

Equity Diversity and Inclusion Applied to Undergraduate Research

Dr. Maira Monteiro, Seattle Pacific University

Equity Diversity and Inclusion Applied to Undergraduate Research

Maíra R. Monteiro, Seattle Pacific University, Seattle, United States

Given the rapid growth and development of engineering technologies, requirements for a reliable skilled workforce, and need for groundbreaking innovators and effective leaders, the next generations of undergraduate Science, Technology, Engineering and Mathematics (STEM) students must be provided with a well-rounded education subjected to high academic standards and delivering life-long learning skills. These skills are directly related to the scientific research process, which is represented by a structured and organized method used to achieve defined objectives. Through the scientific research process, one is responsible to answer four main questions, i.e., "What is the problem being addressed?"; "Why is this problem relevant?"; "How can you solve this problem?"; "What are the proposed solution results?". For this, 1) First, in the preliminary stage, one must clearly define the problem to be addressed (what); 2) Next, the motivation describing the importance of this topic compared to what is discussed in the literature should be developed (why); 3) Following, a clear and reproduceable method, or methodology, for successfully tackling this problem must be established (how); and 4) Finally, results depicting the contributions/improvements of the proposed solution compared to the literature must be presented (results).

Based on these perspectives, scientific research experience can significantly assist undergraduate students' development of analytical problem-solving skills, and foster their eagerness to learn, understand, and develop new methods to address on going and future problems they will likely face during their professional lives. In addition, from this perspective, considering the current requirements of engineering students, fostering student interest and participation in scientific research initiation can bring significant benefits to their training and professional journey. Then, the development of courses fully focused on research, as well as the blending of research aspects STEM courses can significantly assist students' education.

In this sense, this work seeks to develop a new methodology for introducing research curriculum in undergraduate engineering students' education, where different students' abilities can be improved. For this, a structured-learner centered design associated with active learning tools, and diversified processes seeking to ensure an equitable, diverse and inclusive (EDI) environment is employed. The proposed methodology is verified employing a case-study representative of a real industrial application problem where students must develop their solution based on the scientific method steps. Through this case-study students are exposed to hands-on research experience, encouraging them to discover the excitement that can be found in the real-world applications of research, while simultaneously highlighting the importance of diversity, as each individual opinions and experiences bring uniqueness to their solution.