Research Memo

A Review of Select Assessments to Measure School Readiness at the Start of Kindergarten

Executive Summary

Measuring kindergarten readiness allows school districts to gauge the knowledge and skills that students bring with them as they enter kindergarten. Readiness measures help teachers adapt their instruction to meet individual students' needs and allow administrators and others to monitor trends in school readiness across time. Measures of kindergarten readiness can also be useful in evaluating and improving pre-kindergarten programs. In this brief, I provide an overview of available assessments to measure school readiness at the beginning of kindergarten. Prior to discussing specific assessments, I present a framework for understanding the construct of school readiness by discussing definitions, domains, purposes, and limitations of school readiness assessment.

Next, I present brief descriptions and intended purposes of the eight assessments included in my review and compare them across assessment format and the developmental domains included. The first five assessments were chosen after conducting a nationwide review of commonly used school readiness assessments. The last three assessments were selected because they are currently used in some capacity by the Madison Metropolitan School District.

- Desired Results Developmental Profile – Kindergarten (DRDP-K)
- Maryland's Kindergarten Readiness Assessment (MD-KRA)
- HighScope COR for Kindergarten – Kindergarten Entry Record (COR)
- Work Sampling System (WSS)
- Teaching Strategies GOLD (GOLD)
- Phonological Awareness Literacy Screening – Kindergarten (PALS-K)
- MAP Growth K-2 (MAP K-2)
- AIMSweb Test of Early Literacy and Test of Early Numeracy (AIMSweb)

The selection of a school readiness assessment depends largely on the district's definition of school readiness, the developmental domains the district prioritizes for school readiness, and the primary purpose(s) of the instrument. With this in mind, **I report the following recommendations**:

1. If the purpose of the assessment is to provide a summative benchmark for school readiness at the beginning of kindergarten using academic and non-academic domains, I recommend California's Desired Results Developmental Profile.

2. If the purpose of the assessment is to provide a summative benchmark for school readiness at the beginning of kindergarten using academic and non-academic domains and detailed formative information over the course of the kindergarten year, I recommend HighScope COR for Kindergarten and Maryland's Ready for Kindergarten System.

3. If the district takes a narrower view of school readiness and seeks to only measure the academic domains of literacy and numeracy, then I recommend MAP Growth K-2 for the purposes of providing a summative benchmark and formative information over the course of the kindergarten year.

Framework for Understanding School Readiness

To select the optimal measure of school readiness, district leaders must explicitly address several questions. How do they define school readiness? Which domains constitute school readiness? For what purpose do they intend to use the assessment data? Clear answers to these questions should guide the selection process to ensure that an appropriate school readiness assessment is chosen.

Defining School Readiness

There is no consensus on an exact definition of school readiness, but most education scholars conceptualize school readiness as the set of foundational skills, behaviors, and knowledge children display as they enter school that enable them to successfully transition into kindergarten and achieve academic success throughout the primary grades (Sabol & Pianta, 2017). Academic success refers to performing at or above grade level in reading and mathematics as reflected by teacher assessments and standardized achievement tests. Several factors contribute to variation in school readiness across children, including intrinsic learning abilities, health, educational opportunities and experiences during early childhood, and social and environmental factors such as parental education, economic resources and housing conditions (Currie & Almond, 2011; Almond, Currie & Duque, 2017; Bradbury et al., 2015; Lee & Burkham, 2002).

Domains of School Readiness

The set of foundational skills, behaviors and knowledge that prepare a child to succeed in school span multiple domains and include both academic and non-academic skills. The National Education Goals Panel identified five domains of school readiness (Kagan, Moore, & Bredekamp, 1998):

1. Physical well-being and motor development
2. Social and emotional development
3. Approaches toward learning[1]
4. Language development
5. Cognition and general knowledge, including mathematics

Age-appropriate proficiency in these five domains predict a child's successful transition to kindergarten and later achievement and outcomes.

The Wisconsin Model Early Learning Standards (WMELS) uses these five domains to structure and guide instruction in early childhood. Currently, Wisconsin only requires districts to assess children's reading readiness. There is no consensus among educators about which domains must be included in an assessment of school readiness or what levels of performance in those domains reflect proficiency. However, assessments that measure school readiness implicitly make these decisions through their inclusion of domains, items and indicators of proficiency.

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[1] Approaches toward learning describes a child's disposition towards acquiring new knowledge, including their habits, attitudes, and learning styles. The WMELS outlines three major subdomains: 1) curiosity, engagement, and persistence; 2) creativity and imagination; and 3) diversity in learning.

Purposes of Assessing School Readiness

The National Education Goals Panel identified four potential goals of assessing school readiness (Shepard, Kagan, & Wurtz, 1998):

1. Improve learning

2. Identify children with special needs

3. Evaluate programs and monitor trends over time

4. Impose a system of high-stakes accountability

While the first three objectives are uncontroversial, the panel emphasizes that high-stakes accountability is not an appropriate goal for assessing school readiness because assessment tools for young children do not meet the high standards of validity and reliability necessary for this purpose.

Different stakeholders might have different goals for measuring school readiness (Howard, 2011). Parents and teachers often want to understand the strengths and needs of individual children to help target instructional resources. School administrators, on the other hand, monitor learning in order to make programmatic decisions about curricula and the allocation of time and resources to maximize student learning on average or for specific groups of students defined by linguistic background, race/ethnicity, socioeconomic status or special needs. Additionally, state policymakers are interested in documenting local and state trends over time to help determine if public expenditures have positive impacts on student outcomes. District leaders responsible for selecting a school readiness assessment must balance the demands of a variety of stakeholders while also minimizing the time in which students and teachers are engaged in assessment.

Limitations of School Readiness Assessments

Although school readiness is most often measured at the child level, the National Association of State Boards of Education suggests that school readiness should be considered at the child, family, school and community levels (NASBE, 1991). It is important for children to be ready for school, but families, schools and communities must also be ready to meet the developmental needs of young children. While families, schools and communities are essential contributors to school readiness, I focus exclusively on the assessment of child-level indicators of school readiness for the purposes of this report.

Maxwell and Clifford (2004) outline three potential limitations of school readiness assessments. First, assessments are designed for specific purposes, and a tool that was designed for one purpose may not be easily adapted to fit another. Therefore, a school district may need to use multiple tools to satisfy different objectives. Second, each assessment is based implicitly or explicitly on a specific definition of school readiness. If the definition implied by the assessment is at odds with the definition of school readiness the district holds, then data from the assessment may be of little utility or even potentially misleading. Lastly, assessments rely on effective implementation and administration, so districts must provide adequate training and professional development in order to ensure the accuracy of the information obtained.

Options for School Readiness Assessments

I searched for available school readiness assessments by conducting a nationwide review of instruments used by other states to measure school readiness and consulting experts in early childhood assessment and school readiness. From this search, I selected two state-developed assessments (California's Desired Results Developmental Profile – Kindergarten and Maryland's Kindergarten Readiness Assessment) and three privately developed assessments (HighScope COR for Kindergarten, Work Sampling System, and Teaching Strategies GOLD).

Additionally, I included three assessments that are currently used for other purposes by the Madison Metropolitan School District (Phonological Awareness Literacy Screener - Kindergarten, MAP Growth K-2, and AIMSweb Test of Early Literacy and Test of Early Numeracy) since these might be of particular interest to the district.

All of the assessments included in this review meet the following specifications:

- Recently updated or developed
- Research-informed
- Adequate evidence of reliability and construct validity
- Measurement of language and literacy development, including phonemic awareness and letter sound knowledge, thereby meeting the Wisconsin reading readiness assessment requirement for kindergarteners

Additionally, all of the assessments are inclusive of children with special needs and English Language Learners. The observational assessments allow teachers to evaluate all students using the same instrument, and assessment manuals provide guidance on how to evaluate students with special needs and English Language Learners. These assessments do not require translated versions because they rely on teacher observations. The direct assessments, on the other hand, allow various accommodations for students in these groups and more information can be found in their respective manuals. Furthermore, PALS-K and the mathematics domain of the MAP Growth K-2 are available in Spanish.

To review the assessments and determine recommendations I begin by providing brief descriptions of each assessment, including background information on their development and their intended purposes. Next, I consider the assessment formats, including whether they are observational or direct assessments, the number of domains and items, the grades covered and the timeline of administration. Then, I present the developmental domains covered by each assessment, focusing on whether they align with the five domains outlined by the National Education Goals Panel. Finally, I conclude by offering recommendations based on the intended purposes of the assessments, the domains that are included and the administration formats, including the timeline of administration.

This review does not consider feasibility constraints, which include the cost of the assessment, the classroom time it will take to administer the assessment to all children, and the training and professional development necessary for successful implementation. Although these constraints are important considerations, much of this information was not readily available online. Before the district selects an assessment, these constraints will need to be further explored.

Description & Purposes of Each Assessment

Below I briefly describe each assessment I considered. I have included additional information on these assessments in Tables A and B on the following pages.

Desired Results Development Profile – Kindergarten (DRDP-K):

> This assessment was developed by the California Department of Education in collaboration with the University of California Berkeley and WestEd. The tool was designed to serve four purposes: 1) provide psychometric measurement of children's development in key domains of school readiness; 2) support the transition from preschool to kindergarten; 3) support research; and 4) guide professional development for teachers. Multiple states have adapted this assessment for use as their statewide school readiness instrument. Illinois' KIDS instrument, which was rolled out in the 2017-2018 school year, is based on the DRDP-K assessment.

Maryland's Kindergarten Readiness Assessment (MD-KRA):

> This assessment was developed by a consortium of states led by Maryland and Ohio, in collaboration with Johns Hopkins University and WestEd, and funded by a Race to the Top – Early Learning Challenge grant. The tool was designed to serve the following purposes: 1) benefit children; 2) assist teachers; 3) inform families; 4) instruct community leaders and policy makers; and 5) advise school leaders and early childhood programs. The Kindergarten Readiness Assessment (KRA) is one component of Maryland's Ready for Kindergarten (R4K) assessment system. The KRA can be used in combination with the Early Learning Assessment (ELA), which is an ongoing formative assessment. The R4K system is being implemented statewide in Maryland and Ohio, and it is also being used by some school districts in Michigan, Tennessee, and South Carolina.

HighScope COR for Kindergarten – Kindergarten Entry Record (COR):

> This assessment was recently developed by the HighScope Educational Research Foundation. It is intended to serve the following purposes: 1) inform instruction; 2) help families make decisions about their children's learning opportunities; and 3) inform efforts to close school readiness gaps. Highscope COR for Kindergarten includes the Kindergarten Entry Record (KER), as well as an Ongoing Record (OR) that serves as a formative assessment. After the initial administration of the KER, teachers can administer the OR up to three times across the school year. The COR for Kindergarten system is currently an approved kindergarten readiness assessment in Colorado and Florida.

Work Sampling System (WSS):

> This assessment was developed by a team of early childhood experts, led by Dr. Samuel Meisels, and published by Pearson. The tool was designed to serve the following purposes: 1) collect information on children's work and compare it to grade-specific guidelines; 2) identify what children are learning, what they are beginning to master, and what they still need to work on; 3) use observations and simplify the process of recording and interpreting them; and 4) inform curriculum and instructional planning. The WSS is widely used for its formative value, and some states, including Georgia, have adapted it for statewide school readiness assessment.

Teaching Strategies GOLD:

> This assessment was developed to assess child development from birth through kindergarten and is often administered in preschools that use the Teaching Strategies Creative Curriculum. It was developed to: 1) gather and organize meaningful data quickly; 2) create a developmental profile of each child that can be used to scaffold each child's learning; and 3) generate comprehensive reports that can be shared with family members and other stakeholders. As of the 2016-2017 school year, nine states had approved GOLD as their school readiness assessment, including Delaware, New Jersey, and Washington.

Phonological Awareness Literacy Screening – Kindergarten (PALS-K):

> This assessment was developed by the University of Virginia and partially funded by the Virginia Department of Education through Virginia's Early Intervention Reading Initiative. It is intended to serve the following purposes: 1) identify students who perform below grade-level expectations in several important literacy fundamentals and are at risk of reading difficulties and delays; and 2) provide teachers with explicit information about what their students know of these literacy fundamentals so that they can more effectively tailor their teaching to their students' needs. PALS-K is used to assess reading readiness in multiple states, including Virginia and Wisconsin. PALS also offers assessments from first through eighth grade (PALS 1-3 and PALS Plus), but these assessments are not designed to measure growth and are not vertically equated.

MAP Growth K-2 (MAP K-2):

> This assessment system was developed by NWEA and was formerly called MAP for Primary Grades. This system offers three types of assessments: growth, screening and skills checklists. The intended purposes are to: 1) inform instruction; 2) track growth over time; and 3) inform resource allocation by assisting administrators in determining program and resource needs. MAP Growth K-2 is not commonly used as a measure of school readiness.

AIMSweb Test of Early Literacy (TEL) & Test of Early Numeracy (TEN):

> These assessments are part of a larger online assessment system called AIMSweb. This system is used for universal screening, progress monitoring and data management. It supports Response to Intervention and tiered instruction. The intended purposes of the AIMSweb TEL and TEN are to identify students who are at risk of academic failure and monitor progress of kindergarteners and first graders. AIMSweb assessments are not commonly used as measures of school readiness.

Assessment Formats

I distinguish between two types of assessments: 1) observational assessments, which rely on teacher observations and 2) direct assessments, which require students to respond to specific items. DRDP-K, COR, WSS, and GOLD are all observational assessments. Teachers complete DRDP-K and COR within the first few months of kindergarten, whereas they enter data into WSS and GOLD throughout the school year. PALS-K, MAP K-2, and AIMSweb are direct assessments administered to students by teachers or staff. PALS-K is intended to be administered at least once per year, and MAP K-2 and AIMSweb are intended to be administered three times per year. MAP K-2 is the only computer-adapted assessment. Lastly, MD-KRA includes a combination of both observational and direct assessment items, which are presented as selected response items or performance tasks. Table A displays information on the formats of each assessment.

Table A. Assessment Formats

	Observational or Direct	# of Domains	# of Items	Grades Covered	Initial and Subsequent Administration
DRDP-K	Observational	11	51	Kindergarten	Within first 8 weeks of school. Can be repeated in the spring.
MD-KRA	Both	4	50	Kindergarten	Before November 1st. Ongoing assessment through a complementary assessment.
COR	Observational	5	20	Kindergarten	Within first few months of school. Ongoing assessment through a complementary assessment.
WSS	Observational	7	55	Age 3 through 3rd grade	Ongoing assessment throughout the year. Summarized reports three times per year.
GOLD	Observational	10	38	Birth through Kindergarten	Ongoing assessment throughout the year.
PALS-K	Direct Assessment	1	7	Kindergarten (Pre-K & 1-3 available)	At least once per year.
MAP K-2	Direct Assessment	2	About 43 (varies)	Kindergarten through 2nd grade	Three times per year, typically in the fall, winter and spring.
AIMSweb	Direct Assessment	2	8	Kindergarten through 1st grade	Universal screening at the beginning, middle and end of the school year. Used more frequently to monitor progress.

Developmental Domains

I distinguish between assessments that measure academic and non-academic domains and assessments that only measure academic domains. DRDP-K, MD-KRA, COR, WSS, and GOLD assess several academic and non-academic domains. On the other hand, PALS-K, MAP K-2, and AIMSweb are much narrower in the domains that they cover, focusing only on literacy and/or numeracy. Table B displays the domains that are included in each assessment, focusing on the five domains outlined by the National Education Goals Panel.

Table B. Developmental Domains

Assessment	Social Emotional	Approaches to Learning	Physical & Health	Language & Literacy	Math	Other(s)
DRDP-K	X	X	Both*	X	X	Science; Social Science; Arts; English Language Development; Spanish Language Development †
MD-KRA	X	X**	X	X	X	
COR	X	X	X	X	X	
WSS	X		X	X	X	Science; Social Studies; Arts
GOLD	X	X**	X	Both*	X	Cognitive; Science; Social Studies; Arts; English Language Acquisition
PALS-K				X		
MAP K-2				X	X	
AIMSweb				X	X	

† "Language development" refers to acquisition for non-native English speakers.
* Indicates that the domain is included and split into two separate domains (e.g., Language and Literacy separately).
** Approaches to learning is included as a subdomain under another domain.

Recommendations for School Readiness Assessment

I advocate a broader definition of school readiness consistent with general understandings of the importance of academic and non-academic skills for a successful transition into and through kindergarten. However, the selection of a school readiness assessment should be based on the domains that the district believes constitute school readiness and the purpose(s) of the assessment. All of the assessments I reviewed include the domain of literacy and all except PALS-K include the domain of numeracy. If the district wishes to only assess literacy and numeracy, then opting for an instrument with fewer domains and thus greater brevity makes sense. A viable option would be the MAP Growth K-2. If, on the other hand, the district embraces a broader definition of school readiness that includes non-academic domains, then MAP Growth K-2 will not be adequate.

All of the assessments reviewed satisfy the statutory requirements to measure "phonemic awareness and letter sound knowledge."[2] However, most of them are not designed to measure growth from pre-kindergarten through 2nd grade. Therefore, if the district wants to measure growth in literacy (or numeracy) through 2nd grade, then it will probably need to incorporate the readiness measure as an additional instrument or forego measuring readiness more broadly.

The purpose for which the district wishes to use the assessment data is critical. None of the assessments I reviewed seem appropriate for school or teacher accountability. The observational measures (DRDP-K, MD-KRA, COR, WSS, and GOLD) seem especially untenable as components of an accountability system. Holding teachers accountable for growth on a measure based on their own observations gives them an incentive to understate children's initial skills and overstate their skills later in the year.

If the purpose of the assessment is to provide a summative benchmark for kindergarten readiness in order to measure change across cohorts of students or evaluate programs intended to enhance the readiness among incoming kindergarteners, then I recommend California's Desired Results Developmental Profile. This assessment is designed to be administered within eight weeks of the start of kindergarten, is freely available online, and measures all of the domains I believe would be relevant to understanding school readiness. The assessment can also be administered again in the spring of kindergarten to monitor growth over the academic year. If upon further investigation the district has concerns about the time to administer the full instrument, it could consider reducing the domains covered to conform to its definition of school readiness. Illinois successfully did so with the KIDS instrument.

Alternatively, the district could choose to adopt an assessment that provides both summative information on readiness close to the point of kindergarten entry and detailed formative data over the course of the kindergarten year. Both HighScope COR for Kindergarten and Maryland's Ready for Kindergarten System would be good choices for this hybrid purpose. HighScope COR for Kindergarten is closely aligned with national preschool standards and national standards for kindergarten for literacy and mathematics; it also aligns with the five domains outlined by NEGP and WMELS.

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[2] In personal communication with Eric Grodsky, co-director of MEP, DPI indicated that they do not maintain a list of approved assessments and instead defer to school districts.

Maryland's assessment, developed in collaboration with Ohio, is aligned with the states' shared common language standards. While both assessments seem promising, they are also relatively new. The validation study for COR for Kindergarten was completed last year (2016-2017) while the Ready for Kindergarten system was initially fielded in the 2014-2016 school years. Furthermore, the district would have to investigate how to gain access to the system, since it is not readily available through a commercial publisher.

Limitations

Although all of the assessments I reviewed provide adequate evidence of reliability and construct validity, they provide insufficient evidence of domain specific criterion validity or fail to test for it. Inadequate evidence of domain specific criterion validity puts into question whether these tools are differentially sensitive at the domain level. Furthermore, since many of these assessments were developed recently, there is minimal available evidence about whether these tools have enough sensitivity to detect the effects of changes in early childhood programming at the domain level.

Test designers face a tradeoff between domain coverage and time. No one wants to spend more time than is necessary on student assessment. Time on assessment is time taken away from instruction, play, and learning. On the other hand, in order to improve the quality of the educational experiences and environments we provide to our children prior to kindergarten, we need to measure important outcomes. The question is how much domain specificity we require. If we need criterion valid tests of each domain, then we will have to spend more time testing.

Appendix A: Examples of Skills Measured by School Readiness Assessments

Table 1A. Skills Measured by Readiness Assessments

Domain	Item	Description of Item	Highest Level of Proficiency	Possible Examples
Physical Development	Fine Motor Manipulative Skills	Child demonstrates increasing precision, strength, coordination and efficiency when using muscles of the hand for play and functional tasks	Performs a variety of tasks with sequential steps that require precision of one hand while manipulating or repositioning small objects in that hand	Uses scissors held in one hand to cut a pattern that has angles and curves, while maintaining continuous cutting motion
Social and Emotional Development	Relationships and Social Interactions with Peers	Child becomes increasingly competent and cooperative in interactions with peers and develops friendships with several peers	Explains own feelings, thoughts, and opinions to other children	Shares with a friend that blue is the prettiest color and that's why it is her favorite
Approaches to Learning: Self-Regulation	Engagement and Persistence	Child increasingly persists in understanding or mastering activities, even if they are challenging or difficult	Completes complex multi-step activities, making and adjusting plans as needed	Finishes current activity, puts away materials and goes to the lunch table with no reminders after an adult announces it is time for lunch
Language and Literacy Development	Phonological Awareness	Child shows increasing awareness of the sounds (elements) that make up language, including the ability to manipulate them in languag	Isolates the initial sound, middle vowel and final sound in three-phoneme (consonant-vowel-consonant) words	Sounds out the word cat, "/c/ /a/ /t/," when adult playing sound game asks, "What are the sounds in "cat"?"
Cognition: Math	Number Sense of Math Operations	Child shows increasing ability to add and subtract small quantities of objects	Represents and solves addition and subtraction word problems with totals up to 20, by using objects, drawings and equations, applying advanced strategies (e.g., count-on), including strategies that reflect understanding of properties of addition and subtraction	Writes the equation "11 + 3," then counts aloud, "11, 12, 13, 14," and replies "14," when presented with a word problem about a child who has 11 balloons and gets three more balloons

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