Informing Change: Course Content Analysis and Organization

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Abstract

This paper introduces a novel, supportive tool for engineering educators while making course adaptations. As pointed out in the 2013 FIE workshop "An Online Revolution in Learning and Teaching," online learning is likely to impact every department and teacher in some manner. Other innovations impacting engineering educators include active learning, peer instruction, problem-based learning, and just-in-time teaching. When implementing change, educators are expected to present existing course materials in alternative formats. One resultant difficulty is visualizing, understanding, and judging the impact of various alternatives. Learning materials' organization is often limited by delivery methods such as learning management systems that present material linearly. This project uses text analysis and graph transformation techniques to produce various alternatives allowing educators to envision ways changes can be effectively implemented in their courses. We demonstrate how temporal and topical relations between individual learning items can be extracted from existing courses and used to produce a graph that is an effective representation of the course. From this, graph transformations produce alternative organizations of course material allowing various solutions for educators to consider while redesigning their courses. This form of automated brainstorming stimulates out-of-the-box thinking, often producing options previously not considered.