Mapping Technical Writing Across the Civil Engineering Curriculum

The Civil Engineering Profession expects graduates to develop sound communication and technical skills during their undergraduate education. Riley et al. (2000) reported the results of a study showing 38% of new engineering graduates across all engineering disciplines indicated that having good communication skills is one of the most important factors impacting their advancement and success in industry. Similarly, it has been documented in the literature that good oral and written communication skills are required attributes for the success of engineering graduates in the workplace. Effective writing is one of the communication skills critical for the success of practicing civil engineers as they develop and write a wide variety of documents. The ability to write concisely and clearly in the workplace is critical for the graduate's success in winning contracts and reducing liability. As information technology advances, it is essential that engineering educators encourage students to develop and improve their communication skills, especially technical writing in the context of the current and emerging information infrastructure. In the Civil Engineering Program at the United States Coast Guard Academy (USCGA), specific performance indicators related to technical writing and information literacy have been developed and linked to several ABET Student Outcomes. Faculty members have developed technical writing instructions that are shared with students and mapped to various courses throughout the curriculum. The faculty have developed specific assignments and grading rubrics designed to progressively assess student communication skills and improve student development in technical writing.

Recent evaluation of the curriculum during the 2021 fall semester resulted in the initiation of a comprehensive study to investigate how and when technical writing is taught in the civil engineering curriculum. Faculty members were interviewed to identify gaps in teaching and assessing technical writing skills in the curriculum. Preliminary assessment of the results indicate that students gain experience in a wide variety of technical writing assignments such as writing lab reports, journals, research papers, technical memos, and design project reports. The information gathered was used to revise and develop new technical writing instructions that will be infused purposefully in various courses and labs within the curriculum. Instructors are devoting some time in their courses to discuss technical writing requirements as it pertains to their assignments. Based on this assessment, there were several recommendations made to the program to increase student technical writing skills based on the identified gaps.

- Revise and increase specific writing topic lessons in the curriculum to include structure, technical content, and grammar.

- Create short technical writing activities and assignments into the curriculum for focused skill practice. Many technical writing assignments are currently term or design projects which may take 2-10 weeks to complete. Larger assignments require use of writing concepts all at once, which can be overwhelming.
- Re-examine grading rubrics and point distributions for assignments to ensure technical writing skills are graded with correct emphasis and balance of larger program goals.
- Promote and make available writing resources for both faculty and students

The authors will discuss the process of developing, implementing, and improving technical writing and information literacy progressively and consistently in the Civil Engineering curriculum at the USCGA. The goal is to help faculty coordinate their activities by mapping technical writing skills requirements into the curriculum and progressively infusing the appropriate technical writing skills throughout the required civil engineering courses. This coordinated effort will enable students to develop and hone the communication skills necessary for them to be successful in engineering practice, as well as encourage them to continue to grow through lifelong learning.

Reference:

Riley, L.A., P. Furth, and J. Zelmer (2000). "Assessing our Engineering Alumni: Determination of Success in the Workplace." ASEE Gulf-Southwest Section Annual Conference.