



Using Computational Text Analytics to Evaluate the Impact of Experiential Learning in an Advanced Engineering Design and Additive Manufacturing Bridge Program

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Abstract

This paper presents an analysis of student reflections collected from participants in a three-year NASA-funded Minority University Research and Education Program (MUREP) High Volume Manufacturing program. The program activities underscore the importance of a bridge program in fostering student engagement and skill development, as well as the role of targeted program design in achieving specific educational outcomes. To capture and analyze these experiences, we employed text analytics techniques. Text analytics involves deriving meaningful information from text data through computational methods. By applying text analytics, we identified key themes, patterns, and sentiments expressed by students, revealing valuable insights into their learning experiences and the effectiveness in meeting program objectives. Text analytics offers a unique and powerful approach to understanding student experiences, especially compared to traditional quantitative assessments. While quantitative methods such as surveys and standardized tests provide valuable numerical data, they often miss the depth and richness that can be captured through open-ended textual responses. By applying these methods, one can gain valuable insights into the effectiveness of program activities and their impact on student learning and engagement.

Further, the insights gained from this exercise can inform the design and implementation of future STEM programs, ensuring they meet the evolving needs of students and the broader goals of federal agencies. The detailed text analytics pipeline, techniques, tools, and results from its use in assessing effectiveness and evaluating student experiences will be discussed in the final paper.

Keywords: program insights; qualitative analysis; text mining; thematic analysis; student reflections