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Experiential Learning Programs for Civil Traffic/Transit Engineering Students

In addition to academic and technical preparedness, on-the-job training and other work-based learning experiences are critical components of worker readiness programs. These national programs provide co-curricular value to student career preparedness:

American Society of Civil Engineers (ASCE) Student Chapters

ASCE provides value to civil engineering and civil engineering technology students by expanding their network. Through volunteer opportunities, leadership resources, mentoring, student chapter meetings, scholarships, contests, and competitions, members meet colleagues who share a commitment to the civil engineering profession. Competitions of interest to Pavement Engineers include the National Concrete Canoe Competition and International Contest on Long-Term Pavement Performance Data Analysis. Students attend regional conferences to compete and to present technical papers.

Summer Transportation Internship Program for Diverse Groups (STIPDG)

The U.S. Department of Transportation (U.S. DOT), Federal Highway Administration's (FHWA) Office of Innovative Program Delivery offers internships to college students of various backgrounds. The objective of the STIPDG is to provide college/university students with hands-on experience and on-the-job training while working on current transportation-related topics and issues. The STIPDG is open to all qualified applicants but is designed to provide qualified women, persons with disabilities, and members of diverse groups with summer opportunities in transportation where these groups have been under-represented.

Transportation Tech

TransportationTech.com provides online, on-demand educational curricula for Intelligent Transportation Systems and Connected Vehicle technology. Transportation Tech content is designed and developed to encourage students to choose careers in ITS as well as train current ITS and CV technicians in the field. The site features a free ITS Boot Camp for students, as well as an informative online magazine (The Accelerator) focused on innovations in transportation technology.

American Public Transportation Association (APTA)

APTA provides research, conference and workshops, and other resources for professionals in the public transportation industry, but also has significant programming for youth. APTA offers teachers guides to help integrate public transportation-related lessons into K-12 schools, hosts a Biennial Youth Summit to introduce high school students from across the country to career opportunities in public transportation, hosts a Transit Virtual Career Network that profiles a variety of transit occupations, and has two leadership academies for early career and experience professionals.

Municipal Traffic Engineering Departments

Counties and cities offer opportunities for paid internships, co-ops, and externships. In externship situations, students spend one to three weeks with their hosts at their workplaces for a career exploration experience that usually includes networking, job shadowing, and a focus project. These experiences occur during semester breaks. It is important to emphasize that students can design their own externship experience.

State Departments of Transportation

DOTs offer internships for both community college, university

and graduate students. Internships or co-ops are available in a number of civil engineering roles, including design, operations, and maintenance. Some DOTs also employ college students to assist in the completion of seasonal work related to highway maintenance, crash system input and analysis, maintenance at roadside rest facilities, and flagging. Some training is provided on the job. DOTs offer rotational programs to entry-level engineers so that they experience different business areas within the organization before selecting a permanent assignment.

US DOT Federal Highway Administration (FHWA)

FHWA offers internships and financial support through its Dwight David Eisenhower Transportation Fellowship Program to students pursuing transportation-related occupations. Two hundred students are placed annually in interest-related assignments throughout the agency.

American Association of State Transportation Highway Officials (AASHTO)

While students are not eligible for AASHTO membership, the website offers an email subscription to the Daily Transportation Update of transportation news from across the country. Transportation TV provides information on new publications, initiatives, and other news. This section also incorporates Transportation 101 segments—brief videocasts of topics. Other videos feature CEOs and other leaders in the transportation world. AASHTO provides a strong social media presence communicating issues, projects, and announcements.

American Public Works Association (APWA)

APWA student members connect with a network of professionals. Membership is available to anyone enrolled in at least nine credit hours per semester at an accredited college, university, junior college or community college offering associate's, bachelor's or advanced degree programs in engineering, public administration, planning, construction, or other public works-related coursework. State chapters provide scholarships as a way to attract students to this field.

Engineers Without Borders USA

Engineers Without Borders provides service-learning opportunities for students at the local and international levels. The national organization offers internships while student chapters offer opportunities for developing leadership, working on infrastructure projects, and making connections with professionals who provide mentorship. Many projects are public works projects. Opportunities exist for students, recent graduates, and professionals.

Institute of Transportation Engineers (ITE)

The ITE Student Leadership Summit is entirely planned by students, for students. Through the promotion of leadership and professional development, these events aim to guide future transportation professionals. The Traffic Bowl, another competition, tests students in topics such as transportation planning and engineering. State and local chapters provide opportunities for students to meet professionals and to learn about the latest in engineering practices in their communities.

National Society of Black Engineers (NSBE)

NSBE offers resources to students across the entire educational spectrum including retention, scholarships, leadership, and soft skills training through local networks and regional conferences. NSBE provides community STEM training for individuals who may want to mentor younger students.

National Society of Professional Engineers (NSPE)

Students can be members of NSPE and attend student chapters or local chapters to learn more about licensing and to network with professionals. The website offers a job board that can be filtered by internship opportunities. Students can log in to experience the virtual Professional Engineers Day event to learn more about the Professional Engineering (PE) license and to hear about the work PEs do from practitioners in the field.

Society of Hispanic Professional Engineers (SHPE)

SHPE programs offer support and development to increase degree persistence and attainment as well as aid undergraduates in professional development for a transition into either a STEM career or pursuit of a graduate degree.

Society of Women Engineers (SWE)

Open to all genders, SWE chapters exist in many institutions of higher education. Chapter activities range from mentoring, K-12 outreach, career and industry presentations, and opportunities for technical competitions, scholarships and national

conference attendance.

The Association for Unmanned Vehicle Systems International (AUVSI)

Students involved in an AUVSI Student Chapter, gain experience in the industry and receive guidance from professionals in the chapter. Drones are emerging as a safer method for bridge inspection.

National Operations Center of Excellence (NOCoE)

The National Operations Center of Excellence's site has a multitude of resources for students and professionals in traffic operations. Resources include a searchable Knowledge Center with publications, tools, case studies, on-demand learning, and research. Students can also get involved in experiential learning through the annual Transportation Technology Tournament and TRB ePortfolio Contest.

WTS International

WTS is an international organization dedicated to building the future of transportation through the global advancement of women. WTS provides students with networking opportunities and professional development through engagement with WTS student and professional chapters, an annual conference, and the TransportationYou program.

Innovative Learning Strategies for a Civil/Transportation Engineer Program of Study

To establish curricular lessons and activities that incorporate the latest strategies for increasing student learning effectiveness and retention, a review of practices deployed by workforce and CTE practitioners reveals several approaches that would benefit students within an engineering program of study. These learning strategies include:

Competency-Based Curriculum

Curriculum that meets academic and quality standards, is designed and organized by competencies required for jobs, and is cross-walked with industry skill standards and certifications, where applicable. Job profiling and the use of subject matter experts (SMEs) should be considered to meet the competency needs of business.

Modularized Curriculum

Structured and sequenced curriculum in modules tied to jobs with multiple entry and exit points and multiple levels of industry-recognized credentials built into the pathway.

Asynchronous Learning

Education and training for students and incumbent workers provided at times and locations convenient to students and employers. This may include evenings or weekends, blended or "hybrid" delivery models, and delivery at off-campus locations.

Problem-Based Learning

Instruction that helps students who benefit from hands-on learning foster team-building skills while solving real-life problems.

Experiential Learning

Opportunities for "learning-by-doing." Examples include apprenticeships, internships, externships, rotational programs, co-op work experiences, simulations, and class projects that are assignments from local employers.

Context-Based Learning

Instruction that fosters interpretation of new information in the context or place of where and when it occurs. By relating new information to what the student already knows, the student comes to understand its relevance and meaning.

Individual Learning

Learners are different and innovative learning environments reflect the various experiences and prior knowledge that each student brings to class. It's important that practices and processes help teachers engage each student where they are.

Online "Micro-Learning"

This approach provides short, content-rich exploration of career opportunities and training modules that lead to a new form of stackable credentialing through badges and other forms of recognition, typically subject to the agency hosting the content.