



## **Use of the American Institute of Constructors' Associate Constructor Level I Exam as a Direct Measurement Tool for Program Student Learning Outcomes**

### **ACCE Position Paper**

#### **Background**

The American Institute of Constructors (AIC) aligned ACCE Student Learning Outcomes (SLOs) to their Associate Constructor (AC) Level I exam in 2017. This enabled the degree programs to directly measure student achievement of the twelve SLOs where an exam could be used. However, several programs wanted a process that can incorporate the AIC Level I Exam into their Degree Assessment Plans. In February 2018, AIC Commission member, Dr. Roger Liska, wrote a white paper and presented a generic process at the ACCE Midyear Conference. Using the exam results, the process demonstrated how to develop, implement, analyze, and improve a program's direct assessments.

Based on the AIC Constructor Certification Commission's psychometric mapping of the ACCE SLOs to their bank of certification questions (relating to each SLO), it was recommended that the AIC AC exam could be used to directly measure student achievement of nine SLOs that contained the Blooms Taxonomy verb "***understand***" (explain ideas or concepts: classify, describe, discuss, explain, identify, locate, recognize, report, select, translate) and three that contained "***analyze***" (draw connections among ideas: differentiate, organize, relate, compare, contrast, distinguish, examine, experiment, question, test). These SLOs are identified in **bold**:

1. Create written communications appropriate to the construction discipline.
2. Create oral presentations appropriate to the construction discipline.
3. Create a construction project safety plan.
4. Create construction project cost estimates.
5. Create construction project schedules.
6. **Analyze professional decisions based on ethical principles.**
7. **Analyze construction documents for planning and management of construction processes.**
8. **Analyze methods, materials and equipment used to construct projects.**

9. Apply construction management skills as an effective member of a multi-disciplinary team.
10. Apply electronic-based technology to manage the construction process.
11. Apply basic surveying techniques for construction layout and control.
- 12. Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.**
- 13. Understand construction risk management.**
- 14. Understand construction accounting and cost control.**
- 15. Understand construction quality assurance and control.**
- 16. Understand construction project control processes.**
- 17. Understand the legal implications of contract, common and regulatory law to manage a construction project.**
- 18. Understand the basic principles of sustainable construction.**
- 19. Understand the basic principles of structural behavior.**
- 20. Understand the basic principles of mechanical, electrical and plumbing systems.**

Faculty members will need to identify specific individual student assignments in selected courses to assess achievement of the remaining eight ACCE SLOs. The remaining eight could not be assessed by an exam due to its inability to demonstrate outcomes requiring “*create*” (produce new or original work: design, assemble, construct, conjecture, develop, formulate, author, investigate) or “*apply*” (use information in new situations: execute, implement, solve, use demonstrate, interpret, operate, schedule, sketch).

## AIC Validation of Exam Questions to ACCE SLOs

After the 2018 Midyear Conference presentation, several programs questioned the validity of the exam to effectively be used as an assessment tool, especially since they cannot evaluate the questions themselves. AIC responded by demonstrating that there was a rigorous validation process that involved academic and industry along with a Role Delineation Study (RDS), under the guidance of a psychometrician, to ensure examination competencies/specifications are current.

Dr. Roger Liska provided the following information:

*“The AIC Commission’s Examination Committee was assigned the task to conduct a mapping exercise with the guidance of Professional Testing Corporation who at the time served as the Commission’s Psychometrician. The Examination Committee is made up of CPCs who are construction educators and practicing professionals thus they served as the subject matter experts. The mapping exercise was conducted in accordance with nationally accepted reliability and validity psychometric standards. The process began with the review of the ACCE Construction Outcomes and determining which could be directly and indirectly assessed through a cognitive measuring instrument – the AC Examination. The next step was to split the entire group of SMEs into two subgroups each having both CPC educators and practicing professionals in them. Each subgroup (by consensus and support from the psychometrician) would select those questions in the AC databank that they felt were pertinent to the subject matter domain associated with each SLO. After doing this for all 20*

*Outcomes, the subgroups exchanged their list of assigned questions by ACCE Outcome with each other to conduct a validation exercise. The validation exercise consisted of each subgroup reviewing the questions the other subgroup assigned to each outcome to either agree or disagree that the respective questions were in fact part of the subject matter domain of the respective outcomes. Once the validation process was completed, both subgroups met together to discuss any differences and make a final determination whether or not to assign the respective questions with a particular Outcome. The final step was to code each question in the AC databank so it could be identified with the respective ACCE Outcome(s). It should be noted that many of the questions have been assigned to more than one ACCE Outcomes because of their inclusiveness in the subject matter domain of the respective Outcomes.”*

Every five years a Role Delineation Study (RDS) is conducted as required by the ANSI National Accreditation Board (ANAB) and is completed by the Commission's third-party psychometrician (a.k.a. PTC Testing Coordinator). They use a nationally acceptable process involving qualified construction practicing professionals and educators as subject matter experts. Since the initial mapping exercise in 2014, a RDS was conducted in 2017. It resulted in a few minor changes to the AC test specifications for which some new questions were added and others removed. Every time a new question is added, it is coded to not only the related specification, but also to the related ACCE outcome. Being that no changes occurred in the 20 ACCE outcomes at the time of conducting the 2017 RDS, there was no reason to do a second mapping exercise. The next RDS is scheduled to start in 2021 and will be completed by 2022. The Commission and a third-party psychometrician will do a second mapping exercise during this time. This will include the revised SLO 9.

## **ACCE Position**

During the last three-year cycle to change Document 103, *Standards and Criteria for the Accreditation of Construction Education Programs*, it was accepted that the AIC AC Level I Exam could be used as a direct assessment measure for the aforementioned twelve ACCE SLOs in compliance with the following requirement:

*“9.4.2. Provide evidence in the form of assessment tools, any associated grading rubrics, and one example of graded student work to:*

- Demonstrate applicability of assessment content to the specified SLO and*
- Demonstrate adequacy of the assessment tool in evaluating individual students' ability to meet each SLO at or above the required level of Bloom's Taxonomy (e.g., Understand, Apply, etc.). Programs using third-party certifications shall provide comprehensive results for each SLO where such assessment is applied.”*

As long as AIC continues to provide comprehensive results to each degree program that uses the AC exam for SLO assessment, it is ACCE's position that programs can continue to use AC exam results as a direct measurement.

*Approved by ACCE Executive Committee on February 2, 2021.*