



# Evaluation of NAEP 12<sup>th</sup> Grade Reading and Mathematics Frameworks and Item Pools as Measures of Academic Preparedness for College and Job Training

## Comprehensive Report

**Prepared for:** National Assessment Governing Board  
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Washington, DC 20002 42330

**Prepared under:** National Assessment of Educational Progress (NAEP)  
Reading and Mathematics Frameworks: 12th Grade  
Preparedness  
ED NAG 13 C 0001

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**Date:** February 9, 2015



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## Executive Summary

The National Assessment Governing Board (hereafter, “Governing Board”) contracted with the Human Resources Research Organization (HumRRO) to conduct a multi-method evaluation of the 12<sup>th</sup> grade National Assessment of Educational Progress (NAEP) reading and mathematics frameworks and item pools as a measure of preparedness for college and job training. This effort included three distinct investigations; 1) a content alignment study between NAEP and the WorkKeys assessments, 2) comparisons between NAEP and U.S Department of Labor’s occupational information network, or O\*NET, for five target occupations, and 3) exploratory papers commissioned from a joint panel of education and industrial/organizational psychology experts, the NAEP Framework Evaluation Technical Advisory Panel (TAP). This report summarizes the entire project and includes highlights from each study.

In summary, findings from both studies—the content alignment study between NAEP and WorkKeys and the study comparing NAEP content and O\*NET content—call into question the validity of inferences that can be made about using NAEP to report on the preparedness of U.S. 12<sup>th</sup> grade students for entry into job training. Moreover, during the TAP symposium many challenges were discussed with regard to conducting research on academic preparedness for job training such as the variability in training programs across and even within occupations. Challenges such as these, coupled with research findings that have provided converging evidence that NAEP measures reading and math content that is broader and at a higher level than the reading and math knowledge, skills, and abilities (KSAs) required for entry into job training, call into question whether the Governing Board should continue to conduct research on using NAEP as an indicator of academic preparedness for entry into job training.

If, however, the Governing Board decides to move forward with preparedness research for job training, several avenues for future research were provided. These avenues fall into essentially two categories. First, modify NAEP itself or NAEP reporting to more directly address job preparedness. This could mean reporting subscores based on relevant parts of the frameworks, re-administering portions of the grade 8 NAEP to high school students, or adding background questions to measure additional constructs that are more relevant to job preparedness (e.g., grit). The second avenue for research involves monitoring longitudinal performance of students with known NAEP scores. This would allow linking to job training performance or job performance. This avenue might help NAEP establish performance categories more directly relevant to job training performance or to select specific frameworks statements on which to base a job preparedness indicator.

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## Table of Contents

Executive Summary .....	i
Introduction .....	1
Background.....	1
This Report .....	3
Content Alignment Between the NAEP and WorkKeys Assessments .....	4
Comparisons Between NAEP and O*NET on Academic Preparedness for Job Training for Five Target Occupations .....	5
NAEP Framework Evaluation Technical Advisory Panel .....	7
Summary of HumRRO Investigations.....	9
References .....	11

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## Introduction

The National Assessment Governing Board (hereafter, “Governing Board”) contracted with the Human Resources Research Organization (HumRRO) to conduct a multi-method evaluation of the 12<sup>th</sup> grade National Assessment of Educational Progress (NAEP) reading and mathematics frameworks and item pools as a measure of preparedness for college and job training. This study advances the Governing Board’s preparedness research agenda, which has been underway since 2010.

The HumRRO evaluation included three distinct investigations. Detailed reports for each of these efforts are listed in the References section. This report summarizes the entire project and includes highlights from each study. To provide context, the following section summarizes the history of the Governing Board’s preparedness research preceding this work.

## Background

In March 2003, the Governing Board established a National Commission on National Assessment of Educational Progress (NAEP) 12<sup>th</sup> Grade Assessment and Reporting. Co-chaired by Mark Musick (Southern Regional Education Board) and Michael Nettles (Educational Testing Service), the commission comprised 18 members representing K-12 education, postsecondary education, business and industry, and the military. The commission focused on improvements needed for 12<sup>th</sup> grade NAEP, as opposed to reviewing the status of secondary education or evaluating the quality and rigor of high school curricula (U.S. Department of Education, 2004).

Questions addressed by the commission included: (a) What does America need to know about 12<sup>th</sup> graders soon to graduate from high school? (b) What can NAEP do to provide that information? (c) What should be the content of 12<sup>th</sup> grade NAEP? (d) How can 12<sup>th</sup> graders be motivated to do their best on NAEP? and (e) How can the Governing Board and the National Center for Education Statistics promote 12<sup>th</sup> grade NAEP participation (Sellman, Wise, Schultz, & Schantz, 2003)?

In a March 2004 report entitled, *Twelfth Grade Student Achievement in America: A New Vision for NAEP*, the commission concluded that 12<sup>th</sup> grade NAEP should be redesigned. One commission recommendation was that NAEP should report 12<sup>th</sup> grade student preparedness for postsecondary learning (i.e., transition to higher education, training for employment, and entrance into the military) (U.S. Department of Education, 2004). Reporting postsecondary preparedness would be a new direction for NAEP that would require researching whether NAEP results could be used to predict preparedness for college, civilian employment training, and military enlistment.

For the next several years, the Governing Board explored potential approaches for implementing the commission’s recommendations. In June 2007, the Governing Board convened a Technical Panel on 12<sup>th</sup> Grade Preparedness Research to assist in planning research and validity studies that would enable NAEP to report on the preparedness of 12<sup>th</sup> graders for education and job training after high school graduation. In particular, the panel was

to identify and recommend research designs and priorities for the use of 12<sup>th</sup> grade NAEP as a predictor of postsecondary preparedness. Composed of seven members with a wide variety of expertise in higher education policy, the civilian and military worlds of work, and psychological and educational measurement, the panel was chaired by Michael Kirst (Stanford University).

After a year of deliberations, the panel concluded: (a) reporting performance on 12<sup>th</sup> grade NAEP in relation to preparedness was feasible and should be pursued, (b) a multipronged approach was the way to gain information regarding the complex relationship between NAEP and postsecondary school success, (c) NAEP's reporting on preparedness should not be construed as the single authoritative definition or conception of preparedness, and (d) the evolving national context related to preparedness policies and practices was a dynamic that required special consideration. The panel recommended that preparedness should represent the academic knowledge and skills in reading and mathematics necessary to enroll in a credit-bearing undergraduate course without need for remediation or to be qualified for placement into a civilian or military job training program (U.S. Department of Education, 2009). This definition of preparedness is meant to be distinct from "readiness," which includes other important aspects of student performance that may mediate post-high school outcomes such as time management, persistence, and interpersonal skills, among others.

In November 2008, Dr. Kirst presented the panel's findings to the Governing Board. The panel recommended several types of studies, to include:

- Content alignment studies to evaluate the extent of content overlap between NAEP and other assessments.
- Criteria-based judgmental standard setting studies by subject matter experts to set cut scores on NAEP via a performance-based standard setting procedure.
- Statistical relationship studies to project preparedness indicators onto the NAEP scale by relating NAEP to performance on other assessments.
- Survey studies to collect data regarding cut scores on other assessments used for college admissions and job training placement decisions.

Later, the Governing Board added a fifth type of study – benchmarking – in which 12<sup>th</sup> grade NAEP is administered to a student reference group of interest, e.g., freshmen college students, military recruits, or job trainees. NAEP scores are then mapped onto relevant preparedness criteria.

In 2009, the Governing Board approved four categories of research to support setting and reporting 12<sup>th</sup> grade preparedness levels. The first group of studies involved analyses of the alignment of NAEP content to the content covered by other assessments (e.g., SAT, AccuPlacer, and WorkKeys). Judgmental standard setting studies, designed and conducted for work preparedness, comprise the second group of studies. Five exemplar jobs were selected by the Governing Board for inclusion in these studies. They are: (a) Automotive Master Mechanic; (b) Computer Support Specialist; (c) Heating, Ventilation, and Air Conditioning Technician (HVAC); (d) Licensed Practical Nurse (LPN); and (e) Pharmacy Technician. Statistical linkage studies comprise the third group of studies, while surveys of two- and four-year colleges, covering admissions and placement practices, make up the fourth group. A fifth group of studies pertaining to benchmarking 12<sup>th</sup> grade NAEP scores against reference groups of interest (e.g.,

college students, military recruits, and civilian job trainees) was also approved by the Governing Board.

Over the past several years, more than 30 12<sup>th</sup> grade NAEP preparedness studies have been completed by the Governing Board. Central to the validity of reporting 12<sup>th</sup> grade preparedness for reading and mathematics is confirmation that the assessments actually measure the knowledge, skills, and abilities for students to be academically prepared for college course work and/or for entry into job training programs. Content alignment studies for 12<sup>th</sup> grade NAEP reading and mathematics assessments with college admissions tests (i.e., SAT, ACT) found similar content in NAEP and the college admission examinations SAT and ACT, and somewhat less with the ACCUPLACER.

On the other hand, alignment between 12<sup>th</sup> grade NAEP reading and mathematics and tests designed to measure knowledge, skills, and abilities supposedly related to the workplace (e.g., WorkKeys) have led to less clear results. Subject matter experts participating in judgmental standard setting studies reported that NAEP reading and mathematics items were less relevant for predicting success in job training programs than in entry level college courses (Loomis, 2012).

At its November-December 2012 meeting, the Governing Board discussed plans for additional research to be conducted during the coming year. This would include content analysis and linking of 8<sup>th</sup> grade NAEP and 8<sup>th</sup> grade EXPLORE, an ACT developed test that is linked to the college-level ACT. Analysis of course content prerequisites for freshman college courses and job training programs, and efforts to obtain information about military job training also were on the drawing board.

After discussing the challenges of job training preparedness, the Governing Board decided to commission this project as a final effort to explore the feasibility of this line of research (Sellman, Wise, & Schultz, 2012).

### ***This Report***

HumRRO conducted a multi-method evaluation of the 12<sup>th</sup> grade NAEP reading and mathematics frameworks and item pools as a measure of preparedness for college and job training. Given that the college preparedness research has progressed further than that for job training, HumRRO focused its efforts on expanding the investigation of job training preparedness. Based on findings from research to date, we incorporated 8<sup>th</sup> grade NAEP reading and mathematics frameworks and items pools into our investigations to determine whether some 8<sup>th</sup> grade NAEP content is better suited than the 12<sup>th</sup> grade NAEP for assessing academic preparedness for job training as well as college.

We extended the prior NAEP preparedness research with two studies designed to dive more deeply into job training preparedness issues not yet clearly resolved. One study investigated the content alignment between NAEP and a job skills assessment that helps employers select, hire, train, develop, and retain a high-performance workforce (ACT WorkKeys). A second study compared the levels of knowledge, skills, and abilities (KSAs) required for relevant NAEP reading and mathematics content to the levels of KSAs required for relevant job training content, as indicated in the U.S Department of Labor's occupational information network, or O\*NET.

A separate, parallel effort commissioned thoughtful guidance from leading experts in industrial-organizational (I-O) psychology and educational research. Panelists were asked to consider

completed NAEP research and develop white papers discussing the potential of the 12<sup>th</sup> grade NAEP reading and mathematics frameworks and item pools as a measure of academic preparedness for college and job training.

### Content Alignment between the NAEP and WorkKeys Assessments

The first study and its results are documented in detail in Dickinson, Smith, Deatz, Thacker, Sinclair, and Johnston-Fisher (2014). HumRRO recruited 48 educators from 13 states as panelists to determine the content alignment between NAEP and WorkKeys. Panelists were divided among two workshops, conducted separately to facilitate the assessment of the reliability of results. Panelists participated in a variety of alignment tasks. This study built upon prior research on the content alignment between NAEP and WorkKeys in three major ways (ACT, 2010a; 2010b). First, this study included the Frameworks and items from the NAEP grade 8 assessments in order to address concerns raised that grade 8 Frameworks may provide a better match to the academic content expectations of job training programs (Kilpatrick, 2012; Loomis, 2012). Second, additional WorkKeys assessments (Applied Technology and Locating Information) were included in the study to determine the extent to which NAEP mathematics and informational reading content may relate to these additional WorkKeys assessments. Finally, the NAEP Frameworks were directly compared to the WorkKeys targets (standards) to determine the degree of overlap between the two content domains.

This study helped to identify (a) the extent to which NAEP assessments measure the content and cognitive complexity reflected in the WorkKeys targets, (b) the extent to which WorkKeys assessments measure the content and cognitive complexity reflected in the NAEP Mathematics Framework and the informational component of the NAEP Reading Framework, and (c) the amount of overlap between the NAEP Frameworks for mathematics and informational reading and the WorkKeys targets for Applied Mathematics, Applied Technology, Locating Information, and Reading for Information. Specifically, the following comparisons were made:

- NAEP Mathematics Framework and WorkKeys targets for Applied Mathematics
- NAEP Mathematics Framework and WorkKeys targets for Applied Technology
- NAEP Reading Framework (Informational component only) and WorkKeys targets for Reading for Information
- NAEP Reading Framework (Informational component only) and WorkKeys targets for Locating Information

Several key results do not support the use of NAEP for determinations related to the academic preparedness of U.S. 12<sup>th</sup> grade students for entry into job training:

- NAEP items do not adequately represent the WorkKeys content domain, as evidenced by the percentages of WorkKeys' mathematics and reading targets (52% and 72%, respectively) that were not matched to any NAEP item.
- Sixteen of the 24 content strands within the NAEP Math Framework and one of the three cognitive targets within the NAEP Reading Framework were not matched to any WorkKeys item.



- A direct comparison of the content frameworks for the two assessments indicated that the majority of the elements of the NAEP Math Framework, WorkKeys math targets, and WorkKeys applied technology targets reflected unique content. Unique mathematics elements were calculated for grade 12 NAEP math framework (85%), grade 8 NAEP math framework (75%), WorkKeys math targets (61%), and WorkKeys applied technology targets (100%). Unique reading elements included grade 8 and 12 informational reading framework (50%), WorkKeys reading targets (46%), and WorkKeys locating information targets (50%).

These results are not all that surprising given the differing purposes of the two assessments. While NAEP has been designed to provide evidence of what students in the United States know and can do with respect to a broad academic curriculum, WorkKeys assessments provide information about job-related skills that can be used in the selection, hiring, training, and development of employees. It should be noted that while this study found that much of the content assessed by WorkKeys and NAEP did not overlap, lack of overlap is not evaluative of either assessment. The lack of overlap in content likely reflects substantial differences in purpose and design. Both assessments may function very well for their specified purposes without exhibiting great similarity in the content they measure.

Finally, while there is some indication that there is more overlap between grade 8 NAEP items and WorkKeys targets, which is consistent with information provided in related research studies (Loomis, 2012; Sinclair, Becker, McCloy, & Thacker, 2014; Educational Policy Improvement Center, 2013), the results of this study suggest that including grade 8 NAEP content does not significantly improve the level of alignment between the NAEP and WorkKeys assessments, nor would the 8th grade NAEP assessments be an appropriate measure of academic preparedness for postsecondary job training.

### **Comparisons between NAEP and O\*NET on Academic Preparedness for Job Training for Five Target Occupations**

Details and results from the second study are documented in Sinclair, Becker, McCloy, & Thacker (2014). This study identified NAEP content (8<sup>th</sup> and 12<sup>th</sup> grade) that is relevant to training performance requirements for each of the five target occupations, and, conversely, the training performance requirements that are relevant to NAEP content. The job training content was based on performance requirements (tasks) adapted from O\*NET, the U.S. Department of Labor's occupational information network. The study also compared the levels of academically-relevant KSAs required for proficiency on the job-relevant NAEP content to the levels of KSAs required for the NAEP-relevant job training content. The KSAs included in this study were a subset of academically-relevant KSAs from the O\*NET covering reading and mathematical related skills (e.g., written comprehension, mathematical reasoning, critical thinking, complex problem solving, deductive reasoning, etc.)

An overview of the findings is as follows:

- The range of reading and mathematics skills required by NAEP (both grade 8 and grade 12) is broader than the range of reading and mathematics skills required by job training. This was demonstrated by the finding that considerably more content on NAEP was rated as irrelevant to job training than was job training content rated as irrelevant to NAEP.
- The NAEP reading objectives most relevant to job training content are the objectives associated with the Locate/Recall cognitive target for NAEP informational reading.

- The NAEP reading objectives that were least relevant to job training content were the objectives associated with the Critique/Evaluate cognitive target.
- The NAEP mathematics objectives most relevant to job training content were the objectives associated with the Number Properties and Operations content area and the Measurement content area (except for Computer Support Specialists). This was true for both grade 8 and grade 12 NAEP.
- The NAEP mathematics objectives that were least relevant to job training content were the objectives associated with Geometry (except for HVAC) and Algebra (except for LPNs). This was true for both grade 8 and grade 12 NAEP.
- The percentage of the NAEP mathematics objectives linked to job training requirements for specific occupations decreased considerably from grade 8 to grade 12, indicating that as the complexity of the NAEP objectives increased from grade 8 to grade 12 their relevance to job training decreased<sup>1</sup>.
- Disconnects were found between the levels of KSAs required for proficient performance on NAEP and the levels of KSAs required for entry into job training such that higher levels of the KSAs were required in the NAEP assessments than for job training. The largest disconnects occurred between grade 12 NAEP mathematics and job training. Disconnects also occurred between grade 12 reading and job training. The disconnects in required levels of KSAs tended to be smaller when comparing grade 8 content to job training content, particularly for grade 8 reading, which demonstrated several “matches” with KSA levels for training content (most notably with Written Comprehension).

As a result of the above set of findings, HumRRO offered the following recommendations for the Governing Board’s consideration:

- Given that there is converging evidence across studies that the Number Properties and Operations content area for mathematics and the Locate/Recall cognitive target from NAEP informational reading are most relevant to job training, consider the possibility of using subscores from these content areas to report on students’ academic preparedness for job training.
- Given the greater correspondence between grade 8 content and job training content in reading and mathematics, consider the possibility of administering the grade 8 assessments to 12<sup>th</sup> grade students to make determinations about their academic preparedness for entry into job training.
- Consider the possibility of updating the working definition of job training preparedness to include trainee outcomes, such as trainee performance in job training. Actual performance in job training is at a level that is somewhat beyond “just qualified” for placement into job training. Including training outcomes in the working definition of job training preparedness might potentially lead to evidence that is more supportive of grade 12 NAEP as an indicator of job training preparedness. Furthermore, including training outcomes as elements of the working definition of job training preparedness would expand opportunities for future research investigations.

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<sup>1</sup> A comparable statement about whether including grade 8 reading resulted in more linked content is not possible given that NAEP reading objectives are the same for grade 8 and for grade 12.

## NAEP Framework Evaluation Technical Advisory Panel

The final HumRRO study involved convening an expert panel as described in McCloy and Day (2014). HumRRO assembled a 10-person technical advisory panel (TAP) to consider the research conducted to date, as well as the two studies described above, produce ideas for future work, and also to provide input on whether the Governing Board should continue to perform research on using NAEP as an indicator of academic preparedness for job-training programs. To draw on a wide range of relevant expertise we recruited 10 experts: 5 experts in the area of industrial-organizational psychology and 5 experts in educational measurement. HumRRO's experience in both these fields led us to recognize the potential of contributions from both disciplines. The members of the Technical Advisory Panel (TAP) were:

### Industrial-Organizational Psychologists

- John P. Campbell, University of Minnesota;
- Michael A. Campion, Purdue University;
- Kenneth Pearlman, Kenneth Pearlman, LLC
- Ann Marie Ryan, Michigan State University
- Nancy T. Tippins, Corporate Executive Board – Valtera Corporation

### Educational Researchers

- Gregory J. Cizek, University of North Carolina, Chapel Hill
- Brian Gong, Center for Assessment, National Center for the Improvement of Educational Assessment;
- Ronald K. Hambleton, University of Massachusetts, Amherst;
- Suzanne Lane, University of Pittsburgh;
- Barbara S. Plake, University of Nebraska—Lincoln, retired, private consultant;

Panelists attended a brainstorming session in October 2013. In this session panelists were briefed on the Governing Board's preparedness research conducted to date and engaged in discussions of possible future studies to further the preparedness research agenda. After the meeting, panelists submitted proposals for white papers. Governing Board staff reviewed these proposals and commissioned three papers. The commissioned authors presented their papers for discussion at a second meeting, the TAP Symposium, in August 2014.

During this symposium, many challenges were discussed with regard to conducting research on academic preparedness for job training. For example, the variability in training programs across occupations—and even the variability across training programs within the same occupation—makes it exceedingly difficult to determine a reference point on the NAEP scale that signifies academic preparedness for job training. Even if arrangements could be made to administer a special NAEP test, it would likely be difficult to obtain participation from organizations to support this special administration. It

also would be challenging to obtain scores from the NAEP respondents on some validated measure of job training. Challenges such as these, coupled with research findings that have provided converging evidence that NAEP measures reading and math content that is larger and broader than the reading and math KSAs required for entry into job training, call into question whether the Governing Board should continue to conduct research on using NAEP as a measure of academic preparedness for job-training programs.

If, however, the Governing Board decides to move forward with preparedness research for job training, the next agenda items to consider, based on the TAP symposium, would be the following:

**1. Build upon the idea to use NAEP to measure student job readiness**

Dr. Plake suggested a modification of prior expert judgment research—namely, asking job training experts to evaluate the importance for training of items mapped onto the NAEP Achievement Levels as a group, rather than simply rating discrete items as was done in a previous standard setting study (WestEd & Measured Progress, 2011; 2012). The items might be organized by content strand, so that importance might be rated differentially by strand. The general idea is to get experts to respond to more general descriptions of academic preparedness, rather than to individual items.

**2. Collect information on additional aspects of preparedness through student (and possibly also teacher) questionnaires**

Dr. Ryan suggested that further research on academic preparedness for job training might employ measures of the grit construct as potential moderators.

**3. Analyze/conduct longitudinal research relating academic performance at the end of high school to subsequent career success**

The National Center for Education Statistics (NCES) has conducted several research studies following students from high school into post-high school activities. The National Longitudinal Surveys conducted by the Department of Labor contain similar data. The TAP discussed how results from prior analyses of these data, together with new analyses, could inform the relation between academic skills in high school and persistence and success in different career fields.

**4. Consider studies linking employment tests to the NAEP scale**

Dr. Tippins suggested studies to link employment tests to the NAEP scale. The approach would likely entail the following: (a) recruit a few large companies that provide entry-level jobs not requiring prior job knowledge or experience, (b) ask them to administer a number of NAEP items along with commonly used employment tests so that the employment test and NAEP scales can be linked, (c) collect information on key decision points, and (d) summarize findings on the relation between the employment test score levels and subsequent success<sup>2</sup>.

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<sup>2</sup> Note that implementing this recommendation would require expanding the current working definition of job training preparedness to include outcome measures.

## 5. Embed job training preparedness items into NAEP

Dr. Champion recommended embedding items from a measure of job training preparedness (e.g., WorkKeys) into the NAEP assessment. This could offer an alternative to trying to get job trainees and/or individuals in associate degree programs to complete a special administration of NAEP.

### Summary of HumRRO Investigations

In summary, findings from both HumRRO studies—the content alignment study between NAEP and WorkKeys and the study comparing NAEP content and O\*NET content—call into question the validity of inferences that can be made about the preparedness of U.S. 12th grade students for entry into job training using NAEP results. Moreover, during the TAP symposium many challenges were discussed with regard to conducting research on academic preparedness for job training such as the variability in training programs across occupations and even the variability across training programs within the *same* occupation. Challenges such as these, coupled with research findings that have provided converging evidence that NAEP measures reading and math content that is broader and at a higher level than the reading and math KSAs required for entry into job training, call into question whether the Governing Board should continue to conduct research on using NAEP as an indicator of academic preparedness for entry into job training.

If, however, the Governing Board decides to move forward with research on preparedness for job training, several avenues for future research were suggested. In summary, based on findings from the studies summarized in this paper and from the TAP symposium, the following have been offered as next agenda items for consideration:

- Consider the possibility of using subscores from the Number Properties and Operations content area from mathematics and the Locate/Recall cognitive target from informational reading to report on students' academic preparedness for job training.
- Consider the possibility of administering the grade 8 assessments to 12<sup>th</sup> grade students to make determinations about their academic preparedness for entry into job training<sup>3</sup>.
- Modify the previous standard setting study (WestEd & Measured Progress, 2011; 2012) such that job training experts evaluate the importance for training of items mapped onto the NAEP achievement levels as a group, rather than simply rating discrete items as was done in the aforementioned standard setting study. The items might be organized by content strand, so that importance might be rated differentially by strand. The general idea is to get experts to respond to more general descriptions of academic preparedness, rather than to individual items.
- Continue explorations already underway by NAEP to use contextual questions to develop a measure of the grit construct as an indicator of preparedness for success in both college and job training.

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<sup>3</sup> It should be noted that evidence from the O\*NET study was more supportive of this recommendation than the evidence from the alignment study with WorkKeys.

- Analyze/conduct longitudinal research relating academic proficiencies at the end of high school to subsequent career success using, for example, data from the National Longitudinal Surveys conducted by the Department of Labor. Results from prior analyses of these data, together with new analyses, could inform the relation between academic skills in high school and persistence and success in different career fields.
- Link employment tests to the NAEP scale. This approach would entail recruiting a few large companies that provide entry-level jobs not requiring prior job knowledge or experience, asking them to administer a number of NAEP items along with commonly used employment tests so that the employment test and NAEP scales could be linked, collecting information on key decision points, and summarizing findings on the relation between the employment test score levels and subsequent success.
- Embed items from a measure of job training preparedness (e.g., WorkKeys) into the NAEP assessment. This could offer an alternative to trying to get job trainees and/or individuals in associate degree programs to complete a special administration of NAEP.
- Consider the possibility of updating the working definition of job training preparedness to include trainee outcomes, such as trainee performance in job training. Actual performance in job training is at a level that is somewhat beyond “just qualified” for placement into job training. Including training outcomes in the working definition of job training preparedness might potentially lead to evidence that is more supportive of grade 12 NAEP as an indicator of job training preparedness. Furthermore, including training outcomes as elements of the working definition of job training preparedness would expand opportunities for future research investigations.

We believe that the above topics are likely to yield the most fruitful avenues for future research on the use of NAEP as an indicator of academic preparedness for job training. However, these recommendations for future research should be tempered with the caveats described in the three HumRRO reports (Dickinson et al., 2014; McCloy & Day, 2014; Sinclair et al., 2014), and summarized in this final report—namely, that there is mounting evidence indicating that 12<sup>th</sup> grade NAEP may not be a suitable indicator of academic preparedness for job training.

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