

# Performance-Based Assessment

## Demonstrating Technical Skills Attainment in Career and Technical Education

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### Why PBA?

In order to receive federal funding, career and technical education (CTE) programs must demonstrate that students have attained technical skills in the funded courses. Traditionally, student learning has been measured using multiple-choice tests (through the Mississippi

Career Planning and Assessment System, Edition 2 [MS-CPAS2] in Mississippi). However, in 2010 Mississippi began the process of introducing performance-based assessments (PBAs) for students in selected CTE programs.

PBAs are designed to allow students to demonstrate what they have learned in class through hands-on, scenario-based methods. CTE courses are centered on project-based learning where students apply what they are learning to real-world situations. PBAs attempt to capture a similar dynamic in the assessment process.

### Piloting PBA in Mississippi

In 2010, PBA was piloted in two Mississippi CTE programs. What began as a portfolio assessment was redesigned to be a performance scenario, the current format, by 2012.

PBA for Mississippi's CTE programs is a three-part process in which students create a résumé and use it to complete a job application (Part 1), perform a set of tasks aligned to the course curriculum (Part 2), and discuss their work with evaluators from the industry and their course instructor (Part 3). Part 1 of the exam is weighted at 5%, while Parts 2 and 3 are combined for the final 95% of a student's total score. The course instructor and the two industry evaluators score students' performance using a predetermined rubric.

### PBA Results: Spring 2015

#### Student Scores

In 2015, eight CTE programs across Mississippi administered PBAs, and 1,215 students in these eight programs completed PBAs. The mean score across programs was 80%, and the cut score for pass/fail was 60% (the same cut score as MS-CPAS2). Across all programs, average PBA pass rates were above 50%.



# MISSISSIPPI PBA PARTICIPANTS



Architecture and  
Drafting



Digital Media  
Technology



Early Childhood  
Education



Energy Technology



Polymer Science



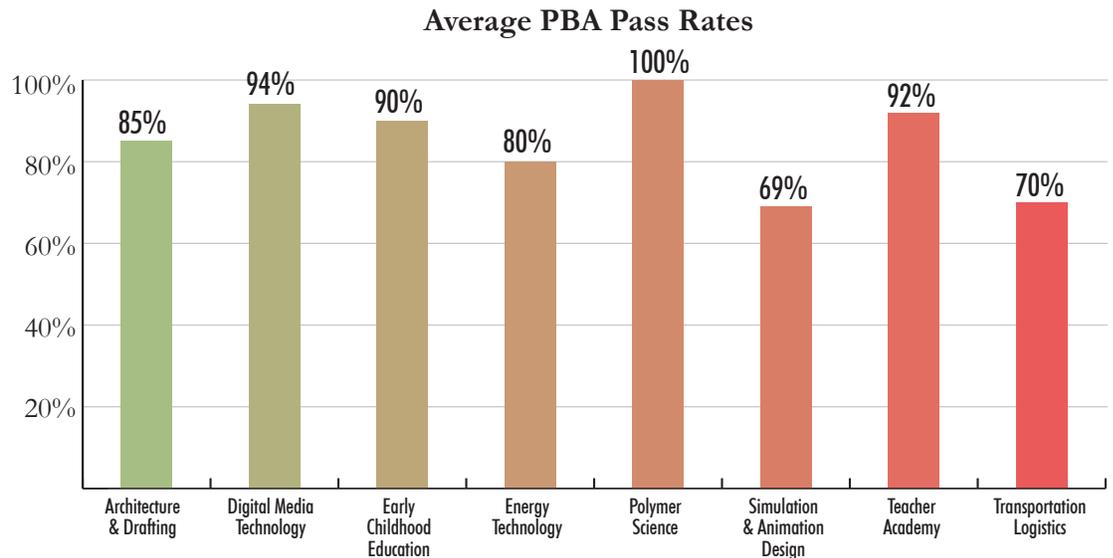
Simulation and  
Animation Design



Teacher Academy



Transportation  
Logistics



**AVERAGE OVERALL PASS RATE: 90%**

Typically, students struggled most with Part 2 (performing a set of tasks) and were most successful with Part 1 (creating a résumé and job application).

## Educator Feedback

Following administration of the spring 2015 PBAs, the RCU sent a survey to participating CTE directors, test coordinators, instructors, and industry evaluators to evaluate their perceptions of PBA and suggestions for improvement in the process; 250 individuals responded to the survey.

Overall, most respondents had a favorable view of PBA, with 77% reporting that PBA tasks either Authentically or Very Authentically measured students' knowledge and skills. In response to the question, "To what extent do you believe PBA is an effective method of measuring students' knowledge and skills in this course compared to multiple-choice assessments?," 81% of respondents answered Much More Effective or Somewhat More Effective.

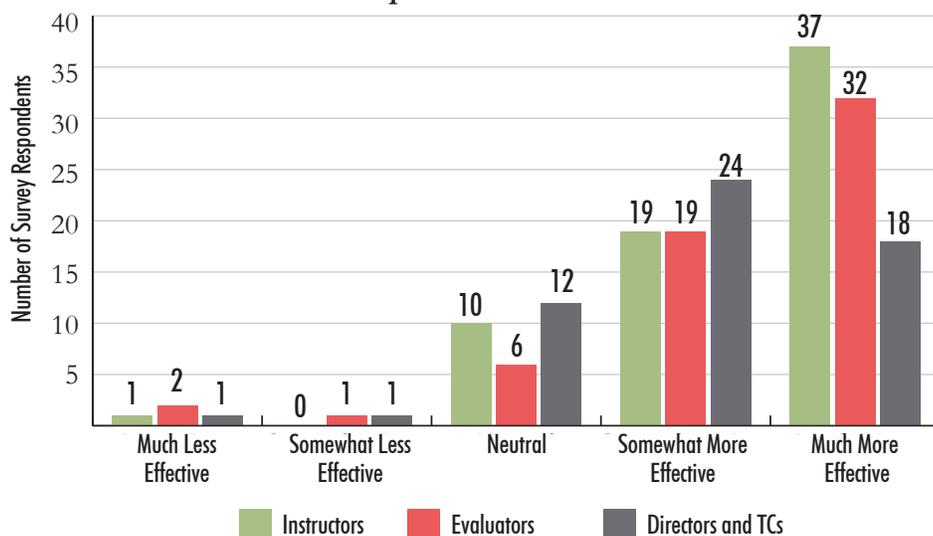
In past years, technology issues and securing enough industry evaluators to help score students' work were two key challenges reported by CTE educators participating in PBA. In light of this feedback, the RCU decided to host the PBA on a different technology platform that is more familiar to educators. The RCU also reduced the number of required industry evaluators from three to two after conducting research that indicated PBA could be scored with the same high degree of reliability with fewer evaluators.

In the 2015 survey, the vast majority of educators responding to the survey did not mention technology as a challenge, perhaps due to the use of a more familiar technology platform for PBA. In addition, 46% of respondents reported that recruiting evaluators was "not difficult at all." Instead, a concern reported by numerous respondents in this round of surveys was the time it took to prepare for and administer PBAs. However, individuals with time-related concerns were split on whether they needed more or less time for PBA administration.

## Student Feedback

Students in some of the CTE programs that pioneered PBA report positive experiences with the new assessment format. One polymer science student reported that he enjoyed the PBA process because it tested a variety of skills in ways a multiple-choice test just can't capture: "The hands-on portion of the PBA [was my favorite part] because it allowed me to show what I learned, [including] lab safety, skills, and techniques in polymer science." A digital media technology student shared his experience with PBA and his appreciation for the flexibility of the PBA format: "What I loved most about the PBA is that it truly felt like a test. In most classes, you're given information in a classroom and then asked to regurgitate it onto a bubble sheet a week later. This test [PBA] hinged on effort, creativity, and motivation." As another polymer science PBA test-taker summed it up, "I would take PBA over a multiple-choice test any day." Not every student had positive comments about PBA, but many seemed to value its authentic approach to assessing skill attainment and professionalism<sup>1</sup>.

To what extent do you believe PBA is an effective method of measuring students' knowledge and skills compared to multiple-choice assessments?



## Validity and Reliability

The PBA development process has been designed to support the ability to interpret PBA scores as true measures of students' technical-skill attainment. CTE instructors from across the state, in collaboration with assessment specialists from the RCU, design PBA performance-task frameworks and scoring rubrics to align with state program curricula.

A potential concern regarding PBA is the scoring of student work by different evaluators across programs and testing centers. To address these concerns, the PBA process includes procedures to support scoring reliability across the state:

- PBA evaluators are required to meet certain criteria, such as having at least three years of experience in the industry for which they are scoring.
- All evaluators must complete an RCU-developed short course that teaches standardized evaluation procedures and instructions for using the PBA scoring rubric.
- Within a CTE program area, evaluators across the state use the same rubric to score student work.

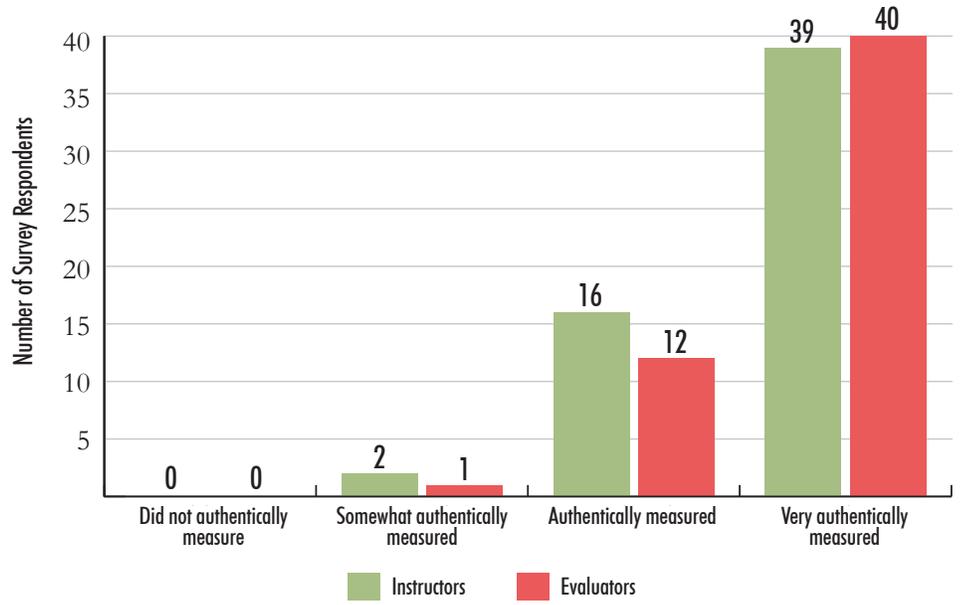
Generalizability studies conducted by the RCU indicated that PBA evaluators reliably scored students across the state.

<sup>1</sup> Nordin, A., & Tribble, S. (2015, Spring). Performance-based assessment: Students weigh in. *Connections*. Retrieved from [http://issuu.com/rcumedia/docs/connections-spring15\\_bbd061b10134f4/12](http://issuu.com/rcumedia/docs/connections-spring15_bbd061b10134f4/12)

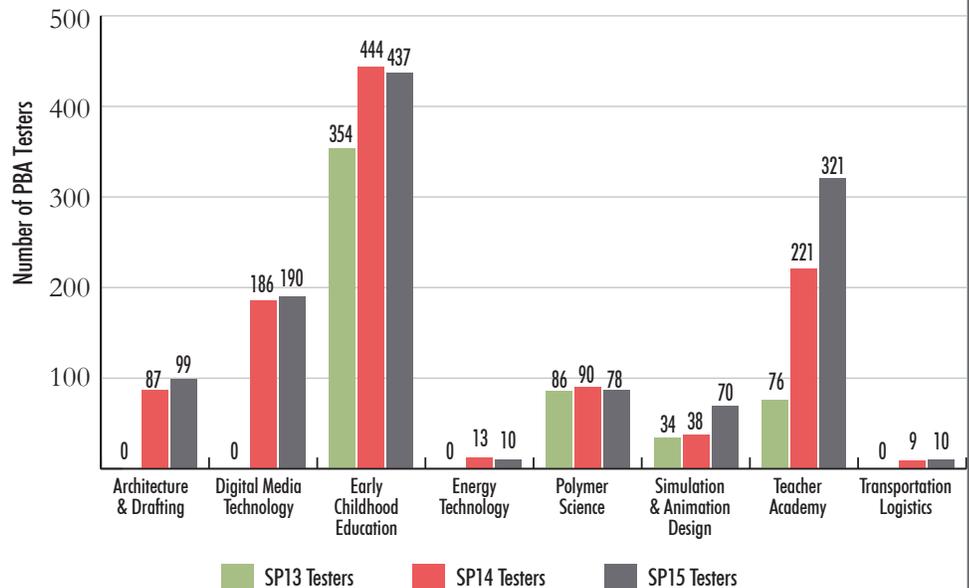
## Score Patterns

Overall, scoring patterns indicated proper execution of the PBA, meaning that, in general, PBA was implemented faithfully across participating CTE programs. However, two unwanted scoring patterns were observed in a limited number of CTE programs during the spring 2015 PBA administration: abnormal agreement and abnormally perfect scores. Abnormal agreement occurs when the course instructor and the two industry evaluators give a student the exact same score, even though instructors and evaluators are instructed not to collaborate or discuss what a student's score should be. Abnormally perfect scores occur when an unlikely number of students within a program receive a perfect PBA score. These abnormalities occurred in a limited number of CTE classrooms, and although they were more common in some programs than others, they were generally rare.

To what extent do you believe the scenario tasks authentically measured students' knowledge and skills in their course?



## Number of PBA Testers Over Time



## Future Directions

The two scoring oddities observed in a limited number of CTE programs during the spring 2015 PBA administration (abnormal agreement and abnormally perfect scores) indicate that a small number of participating CTE instructors and evaluators may not be correctly scoring student work. Further training of CTE educators and industry experts could help alleviate these scoring abnormalities in future years.

PBA is still a relatively new endeavor for Mississippi, and additional research is needed to strengthen confidence in this method. In future years, additional research on concurrent validity, predictive validity, and consequential validity will further strengthen trust in the ability of PBAs to correctly measure student learning.



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