

Green & Complete Streets as an Opportunity for Cross-course Collaborative Projects

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Practicing engineers regularly work in interdisciplinary teams. However, engineering students gain disciplinary expertise primarily in specialized courses with instructors and classmates who share a common disciplinary focus. Shared team projects between distinct but related courses offer an opportunity for students to build disciplinary expertise while practicing interdisciplinary teamwork and communication skills. Green and Complete Streets represent an excellent opportunity for this type of collaboration. Green and Complete Streets provide effective multimodal transportation while incorporating green infrastructure elements for storm water management. Frequently, modifications to existing roadways to improve functionality for different transportation modes may affect storm water runoff in and around that roadway, and vice versa. Therefore, it is most valuable to approach Green and Complete Street design with a multidisciplinary team, including both transportation engineers and pollution prevention engineers. This project presents a “Green & Complete Streets” project, taught as a collaboration between a Sustainable Mobility class (comprised mostly of Transportation Engineering students), and an Industrial Pollution Prevention class (comprised of Environmental Engineering students).

Multidisciplinary teams comprised of students from both classes developed conceptual-level improvement designs for one of a number of pre-selected on-campus roadways. Objectives for the project included creating an effective experience to cover key course content in either transportation engineering or pollution prevention engineering; allowing students to appreciate the essentially multidisciplinary nature of sustainable solutions; engaging the students in an active and relatable on-campus project, and developing an interdisciplinary collaboration between transportation engineering students and environmental engineering students. While both transportation and environmental engineering fall under the larger civil engineering umbrella, the two student groups typically have very little interaction.

Development of this project relied upon both experiential learning and critical thinking pedagogies, by allowing students to work through a complex, open-ended creative project. The team-based learning approach provided an opportunity for both shared and exchanged expertise. Students from each discipline had opportunities to instruct each other on their respective areas of expertise, while relating to each other through the shared expertise of working on an on-campus site, an area both groups knew equally well.

The challenges that arose through the first experience in conducting this collaborative project offer a number of lessons learned. One of the most important was that group members often failed to fully integrate design elements addressing transportation needs with those addressing storm water needs, suggesting that there had been minimal interaction within the team throughout the design process. Potential methods to address this challenge include: a

specific requirement within the assignment to present design iterations influenced by both disciplines; setting aside time within the shared lab for team meetings, cross-disciplinary instruction, and guided field trips to the on-campus project sites; and, class discussion in Green and Complete Street design led by an industry professional from a third discipline such as City & Regional Planning. Project evaluation also represented a challenge since the project learning objectives differed between the two classes and within each team.