



Using the American Institute of Constructor's (AIC) Associate Level I Exam as Direct Measurement Tool for Program Student Learning Outcomes (SLOs)

ACCE Position Paper

Background

The American Institute of Constructors (AIC) aligned ACCE Student Learning Outcomes (SLO) to their Certified Associate Constructor (CAC) Level I exam in 2014. This enabled the degree programs to directly measure most of the SLOs where an exam could be used; however, several programs wanted a process that can incorporate the AIC Level I Exam into their Assessment Plan. In February 2018, AIC Commission member, Dr. Roger Liska wrote a white paper and presented a generic process to ACCE attendees at the midyear meeting in 2018. Using the Exam's results, the process demonstrated how to develop, implement, analyze, and improve program's direct assessments.

Based on the AIC Constructor Certification Commission's psychometric mapping of the ACCE outcomes to their bank of AC certification questions, many educators recommended using the CAC exam to directly measure 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). The identified ACCE SLOs are 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 methods, materials, and equipment used to construct projects.**
8. Apply electronic-based technology to manage the construction process.
9. Apply basic surveying techniques for construction layout and control.
10. **Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.**
11. **Understand construction accounting and cost control.**
12. **Understand construction quality assurance and control.**
13. **Understand construction project control processes.**
14. **Understand the legal implications of contract, common, and regulatory law to manage a construction project.**
15. **Understand the basic principles of sustainable construction.**
16. **Understand the basic principles of structural behavior.**
17. **Understand the basic principles of HVAC, electrical, and plumbing systems**





The remaining seven SLOs 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). Faculty would need to identify specific individual student assignments in selected courses that would be used to assess the mastery of the remaining seven ACCE program SLOs.

AIC Validation of Exam Questions to ACCE SLOs

At one of the ACCE mid-year meeting, AIC had a presentation that demonstrated the validation of exam questions to ACCE SLOs. 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 involving academic and industry along with 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 then by ACCE Outcome select those questions in the AC databank that they felt were pertinent to the subject matter domain associated with the respective outcome. 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.

In accordance with ANSI (now ANAB- ANSI National Accreditation Board)) once every five years the Commission has to conduct a Role Delineation Study (RDS) under the guidance of a psychometrician to ensure its examination competencies/specifications for both tests are current. The results of this exercise are forwarded to the Examination Committee so they can delete and/or develop new questions for the AC and CPC databanks. Any new AC questions developed are then coded for the appropriate ACCE Outcome(s). At least every five years, following the completion of the last RDS, the Examination Committee determines whether or not that there have been significant changes to the

competencies/specifications and thus questions in the data bank to conduct a revalidation exercise of the results of the previous mapping exercise of the AC questions to the ACCE Outcomes.”

ACCE Position

During the last two three-year cycle to change the ACCE Standards, it was generally accepted that the AIC AC Level I Exam could be used as a direct measurement of the aforementioned ten ACCE SLOs. As a result, ACCE maintained this sentence (in **bold**; formally in Section 3, now in Section 9 of Document 103):

9.4.3. Produce evidence in the form of assessment tools, associated grading rubrics, and one example of graded student work to:

- Demonstrate applicability of assessment content to the specified SLO.
- Demonstrate adequacy of the assessment tool in evaluating individual student’s ability to meet each SLO at or above the required minimum 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.**
- The determination of achievement shall be documented in a systemic manner.

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