

# Digital Standards Education Modules for Innovation and Sustainability of Concrete Infrastructure

---

PI: [Alexander Brand](#), Eric Jacques, and Roberto Leon

Department of Civil and Environmental Engineering, Virginia Tech



# Accomplishments

---

- Four modules of digital content available through an open Canvas website
- Each module includes recorded presentations (including available slides and transcript) and activities
- Accompanying quizzes and assignments are available

## Welcome to the Digital Standards Education Modules for Innovation and Sustainability of Concrete Infrastructure

### Student Expectations:

The digital standards education modules introduce current and emerging trends in concrete and standardization related to materials, sustainability, and future technologies. Students can download the transcript and blank notes to accompany the video lectures. You can complete the course content at your own pace.

### Course Structure:

The course consists of four self-directed, interactive standards education learning modules. The modules are tailored to students with varying levels of prior standards knowledge and cover standards and standardization in four thematic areas. The syllabus can be found [here](#).



# Communication Plan

---

- Communication effective within the department to utilize modules in multiple courses
  - Student feedback has been positive!
- Content is still being updated and improved, based on feedback, so the final versions of the modules are nearly complete
- PIs plan to disseminate content to colleagues
- Modules are openly available, so anyone is able to use them and build upon the content

# Final Summary Paper

---

- Final summary paper is in progress
- We want to include additional feedback from students in Fall 2022 semester
- Findings: In general, students had a positive feedback to the content
  - “These modules were helpful. Although I already understand what a standard is, these modules helped me look at the bigger picture.”
  - “I think overall the module is successful in its goal of getting the user/learner to better understand standards and how they are used. I personally feel like this module exercise was very beneficial.”

# Evaluation

---

- The content of the modules was evaluated through student surveys
- Students had the opportunity to provide feedback for changes or improvement
  - Feedback was anonymous
- Quiz questions were given to students before and after the module to assess student understanding and comprehension



# Outcomes

---

- We have met our primary goal
  - “The goal of this project is to combine standards education in concrete and cementitious materials with future and emerging technologies to prepare students for sustainability and resilience of the built environment.”
- We have not completed all of our desired impacts
  - Pilot content to students in another program (United States Military Academy at West Point)
  - Disseminate content at a professional meeting (ACI Committees E701 and ACI S802)

# Outcomes - Metrics

---

- Content has been piloted in CEE 4614/5984
  - Impact 90 students (80 undergrad, 10 grad)
- Developing module content has included 3 graduate students
- Changed instructional perspective on how and when students are introduced to standards and how they are used in civil engineering
- Content is or will be part of core curriculum in CEE 3684, CEE 4614/5984, and CEE 3424 at Virginia Tech
  - Content will also be used as “training material” for new undergraduate research assistants

# Lessons Learned

---

- Define “when to stop” with making more content
- Hire a student with videography and video editing experience
- Take advantage of available university videography resources (Virginia Tech has Media Design Studio A)



# From Proposal to Project: Project Management Challenges

---

- Project timeline shifted dramatically (taking more time than planned), since we had issues with video editing and since we keep updating the content
- Project outcomes did not change due to delay
- Project end date was extended by no-cost time extension
- Budget was realistic, but if I did it all over, I would shift GRA appointments to later in the project to handle more of the videography

# Additional Information/Future Plans

---

- Other faculty in CEE at VT are interested in seeing the final product
  - We plan to extend to Construction Engineering and Management program
- Short term: Finish summary paper, disseminate modules to colleagues outside of VT, and continue to update/modify the content based on student responses
- Long term: Highlight the importance of standards earlier in the CEE curriculum

# Contact Details

---

Alexander Brand, PhD, PE  
[asbrand@vt.edu](mailto:asbrand@vt.edu)



Eric Jacques, PhD, PEng  
[ejacques@vt.edu](mailto:ejacques@vt.edu)



Roberto Leon, PhD, PE  
[rleon@vt.edu](mailto:rleon@vt.edu)

