Guidance for Using DRDP (2015) Scaled Scores and Domain Ratings

Introduction

The Desired Results Developmental Profile© (2015) [DRDP (2015)] is a formative assessment instrument developed by the California Department of Education (CDE). A central feature of the DRDP (2015) is that teachers regularly observe, document and reflect on the learning and development of children in infant/toddler (I/T), preschool (PS), transitional kindergarten (TK), and kindergarten (K) classrooms. The DRDP (2015) aligns to the CDE's early learning and development foundations[1] and kindergarten content standards,[2] including Common Core State Standards (CCSS) and Next Generation Science Standards. The primary use of results from the DRDP (2015) is to inform curriculum planning and program development. This Guidance document explains how to use DRDPtech as intended by the CDE.

The DRDP (2015), with I/T and PS views, includes measures in eight domains, while the DRDP-K includes measures in 11 domains, with one supplemental domain that is unique to this view. A domain represents a distinct area of learning and development for children defined by early childhood research and practice. The focus of each domain is on the acquisition of knowledge, skills, or behaviors that reflect each domain's developmental constructs. Each domain contains multiple measures, and each measure consists of a sequence of developmental levels or a progression along which a child's observed behavior is assessed. Measures represent the individual assessment items in the DRDP. Teachers assess children according to their developmental level for each measure, which represents a point along the developmental progression. The levels are organized in a sequence by four categories: Responding (Earlier, Later), Exploring (Earlier, Middle, Later), Building (Earlier, Middle, Later) and Integrating (Earlier, Middle, Later). Taken together, teacher ratings on each of these measures can be used to determine a child's domain scaled score, which is an estimate of a child's developmental location or progress on a DRDP (2015) domain.

This document provides guidance on the appropriate use of DRDP (2015) and DRDP-K (2015) domain scaled scores, which are available to agencies that have a DRDPtech account and have entered data into DRDPtech.[3]

> **Summary of Key Points**
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> - The DRDP was developed to fully cover the breadth and content of the early learning and development foundations with a relatively small number of measures in each domain.
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> - The psychometric approach that guided DRDP development supports teachers in using the qualitative information from the DRDP progressions to plan learning and development for individual children, and can also support planning for groups of children in classrooms, programs/schools, agencies/districts, counties, and the state.
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> - DRDPtech™ reports provide psychometrically-valid information (scaled scores) that allow teachers to look at children's progress over time in all of the domains of development.
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> - The purpose of scaled scores is to provide a true picture of children's learning at key points in time across the different areas of development.

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[1] https://www.desiredresults.us/drdp-2015-aligned-california-foundations

[2] http://www.drdpk.org/cor_sum.html

[3] When data, scaled scores and standard errors, or thresholds are shared with third-party vendors, said vendors are subject to a signed agreement separate from the one signed by agencies. Both agencies and vendors must abide by the same guidance, outlined in this document. Agencies may request the separate vendor agreement, "Vendor Statement of Compliance," via email at drdptech@wested.org.

The DRDP (2015)'s Psychometric Approach

The child's individual ratings for each measure in the domain are used to create the overall domain scaled scores. This overall rating can be used to interpret how a child is progressing on each domain of the DRDP (2015) instrument. After entering children's ratings into DRDPtech and locking records, agencies may request DRDPtech domain scaled scores with standard errors for secondary analysis by making a request via email to the Desired Results Training and Technical Assistance Project: drdptech@wested.org. Domain scaled scores and standard errors may also be used to produce CDE/EESD approved child and group reports.[4] Agencies should only use those DRDPtech scaled scores and domain ratings and may not use scaled scores and domain ratings or other scaled calculations developed by the agency, the agency's vendor, or others.

Domain scaled scores are computed through a statistical model based on Item Response Theory (IRT).[5] IRT is a method of psychometric measure development and analysis that considers the relationship between an individual's rating on a given item of an assessment and that person's rating on the overall measure from which the item was derived. More priority is given to how an individual is rated on individual assessment items than on the raw domain score. As applied to the DRDP, it is important to examine the relationship between a child's rating on a particular measure (e.g. "Interest in Literacy") and his or her development in relation to the broader developmental domain (e.g. "Language and Literacy Development"). This approach to assessment is important, because, for a teacher looking to support individual children's learning effectively, information on a child's strengths as well as areas where that child is at earlier developmental levels than anticipated is more valuable than having only a summary score for the developmental domain.

> **Key Definitions**
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> *Domain scaled scores*, "domain scores," provide an estimate of a child's developmental location or progress on a DRDP (2015) domain, based on the teacher ratings of all of the measures that define that domain.
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> *Domain standard errors* provide information about the precision/ accuracy of the estimate of a child's developmental location on a DRDP domain.
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> *Domain-level cut points* are the median scale value at which children most likely would move from one developmental level to the next across all measures in a domain.

One major advantage of IRT is that it allows for different items (levels) on a measure to vary in amount of challenge or complexity or to have different probabilities for being rated at each level of a measure. As applied to the DRDP, this means that knowledge and skills that typically develop earlier or later than other knowledge and skills are accounted for in the quantitative models that produce the domain scales. In addition, IRT allows for the analysis of binary assessment items. For example, for each developmental level of the DRDP, the child is either at that level or not. Another advantage of IRT scores is that they account for the uncertainty of measurement. A number of factors can create variability in a child's rating

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[4] CDE does not authorize the use or publishing of data presented in any child or group-level reports other than those presented in CDE/EESD-approved reports, based on scaled scores and provided through DRDPtech.

[5] The measurement model used to calibrate DRDP (2015) is the Multidimensional Random Coefficients Multinomial Logit Model (MRCML; Adams, Wilson, & Wang, 1997). MRCML is the 'parent' model for the entire family of Rasch item-response models

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including who completed it (e.g., different teachers may base their ratings on differing amounts of experience with a child) and when the assessment was completed. Because all assessments contain some variability, a child's true proficiency can never be perfectly precise with any assessment tool. Thus, IRT provides a standard error which represents the area in which we are confident that a child's true rating lies.[6]

Information Provided by Domain Scaled Scores

A domain scaled score portrays the developmental progression of knowledge, skills, and behaviors that encompass the collection of measures included in that DRDP (2015) domain. When looking at the layout of measures on the DRDP (2015) instrument, each level appears to be an equal developmental distance from the other. However, as children grow and develop, some knowledge and skills take more time to develop than others. These differences in development are expected and are represented by different widths of the developmental levels in the domain scale. When a child stays in a particular level for what appears to be an extended period of time, it is important to consider that the child may still have made gains within that domain. A teacher's observation notes, classroom learning activities, ongoing curriculum data (and other documents) can provide additional information about a child's learning and development.

A domain rating is a scaled score proficiency estimate that is calculated when the child's individual measure ratings are statistically transformed to a scale. For example, all measures in the Language and Literacy Development domain are used to calculate the domain or subdomain rating. The domain ratings can be used to identify children's strengths and areas in need of additional support. Starting in fall 2017, scaled score proficiency estimates across the five school readiness domains (ATL-REG, SED, LLD, COG, PD-HLTH) will be calculated together, which will allow direct comparison of results from one domain to another within the same assessment period.

In DRDPtech reports, [7] all of the levels for each domain follow a progression from early infancy (starting at the left) to kindergarten (toward the right), in a manner similar to the developmental progression on the DRDP (2015) instrument. The key difference is that the domain scale in the report reflects the psychometric transformation of the developmental levels based on the data collected during the calibration studies for the DRDP (2015),[8] whereas the developmental progression on the DRDP (2015) instrument represents the developmental levels as having equal intervals. Only the report shows the amount of challenge or complexity of each level of a measure, which is indicated by the varying widths of the measure's different levels.

The variation between developmental levels within and across each domain scale means, for example, that a child who demonstrates mastery at Exploring Later on one domain will not necessarily demonstrate mastery at Exploring Later on every other domain, even when the vertical domain rating on a report appears to be at about the same location on both domain scales. Likewise, even when a child has the

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[6] Wilson, M. (2005). *Constructing Measures: An Item Response Modeling Approach*. New York, New York: Psychology Press.

[7] For a summary of reports available in DRDPtech, along with a brief description of each report, refer to "DRDPtech Reports and Guidance," located at https://www.desiredresults.us/drdptech.

[8] Domain-level cut points are considered the intellectual property of the University of California Berkeley Evaluation and Assessment Research Center (UC Berkeley BEAR Center).

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same domain ratings across two domains (i.e.: at Exploring Later for both domains), the vertical domain rating line may not be at the same location on both domain scales.

The Need for Domain Scaled Scores

Use of domain scaled scores is critically important because individual measures do not have scale reliability. Because individual measures do not have scale reliability, they cannot be validly used in statistical analyses that compare individual or group scores over time or to compare between groups at the same point in time. In general, it is inappropriate to use individual DRDP (2015) measure results in comparative statistical analyses. It is also inappropriate to assign numeric values to levels of the DRDP (2015) to create aggregate domain scores that treat developmental levels as though they are on an interval scale, because DRDP (2015) developmental levels are not the same size or width. Differences in the width of developmental levels correspond to the tendency of some areas of growth and learning either to develop more gradually or to take longer to develop. Because the calibration of the DRDP scaled scores was generated through an analytic model at UC Berkeley BEAR Center, the only valid DRDP (2015) domain scores are those that are produced through the UC Berkeley BEAR Center analysis.[9]

When using the DRDP (2015) to look at change over time, domain scaled scores must be used. It is inappropriate to draw conclusions about change over time at the measure level. A rating on a single measure lacks reliability and does not meet psychometric standards. In comparisons of individual children's scores at two or more points in time, statistically validated change can be attributed only at the domain level. Moreover, equating DRDP (2015) domain scaled scores or levels with ages of children is also not an appropriate use of such data.

Use of the DRDP in Curriculum Planning and Other Decision Making

The domains in the DRDP (2015) correspond to the domains of the Infant/Toddler Learning and Development Foundations (ITDLF) and the Preschool Learning Foundations (PLF)[10] and the DRDP-K corresponds to the California Kindergarten Content Standards, the Common Core State Standards, and the Next Generation Science Standards.[11] Because as an assessment tool the DRDP (2015) necessarily represents a sample of knowledge and skills, there is not a DRDP measure for every foundation or standard. In addition, some DRDP measures correspond to multiple foundations or standards. Even so, as a group, the measures in each DRDP (2015) domain focus on the breadth and most salient constructs from the corresponding foundations of that domain. In order to ensure appropriate coverage of a domain, all measures in that domain must be considered in a balanced way. Concentrating on a narrow set of specific skills by selecting a few measures in a DRDP domain does not provide the same level of coverage of the research-based developmental constructs that are described in the foundations. When assessment is used for curriculum planning, the limited set of measures sampled may narrow a teacher's focus to only the developmental constructs represented in those measures, to the exclusion of other important

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[9] CDE does not authorize or permit alignments or instrument equating activities developed by organizations other than the UC Berkeley BEAR Center and WestEd. DRDP (2015) alignments presented by organizations other than CDE/EESD, WestEd, or UC Berkeley BEAR Center do not comply with authorized use agreements for the DRDP. In particular, reverse engineering the psychometric models used by CDE/EESD or its subcontractors is a violation of intellectual property, as is allowing or assisting any third party to attempt to do the same.

[10] https://www.desiredresults.us/drdp-2015-aligned-california-foundations

[11] http://www.drdpk.org/cor_sum.html

developmental constructs. For example, the DRDP measure Phonological Awareness describes the developmental progression for increasing awareness of sounds that make up words, which is an important early literacy skill for languages such as English. However, an over-emphasis on any given skill such as phonological awareness may lead to too little attention being given to language and literacy skills addressed implicitly in several DRDP measures such as vocabulary development. Focusing on a limited set of measures to the exclusion of other measures and related skills may lead to gaps in supporting learning and missed opportunities in individualizing that support.

Reviewing a child's level of development as indicated by specific measures can provide additional information to guide the individualization of instructional supports. The whole set of measures in each domain provide valid and reliable assessment of progress in essential domains of learning and development for young children. (Refer to curriculum frameworks about how to use assessment data to guide instruction). Using measure ratings in a qualitative way provides useful information for teachers. All skills are important, and teachers should attend to all of them and use that information formatively to support the learning of individual children and groups of children.

Parent reports will be available in DRDPtech in fall 2017. Once available, it is recommended that these reports be used when communicating about DRDP (2015) results with parents.

Data for individual children can be aggregated at the classroom-, program-, district-, county-, and state-levels to determine trends that warrant attention. This information then feeds into a cycle of continuous improvement and action planning to modify the curriculum and environment to address areas in which children can most benefit additional support. As early care and education programs complete action plans, the foundations can serve as a guide to understand the overall goals and objectives for all children's learning in the program. In addition, teachers can draw upon other areas of California's Early Learning and Development System, in particular, the curriculum framework, for general planning to support learning and development. For children in transitional kindergarten and kindergarten, the California Preschool Learning Foundations, which provide the overall goals and objectives for typical development at around 48 months and 60 months of age, can serve as a guide for developing curriculum. In addition, kindergarten teachers can draw upon other areas of the Early Learning and Development System, such as the curriculum framework, for general planning to support learning and development. Mirroring the reflective process used by teachers in early childhood settings, aggregate DRDP results help California lead an effort for early childhood reflective practices focusing on how young children can best be supported from birth through kindergarten completion, from the highest levels of state government to the teachers, aides, and families working with young children.

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