives on demographic factors and expectancy-value. The second model is the regression of attendance rate and hours outside of class studying on five motives. Method: In-class survey. Subjects: 37 undergrad students of Financial Management in the Agricultural-Food System (ABM 435) class at Michigan State University, Spring 2013. Results and conclusion: The empirical result showed that students come to class with different motive structures. Own consumption motive explained about 33% of the motivation for going to class, following with self-respect motive which explained 29% of students' motivation. The linear regression model showed significant relationship between class attendance and all five motive (P = 0.001). The study also found statistically significant relationship between study hour outside of class and own consumption, sharing, self-respect motive at 1%, and goodwill motive at 2%. The results did not show significant relationship between demographic factors and expectancy-value on five motives. Implication: Even though, own consumption and self-respect motives were the first two dominant motives, accounted for 62%, the other 38% of motivation should not be overlooked. With the increasing in diversity of student attaining university, recognizing the influence of five motives on attendance rate and study habits may help and lead to strategies for improving student attendance and academic achievement.

IRB # X12-159e
A Comprehensive Teaching-as-Research Study Designed to Evaluate the Effectiveness of Introducing New Interactive Learning Methods and Assessment Techniques, to a 200-level Organic Chemistry Course

FAST Fellow: Hovig Kouyoumdjian, Department of Chemistry

Mentor: Dr. Melanie Cooper, Department of Chemistry, Michigan State University

The purpose of this study is to explore how utilizing audiovisual techniques or technologies enhance teaching effectiveness and help assess students’ learning of organic chemistry. It has been demonstrated that keeping students engaged would result in a better learning experience. Hence, in this project multiple interactive teaching methods, in addition to assessment techniques, will be used in a 200-level Organic Chemistry course. The main technique is characterized by using PowerPoint presentations in lectures, along with I-clicker session throughout each lecture. And to ensure the interactive nature of the lectures, a wireless pad will be used to write notes on the presentation slides and also to let students answer question from their seats using the pad. Learning assessments are divided into two parts, short and long term. The short term assessments involve I-clicker questions, and online problem solving system called BeSocratic™. Long term assessments will be done by comparing grades to the previous semesters’ grades after getting the corresponding student background information through Office of the Registrar at MSU. Two anonymous surveys, pre (base) and post (SALG), will be conducted as well. It is noteworthy that the aforementioned techniques are being used for the first time in an organic chemistry courses at MSU.

IRB # i042756
How Does the Students’ Demo Effect a College-Level Calculus Class

FAST Fellow: Hongli Gao, Department of Mathematics

Mentor: Dr. Milos Savic, Department of Mathematics, Michigan State University

The idea of student presentations of questions on the blackboard has been discussed in many articles. Our initial idea comes from Buchele’s paper (2005), where the professor asks students to present homework questions on the blackboard at the beginning of each class. In our project, we implement a similar idea (which is called “demo”) in a section of MTH 132 in spring 2013. The instructor asked for volunteer student(s) for presenting one or two questions at the beginning of each class. The questions are randomly selected by the instructor and the students will not know the questions until they are posted on the board. How many students would voluntarily come to work on the board and explain to others without knowing the questions ahead of time? Do the students like the “demo”? Will the “demo” helps them learn calculus and improve their course performance? Our data includes the observation notes of each class, two surveys from the students and grades of Question 2 from an exam. By analyzing the data, we are able to answer all the questions above. Possible improvements and future work will be discussed at the end. The result of this project may improve the teaching of this type of class in the future.

IRB# x13-024e