

## PROJECT SUMMARY

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### **Overview:**

Communication is the exchange of information and ideas, and plays a critical role in teaching and learning. While educational materials help an instructor communicate content knowledge to a student, assessment tools help the student communicate their understanding of the content knowledge to the instructor. Hence, in teaching and learning, the roles of creating knowledge and interpreting knowledge ebb and flow between the instructor and the student continuously. Instructor-created educational material is interpreted by the student, and student-created responses for assessments are interpreted by the instructor. Poetry is a form of artistic communication. An individual can engage with a poem by either creating it as the poet or reading and interpreting (i.e., analyzing) it as the reader. Hence, poetry can facilitate the communication of content knowledge between the instructor and the student in two ways: Either the instructor can be the poet and the student the reader or the student can be the poet and the instructor the reader. This project will investigate the use of poetry-based activities to enhance student learning in engineering education. In particular, poetry-based educational material will be developed and incorporated into an upper-level, required, discipline-specific, technical course (entitled Inventory and Supply Chain Systems) in the Department of Industrial and Systems Engineering at the University of Florida.

The overall goal of the proposed work is to develop a comprehensive framework for the use of poetry as a mechanism for engaged learning and a tool for enhanced teaching in engineering education to increase imaginative capacities of engineering students, deepen their conceptual understanding of the technical content, and develop their communication skills. The specific objectives that serve this goal are to (1) create poetry-based in-class activities and homework assignments and evaluate the effectiveness of such activities and assignments on student learning; (2) develop poetry-based supplemental teaching material and evaluate their effectiveness on student learning; and (3) offer a framework and develop a training workshop to help guide other instructors in engineering to incorporate poetry-based activities into other engineering courses as an engaging learning mechanism and effective teaching tool. To achieve our goal, we will use arts-based, qualitative, and quantitative research methods from literary arts, communication studies, social studies, and engineering. Hence, the methodological component of the proposed work will hinge upon art-based research, qualitative analysis, content analysis, survey research, and experimental research.

### **Intellectual Merit:**

The intellectual merit of the proposed research lies in (1) the generation of new knowledge on how to develop and use poetry-based activities and educational material to enhance student learning in engineering education; (2) the collection and analysis of evidence on the perceived benefits and measurable positive impact of using poetry-based activities and educational material in engineering education to improve students' imaginative capacities, technical knowledge acquisition, and communication skills; and (3) the improvement of our understanding on the value of infusing arts-based inquiry tools into engineering education.

### **Broader Impacts:**

The broader impact of the proposed research is due to its potential to (1) enhance science technology, engineering and mathematics (STEM) education to include poetry-based activities and educational material to support technical training; (2) contribute to STEM educator development by providing a comprehensive framework on how to develop and incorporate poetry-based activities into any engineering course; (3) educate a scientifically, artistically, and culturally literate engineering workforce for the future; (4) facilitate interdisciplinary research between engineering, education, and communication studies; and (5) demonstrate the value of using arts-based approaches for research and education in engineering.