



# MLDS CENTER

Maryland Longitudinal Data System

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## Memorandum

**To:** Governing Board

**From:** Ross Goldstein

**Date:** January 13, 2023

**Subject:** External Research Request - *College and Career Readiness Empirical Study*  
Research Requested by MSDE as required by the Blueprint

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### **Purpose**

The purpose of this agenda item is for the Governing Board to review and approve an external research project to study *College and Career Readiness Standards*. This research is a requirement under the Blueprint for Maryland's Future and is being conducted by an external research team on behalf of MSDE.

### **Background**

#### CCR Research Proposal

The Blueprint for Maryland's Future (see Ed. Art. § 7-205.1, Annotated Code of Maryland) requires each student to be assessed, no later than the 10th grade, to determine whether the student is college and career ready, which is defined by the Blueprint as meeting a standard in English, mathematics, and science that enables the student to be successful in entry level credit bearing courses or postsecondary education training at a State community college. MSDE has established an interim standard, that was approved by the State Board of Education, for determining whether a student is college and career ready.

MSDE, in consultation with AIB, is required to contract with a public or private entity to conduct an empirical study of the CCR standard adopted by the State Board to determine whether that standard adequately meets the CCR standard in the Blueprint. The empirical study must be reported on or before September 1, 2023 and must include the results of its study and recommendations to modify the CCR standard to align with the literacy standards necessary to be successful in State community colleges and, to the extent applicable, comparable postsecondary institutions in top performing systems. Some, but not all, of the study will require access to MLDS data.

Attached is the external research application submitted by the team of researchers from the [American Institutes for Research](#) (AIR) The organization was selected by MSDE through a competitive RFP to conduct this study.

#### Review and Approval Process

As discussed during the December Governing Board Meeting, even though this project is necessary to fulfill a legislative mandate, it is an external research project and subject to the MLDS Center's [Policies and Procedures for External Research Projects](#). Those procedures require the researcher applying to use the MLDS to complete a form providing information about the project, the researchers, the data to be

used, and how the research will benefit the State of Maryland. These procedures ensure not only that the proposed use of the MLDS is consistent with state law, but also provides an opportunity for our data sharing partners to understand how their data are being used and provide feedback and suggestions about the project.

Due to the importance of this research project and the need for the research team to meet project milestones established under the RFP, the Center has shortened the review timeline, but has completed each of the required steps:

1. Internal meeting was held on December 20, 2022;
2. A special Research and Policy Advisory Board (RPB) Meeting was held on January 5, 2023; and
3. Governing Board meeting to be held January 18, 2022.

### **Issues Raised**

During the review and discussion at the RPB meeting, members (primarily those representing higher education) expressed reservations about the project.

1. The research could be construed as more of a higher education evaluation than what it means to be ready for college.
2. The project did not demonstrate a nuanced use of higher education data. For example:
  - a. The project does not specify what constitutes “college going” - e.g. only first fall after high school enrollments or any enrollment post-high school.
  - b. The project does not acknowledge or provide a process managing the variations in higher education institutions, the students they attract and the varied outcomes.

MSDE and the AIR researchers have worked to amend the research proposal to address the concerns of the higher education representatives, including seeking input from stakeholders during the research and analysis process.

### **Requested Board Action**

My recommendation is to approve the project.

1. Qualifications: The AIR research team is highly qualified and has the requisite credentials and capabilities to conduct this research. Members of the MLDS Research Branch are familiar with the work and professional reputation of the project lead Dr. Jordan Rickles. Dr. Mark Lachowicz, one of the AIR team members has had in-depth experience working with the MLDS as part of the synthetic data research team.
2. Cross-Sector: This project is cross sector and will require the use of K-12, Higher Education and Workforce data.
3. Value to the state: As discussed this project is at the request of MSDE and is being done to fulfill a statutory requirement.
4. Issues raised: The higher education concerns are valid and require serious consideration. In my view, MSDE and AIR have been responsive in addressing most of the issues raised and appear willing and able to continue the dialogue to ensure input and expertise from higher education interests are included throughout the project.

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**Section 1. Project Information**

<b>Project Title</b>
Career and College Readiness (CCR) Empirical Study
<b>Principal Investigator (please list additional project team members in Section 4)</b>
Jordan Rickles, PhD
<b>Email Address and Phone Number</b>
email: <a href="mailto:jrickles@air.org">jrickles@air.org</a>
<b>Name of University or Organization</b>
American Institutes for Research (AIR)
<b>Applicant Background and Qualification (provide overview of experience and attach a CV)</b>
<p><b>Dr. Jordan Rickles</b> is a principal researcher at AIR with more than 15 years of experience designing and conducting experimental and quasi-experimental research studies on policies, programs, and strategies for improving student learning opportunities and performance. He specializes in research design and quantitative methodology, with a particular interest in investigating variation in effects and practices across schools. Dr. Rickles has experience leading quantitative analyses for a wide variety of research projects, from multi-year, large-scale randomized controlled trials (RCTs) investigating supports for reading in early elementary grades, to quasi-experimental studies estimating the effects of a mathematics digital curriculum program. His work primarily focuses on ways to improve learning opportunities and outcomes for historically underserved students and students falling behind academically. Dr. Rickles is currently the PI for an efficacy study of an online credit recovery program funded by the Institute of Education Sciences (IES) and directs the impact evaluation for an Education Innovation and Research mid-phase study of a middle school supplemental math program. He also serves as the quantitative analysis task leader for a large-scale RCT of multi-tiered systems of support for reading funded by the National Center for Education Evaluation in the U.S. Department of Education. In 2015, Dr. Rickles was the recipient of an IES Statistical Research Methodology in Education Early Career Grant. Prior to working at AIR, he led research projects within the Los Angeles Unified School District. Collectively, his experience includes leading complex education evaluations across multiple sites, as well as the analysis of complex and multifaceted education data. Dr. Rickles regularly presents at national conferences, and his work is published in book chapters and peer-reviewed journals, including the <i>Journal of Educational and Behavioral Statistics</i>, <i>Educational Researcher</i>, the <i>Journal of Research on Educational Effectiveness</i>, and <i>Educational Evaluation and Policy Analysis</i>. Dr. Rickles earned a PhD in education from the UCLA Graduate School of Education and Information Studies, with a concentration in social research</p>

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methodology. He was also an IES predoctoral fellow in the UCLA Advanced Quantitative Methodology program. He received an MPP from the UCLA School of Public Affairs and a BS from the Cornell University School of Industrial and Labor Relations.

**Dr. Tracy Sweet** is the Maryland sponsor for this project. Dr. Sweet is an Associate Professor in the Measurement, Statistics and Evaluation program in the Department of Human Development and Quantitative Methodology. She completed her Ph.D. in Statistics at Carnegie Mellon University and a M.A. in Mathematics at Morgan State University. Her research focuses on methods for social network analysis with particular focus on multilevel social network models. Recent projects include network interference, measurement error, and missing data. She serves as the Associate Director of Research for UMCP for the Maryland Longitudinal Data System Center and is currently overseeing projects applying data science and statistical methods to large-scale educational data. Finally, Dr. Sweet is committed to improving diversity in the fields of statistics and quantitative methodology. She serves on the DEI committee for her department and the College's Council on Racial Equity and Justice, and she is interested in exploring how race and ethnicity is analyzed in quantitative methods.

**Abstract or Brief Description of Proposed Project (no more than 1,500 words)**

The *Blueprint for Maryland's Future* defined a preliminary standard for college and career readiness (CCR). The Blueprint requires that "a student shall meet the CCR standard when the student meets a standard in English language arts, mathematics, and, when practicable, science that enables the student to be successful in entry level credit bearing courses or postsecondary education training at a state community college." Further, the Blueprint requires that the Maryland State Department of Education (MSDE) contract with a public or private entity to conduct an empirical study of the CCR standard set by the State Board of Education to determine whether that standard does reflect and/or predict whether a student will be successful in entry level credit bearing courses or postsecondary education at a state community college. The MSDE contracted with AIR (contract #R00B2600072) to conduct the empirical study required by the Blueprint and to explore additional possible measures of student readiness for college and career success. The empirical study includes two components:

- A predictive validity study (quantitative study) to determine whether the current CCR standards reflect and/or predict whether a student will be successful in entry-level credit-bearing courses or postsecondary education training.
- A content and standards alignment study to determine the levels and types of literacy in English language arts (ELA) and mathematics needed to succeed in entry-level credit-bearing courses and postsecondary training.

The MLDS Center research request is for the predictive validity study. The proposed approach to the predictive validity study includes exploration of the relationship between (1) the current Maryland CCR standard and postsecondary achievement, and (2) other potential high school measures of readiness and postsecondary achievement. Looking at more measures than what is stipulated in the Blueprint will help us understand how well the current preliminary CCR standard predicts postsecondary readiness and determine if there are alternative standards for Maryland public high school students which would be a better indicator of postsecondary achievement after high school graduation.

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In addition, this study will examine measures of postsecondary achievement beyond those defined by the Blueprint, including college enrollment and college progression (both in-state and out-of-state) and employment, rather than narrowly considering completion of entry-level credit bearing courses at Maryland community colleges. Looking at a broader set of postsecondary achievement measures will help us understand whether the CCR standard is equitable for all high school students and whether certain student groups are disproportionately impacted by the standard.

Specifics regarding the predictive validity study analysis will be informed by engagement with stakeholders, including higher education and workforce development representatives, and information collected from the content and standards alignment study. As part of the content and standards alignment study AIR will: collect postsecondary course requirements in the form of syllabi or course descriptions for entry-level credit-bearing courses and certificate/credential-granting training programs; collect information on placement strategies used by postsecondary institutions (such as assessments used and/or prerequisites); and conduct focus groups with postsecondary institutions to ascertain the content knowledge and skills required/desired/prioritized for placement into entry-level credit-bearing courses and certificate/credential-granting postsecondary training programs. The focus groups, in particular, may inform the inclusion of (and add context to) additional measures of readiness and postsecondary achievement (both within college and in the workforce).

**Project Question**

The MLDS Center research request is for the predictive validity study. For this study, we have the following research questions.

RQ1. To what degree does the standard set by the Maryland State Board of Education predict whether students will be successful in entry-level credit-bearing coursework or postsecondary education training?

RQ2. How do other standards/measures predict whether students will be successful in entry-level credit-bearing coursework or postsecondary education training?

RQ3. How should certain variables (for example, grade point average) be operationalized such that they are best predictors of whether students will be successful in entry-level credit-bearing coursework or postsecondary education training?

RQ4. Are there certain standards/measures that can be used in combination and/or in sequence to predict whether students will be successful in entry-level credit-bearing coursework or postsecondary education training?

RQ5. Are there other measures of success that help inform which standards/measures should be used in combination and/or in sequence to predict whether students will have postsecondary success?

RQ6. Are there any predictors (whether alone or in combination), that, if used as a CCR indicator, would have a disproportionate impact on any particular group of students (by race, ethnicity, service group, gender, home language, socioeconomic status, and/or location)?

RQ7. How do the results of the quantitative analyses align with the CCR standard set by the Maryland State Board of Education?

**Methods (provide a brief description of the research methods you plan to use)**

To describe the predictive validity study's research methods, we use the following operational definitions for key terms:

- CCR standard = a set of decision rules or requirements that indicates whether a high school student (or graduate) meets a minimum threshold to be designated as ready for college and career success.
- CCR measures = measures of a student's performance and/or achievement during their K-12 academic career that are used in a CCR standard.
- Postsecondary achievement measures = post-high school measures or indicators of positive progression toward college and career success.

We will conduct the predictive validity study in two phases. The primary analysis will take place during the first phase. During this phase, we will focus on **how well measures that are part of the current CCR standard and a subset of alternative CCR measures predict postsecondary achievement for college-going students in their first two years after high school completion** (see Exhibit 1). Our analysis will focus on the current CCR standard (and the alternative CCR measures) at the end of 10<sup>th</sup> grade, but we will conduct a supplemental analysis that examines the CCR standard (and alternative CCR measures) at the end of 12<sup>th</sup> grade. We will assess the validity of the current CCR standard for students who enrolled in a Maryland public college the year after graduating from a Maryland public high school. Where feasible, we will also conduct an analysis for students who enrolled in other postsecondary institutions of higher education the year after graduating from a Maryland public high school. The specific operationalization of the CCR measures, postsecondary achievement measures, and student populations may be revised through consultation with MSDE staff, MLDS staff, and postsecondary stakeholders.

During the second phase, we will supplement the primary analysis based on stakeholder feedback, including postsecondary constituents, and preliminary findings from the content and standards alignment study. Based on the stakeholder feedback and information gathering, we will extend the predictive validity analysis to get a more comprehensive picture of college and career readiness by looking at additional CCR measures, additional postsecondary achievement measures, including employment/earnings, and additional populations. The second phase of work will start approximately two weeks after the first phase starts, but stakeholder feedback and additional information will continue to shape the of phase two work through June 2023.

To evaluate the association of the current CCR standard and alternative CCR standards (the independent or predictor variables) with postsecondary achievement (the dependent or outcome variables), we will calculate accuracy, sensitivity, and specificity rates based on bivariate tabulations. In addition, we will use multilevel logistic modeling to estimate the probability of postsecondary achievement as a function of multiple predictors, where the key predictor of interest is a dichotomous measure indicating whether a student meets a given CCR standard, while controlling for important student-, school-, and district-level covariates. To test alternative CCR standards, we will use bivariate and multivariate models to explore the relationships between key CCR measures (e.g., assessment scores, course grades) and the probability of postsecondary achievement. In addition, we will test how the predictive properties change with the inclusion/exclusion of multiple CCR measures. To further explore ways to combine multiple readiness measures into a single CCR standard, we will

use classification and regression tree analysis (CART), which will allow us to develop criteria we can use to construct and evaluate alternative indicators of readiness. The result of these analyses will be a set of scores for the key readiness measures that optimally predict postsecondary success.

Where applicable, **our results will be disaggregated by initial postsecondary pathway**, specifically 2-year and 4-year college, as well as other postsecondary institution characteristics (e.g., segments of the postsecondary community). We will also disaggregate results by student characteristics, including race/ethnicity and economic disadvantage, and school district. The disaggregated results will help inform the extent to which findings about the CCR standard are consistent across different types of institutions, students, and districts across the state.

**Exhibit 1. High school CCR Measures and Postsecondary Achievement Measures for the Phase 1 Analysis**

CCR Measures	Postsecondary Achievement Measures
<ul style="list-style-type: none"> <li>• PARCC – English*</li> <li>• PARCC – Math*</li> <li>• MCAP – English*</li> <li>• MCAP – Math*</li> <li>• SAT – Math*</li> <li>• SAT – Reading</li> <li>• SAT – Composite</li> <li>• ACT – Math</li> <li>• ACT – Reading</li> <li>• ACT – Composite</li> <li>• PSAT – Reading</li> <li>• PSAT – Math</li> <li>• PSAT – Composite</li> <li>• High school GPA (operationalized in multiple ways)</li> <li>• Success in advanced high school courses</li> </ul>	<ul style="list-style-type: none"> <li>• Any credits earned in first-year postsecondary courses</li> <li>• Cumulative credits earned in first-year postsecondary courses</li> <li>• Cumulative GPA in first-year postsecondary courses</li> <li>• Maintained enrollment in any postsecondary college for two years</li> </ul>

*Notes.* The specific operationalization of the CCR measures, postsecondary achievement measures, and student populations will be revised through consultation with MSDE staff, MLDS staff, and postsecondary stakeholders.

\* CCR measures that are part of the current CCR standard

**Which MLDS [Research Agenda](#) question(s) is applicable to this project?**

The research questions addressed by this project primarily fall under Section B of the MLDS Research Agenda, in particular the first agenda question: “Are Maryland students academically prepared to enter postsecondary institutions and complete their programs in a timely manner?”. The purpose of this project is to evaluate the current CCR standard proposed by the state legislature and determine if there is an alternative set of CCR measures that better predict postsecondary readiness and success.

**How will this project benefit the State of Maryland?**

The study, contracted by MSDE, will explore the relationship between the standard set by the Maryland State Board of Education and actual student postsecondary achievement. Further, the study will explore the relationship between additional potential measures or indicators of student readiness



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(other than those initially set by the Maryland State Board of Education) and actual student postsecondary achievement. Finally, the study will determine whether standards or indicators of student readiness have a disproportionate impact on students of a particular race, ethnicity, gender, address, socioeconomic status, or home language, such that certain students do not have equitable access to college and career readiness and/or are less likely to meet the CCR standard at an equal rate. MSDE will use the study findings to define a CCR standard that will best serve Maryland public school students.

**Explain why this project requires longitudinal cross-sector data?**

This study requires cross-sector data because the key predictors are measures of achievement and persistence for Maryland students in high school, and the outcomes are measures of readiness/success for those students in postsecondary institutions or the workforce. This study requires longitudinal data because key predictors and outcomes will be considered at several points in the students’ high school and postsecondary careers. The study will also use multiple cohorts of Maryland students to account for changes in academic context (e.g., the COVID-19 pandemic).

**Proposed Center Output**

The study includes two primary deliverables for MSDE that will present results based on the analysis of Center data: an interim report focused on the quantitative analysis findings and a final report that will include the quantitative and qualitative analysis findings. In addition, the study will produce materials (i.e., presentation slides) to present the study findings to stakeholder groups and will provide some preliminary findings to MSDE staff (Chandra Haislet, Phil Lasser, Matthew Duque) during regular check-in meetings and monthly status updates.

**Timeline for the proposed project (identify major deliverables and approximate dates)**

- Interim Quantitative Study Report, draft for review: March 17, 2023
- Interim Quantitative Study Report, delivered to MSDE: March 31, 2023 (or 90 days after receiving access to the MLDS data)
- Presentation of findings to MLDS and MSDE staff: June 30, 2023
- Final Report, draft for review: July 17, 2023
- Final Report, delivered to MSDE: August 1, 2023

**Plans for further development (i.e. journal submission, etc)**

In consultation with MSDE, AIR will consider writing a manuscript based on the study analysis and findings for submission to a peer-reviewed journal and for presentation at an academic conference.

**Section 2. Data and Cross Sector Analysis**

Sector	X	Data Category
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K-12 (Maryland public school students only – no private school data)	X	Assessment
	X	Attendance
	X	College Readiness
	X	Completers/Graduates
	X	Courses
	X	Schools
Adult Education		Adult High School Program
		Correctional Education
		Employer Information
		GED
		NEDP
Postsecondary (excludes private and for-profit career schools)  <i>*Financial aid data derived from the FAFSA has federally imposed use restrictions</i>	X	Courses
	X	Credits/Grades
	X	Enrollment
		Financial Aid
	X	Graduates
		Teacher Education Completers
	X	Transfers
Workforce (primarily from unemployment insurance)	X	Employer Information
		K-12 Staff
	X	Wage Data
Juvenile Services		
Business and Professional Licenses and Certificates		
Child Welfare		
Other (describe)		

*Put an 'x' next to each data category your research will include*

**Additional Information about planned data use (optional)**

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**Section 3. Financial Information**

The MLDS Center incurs costs for every project related to: (a) IT support and infrastructure; (b) assistance from subject matter experts, (c) criminal history background checks; and (d) creation of an analytic data set. Average project costs are between \$3,000 and \$5,000. A detailed, customized estimate will be provided prior to project initiation. (Please indicate your answer with an “X”)

X	I will reimburse MLDS for all applicable fees.
	I will only able to provide partial reimbursement.
	I will need a waiver.

**Grant Funding** (indicate with an ‘X’)

X	This project has already received funding
	I plan to apply or am in the process of applying for grant funding
	No grant funding is planned

**Name of Grantor**

Maryland State Department of Education

**RFP or Grant Program Information (you may provide a link to the grantor’s website)**

See attached RFP

**Amount of grant funds sought or awarded.**

\$ 995,930.99

**Grant Application Date**

NA

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<b>Do you intend to proceed without grant funding?</b>
NA
<b>Are you receiving other funding for this proposed project? If yes, how much?</b>
No

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**Section 4. Project Team**

<b>Project Team (please list all members of the research team and indicate roles and responsibilities)</b>		
<b>Name and Organization</b>	<b>Role</b>	<b>System Access (Yes/No)</b>
Jordan Rickles ( <a href="mailto:jrickles@air.org">jrickles@air.org</a> ), AIR	Project Director	Yes
Mark Lachowicz ( <a href="mailto:mlachowicz@air.org">mlachowicz@air.org</a> ), AIR	Quantitative Analysis Task Lead	Yes
Roman Ruiz ( <a href="mailto:rruiz@air.org">rruiz@air.org</a> ), AIR	Analysis Support	Yes
Kyle Neering ( <a href="mailto:kneering@air.org">kneering@air.org</a> ), AIR	Analysis Support	Yes
Ji Hyun Yang ( <a href="mailto:jyang@air.org">jyang@air.org</a> ), AIR	Analysis Support	Yes
Tracy Sweet ( <a href="mailto:tsweet@umd.edu">tsweet@umd.edu</a> ), UMCP, MLDS Research Branch	MD Sponsor	Yes (Dr. Sweet already has access to the data)

To submit this form, please complete the online application ([here](#)) and upload this completed form and CVs for all members of the research team.