

Miller Faculty Fellowship Grants Academic Year 2020-2021

A community of inquiry and practice for cyber-learning implementation: Identifying the impact of a gamified dashboard on students' motivation, \$11,000

Michael Brown, School of Education (CHS); Larysa Nadolny, School of Education (CHS); Heather Bolles, Mathematics (LAS); John Haughery, Agricultural and Biosystems Engineering (ENGR); and Sara Pistoletti, Chemistry (LAS)

Large enrollment undergraduate STEM courses that are the source of much of the STEM pipeline attrition offer few opportunities for students and instructors to interact, often leaving students confused about their competence in the course, undermining their motivation and performance (Brown et al., 2019). Gameful digital tools have demonstrated significant impacts on learning (Abdul Jabbar & Felicia, 2015), including retention and motivation in undergraduate courses, encouraging students, behavioral engagement by providing them information about their progress in a course (Chapman & Rich, 2018). In this study, we design and implement low-cost game-based tools for the Canvas Learning Management system in three undergraduate STEM courses to enhance motivational and self-regulatory actions among students and promote the comprehension of key course concepts.

Engineers as Effective Team Players: Flipping Project Management for Civil Engineers Course to Improve Teamwork Skills, \$15,000

Aliye Karabulut-Ilgu, Civil, Construction & Environmental Eng (ENGR), Jennifer Shane, Civil, Construction & Environmental Eng (ENGR), and Katherine Madson, Civil, Construction & Environmental Eng (ENGR)

As an innovative teaching pedagogy, flipped learning requires students to engage in course content before class, usually in a lecture video format, gain the background knowledge, and work on problems previously assigned as homework during class. In this project, we aim to convert a junior-level Project Management for Civil Engineering course to a flipped format and create opportunities for students to enhance not only their technical skills (via lecture videos) but also professional skills (via in-class activities). In particular, our goal is to assess the role of flipped learning in developing teamwork skills that are considered essential for the 21st-century workforce.

Integrating Creative Thinking in Engineering Education, \$15,000

Jae Hwa Lee, Interior Design (COD) with Tejas Dhadphale, Assistant Professor, Industrial Design, College of Design; Benjamin Ahn, Assistant Professor, Aerospace Engineering, College of Engineering; Matthew Nelson, Assistant Teaching Professor, Aerospace Engineering, College of Engineering Design

Engineering education is becoming more vested in innovative learners who embrace creative thinking methods. This project aims to introduce a series of five creative thinking modules to engineering students and measure its impact on students, creative potential. Modules will be structured based on the topics of demystifying creativity, barriers, and blocks to creativity, innovative thinking tools, creative teamwork, create self-awareness, and personal development. Assessment of students' creative potential will include 1) creative confidence and 2) creative thinking ability. Pre- and post-surveys, Torrance Tests of Creative Thinking (TTCT), weekly reflection papers, and interviews will assess students' creative potential. The project aims to enhance the creative potential of 200 students in the Make To Innovate (M:2:1) program (AerE 294 and AerE 494). The next goal of this cross-disciplinary project is to extend pedagogical modules of creative thinking in STEM disciplines.

Learning Chinese Writing System with Augmented Reality, \$5,550

Shenglan Zhang, World Languages and Cultures (LAS);

During the past three decades, higher education institutions in the U.S. have experienced significant increases in Chinese language enrollments (Looney & Lusin, 2018). For programs in Chinese-as-a-Foreign-Language (CFL), including the Chinese Program at ISU, the greatest challenge facing instructors and their students is teaching and learning the complex writing system of Chinese characters (Everson, 1998; Xu, et al., 2013). With the Miller Fellowship, I will design and develop a series of modules using multimedia and augmented reality to revolutionize students' character learning. The module design will be on the dualism-based method developed by the French Scholar and Professor Jo Bellassen*, the most influential researcher in character learning in the world. The modules will engage CFL learners at ISU (and subsequently in the U.S.) in learning Chinese characters while making character learning more straightforward, more efficient, and enjoyable. The augmented reality format will give students flexibility and convenience in their learning.

Transforming Agricultural Communication Internship Class from Face-to-Face to TPACK-Enhanced Online Class, \$8,000

Shuyang Qu (Ag Ed Studies) with Chuanli Zhou, Instructional Development Coordinator, Brendon Center, CALS Gaylan Scofield, Professor and Director of the Brendon Center, CALS

We propose transforming AGEDS 412: Internship in Agricultural Communication by adopting the TPACK (Technological, Pedagogical, and Content Knowledge) framework (Figure 1). An internship class's essence is to practice the knowledge gained from the classroom in a professional work environment. Connecting concepts and models to internship tasks, paired with deep reflection and synthesis of the knowledge and practices, is vital to achieving meaningful growth from the internship experience. The TPACK framework describes the complex interaction of the three fundamentals of classroom teaching: content, pedagogy, and technology (Koehler & Mishra, 2009). By adopting TPACK, we will incorporate pedagogies, including experiential learning and reflection, peer learning, guest speakers, along with technologies online lectures of key concepts, in-video assessments, video testimonials from industry professionals, to ensure the content is effectively delivered and student learning outcomes are successfully achieved.

Using Case Studies to Integrate Evidence, Ethics, and Equity in Education Courses, \$15,000

Alyssa Emery (SoE) with Nicholas Tanchuck, Assistant Professor, School of Education (SOE), Human Sciences; Amanda Baker, Assistant Professor, SOE, Human Sciences; Gabriel Rodriguez, Assistant Professor, SOE, Human Sciences; Mollie Appelgate, Assistant Professor, SOE, Human Sciences, CHS

One goal of teacher preparation is to help future teachers appropriately apply theory and research. Simultaneously, we aim for prospective teachers to develop the judgment and decision-making skills necessary to integrate equity, ethics, and social justice in their practice. Case-based instruction is a practical, active learning strategy that promotes critical thinking, perspective-taking, and content application in ways that can enhance future teachers' self-efficacy for translating course content into meaningful professional action (Kleinsasser, 2014). We will design a case study analysis protocol for instructor use across the required coursework and a repository of supplementary video recordings. This work will provide educators and community members with resources to incorporate case-based instruction into their courses. Together, these resources work to align teacher preparation curriculum across the School of Education and promote dynamic, active learning that fosters a commitment to equity.

Virtual Reality: Uses for Dietetics Education, \$12,000

Lorraine Lanningham-Foster (FSHN) with James Hollis, Associate Professor, FSHN, Ruth Litchfield, Professor, FSHN, Maren Wolff, Clinical Assistant Professor, FSHN, Amber Baughman, Graduate Teaching Assistant, FSHN (CALs)

Community Nutrition (F.S. HN 463) is a senior-level course required of all dietetics students. The course addresses diversity and inclusion, which is imperative in today's social climate. The majority of students have limited exposure to the circumstances and situations experienced by 40.6 million Americans living in poverty (U.S. Census, 2016). This study will test an innovative approach to dietetics education using virtual reality to enhance grocery stores' shopping experience with limited options on a Supplemental Nutrition Assistance Program (SNAP) budget. This approach will be compared with the current classroom approach to determine virtual reality's usefulness as a teaching aid.