

Research Brief

Predicted Developmental Level Scores for Children Birth through 5 Years Based on 2015-16 Assessment Data

by Sarah Callahan Estrada, Ph.D.
Assessment Technology Incorporated



Overview: The Galileo® Pre-K Online Educational Management System applies procedures based in Item Response Theory to information gained through observational assessment to estimate a measure of child learning called the Developmental Level (DL) score. The DL score indicates a child's position on a developmental path and provides specific information about which capabilities the child has learned and which capabilities the child is ready to learn. ATI conducts annual research that can be used to predict the DL score for children at various ages. Conducting this research on a regular basis ensures that these predictions are sensitive to changes in child populations, curricula, and learning standards. Early childhood providers can use the up-to-date information provided by this research to evaluate whether children are progressing appropriately over time relative to their peers.

Design and Sample: The current study evaluated child DL scores throughout the 2015-16 program year. The data in this study were collected as part of the ongoing multi-method observational assessments conducted by early childhood programs using the Galileo G3 scales for children ages 0 to 8 months, 8 to 18 months, 18 to 24 months, 2 to 3 years, and 3 through 5 years (used for children up to 6 years old). For the scales for children 0 months to 3 years, child DL scores were evaluated for five assessment scales in each age range targeting various developmental domains (i.e., *Approaches to Learning; Cognitive Development and General Knowledge; Language, Communication, Reading, and Writing; Physical Development and Health; and Social and Emotional Development*) as well as a *School Readiness Scale* for each age range consisting of a variety of critical school readiness capabilities drawn from the assessment scales. Observations were conducted in 35 early childhood programs in 17 states nationwide. On average, six observations were conducted for each child for each scale throughout the 2015-16 program year. The sample for each scale contained, on average, 5,260 observations representing 858 children. For the scales for children 3 through 5 years, child DL scores were evaluated for 12 assessment scales targeting various developmental domains (i.e., *Approaches to Learning, Creative Arts, Early Math, English Language Acquisition, Language, Literacy, Logic and Reasoning, Nature and Science, Physical Development and Health, Social and Emotional Development, Social Studies, Technology*) as well as a *School Readiness Scale* consisting of 88 critical school readiness capabilities drawn from the assessment scales. Observations were conducted in 88 early childhood programs in 27 states nationwide. On average, seven observations were conducted for each child for each scale throughout the 2015-16 program year. The sample for each scale contained, on average, 238,249 observations representing 27,900 children.

Predicted DL Scores for Children of Various Ages: Linear regression analyses were conducted for each scale to evaluate the relationship between child DL score and child age (in months). Each analysis resulted in a regression equation that best describes, for a given scale, the change in DL score as child age increases. The regression equation can be used to generate a predicted DL score for any given age within the age range of the scale. Tables 1-5 present, for each scale in the various age ranges, the predicted DL score for children of various ages as well as the minimum and maximum DL score for each scale. As would be expected, the predicted DL score increases as child age increases. It is also worth noting that the predicted DL score for the minimum age for the scale is above the minimum possible DL score for the scale and the predicted DL score for the maximum age for the scale is below the maximum possible DL score. In this way, each scale supports the assessment of children with varying levels of learning, including those whose learning is below or above the predicted learning for their age.

TABLE 1

Predicted DL scores for children of various ages for Galileo® G3 assessment scales for 0-8 months

Predicted DL Scores: Galileo G3 Scales for 0-8 Months					
Developmental Domain	Minimum Possible DL Score	Predicted DL Score			Maximum Possible DL Score
		0 Months	4 Months	8 Months	
Approaches to Learning	182	215	254	293	390
Cognitive Development and General Knowledge	186	226	258	291	417
Language, Communication, Reading, & Writing	181	224	258	292	408
Physical Development and Health	197	251	284	318	413
Social and Emotional Development	181	236	264	292	421
Galileo School Readiness	218	248	281	315	433

TABLE 2

Predicted DL scores for children of various ages for Galileo G3 assessment scales for 8-18 months

Predicted DL Scores: Galileo G3 Scales for 8-18 Months					
Developmental Domain	Minimum Possible DL Score	Predicted DL Score			Maximum Possible DL Score
		8 Months	13 Months	18 Months	
Approaches to Learning	232	290	321	352	437
Cognitive Development and General Knowledge	198	282	308	335	476
Language, Communication, Reading & Writing	211	275	308	341	454
Physical Development and Health	225	297	324	351	439
Social and Emotional Development	211	299	320	340	476
Galileo School Readiness	268	322	346	369	455

TABLE 3

Predicted DL scores for children of various ages for Galileo® G3 assessment scales for 18-24 months

Predicted DL Scores: Galileo G3 Scales for 18-24 Months					
Developmental Domain	Minimum Possible DL Score	Predicted DL Score			Maximum Possible DL Score
		18 Months	21 Months	24 Months	
Approaches to Learning	306	381	402	423	520
Cognitive Development and General Knowledge	301	382	403	424	561
Language, Communication, Reading and Writing	289	364	384	404	567
Physical Development and Health	258	349	364	379	516
Social and Emotional Development	266	354	371	388	532
Galileo School Readiness	302	371	386	402	528

TABLE 4

Predicted DL scores for children of various ages for Galileo G3 assessment scales for 2-3 years

Predicted DL Scores: Galileo G3 Scales for 2-3 Years					
Developmental Domain	Minimum Possible DL Score	Predicted DL Score			Maximum Possible DL Score
		24 Months	30 Months	36 Months	
Approaches to Learning	339	418	450	481	558
Cognitive Development and General Knowledge	331	419	440	461	590
Language, Communication, Reading and Writing	338	421	443	466	591
Physical Development and Health	303	394	425	455	562
Social and Emotional Development	327	418	436	455	580
Galileo School Readiness	354	423	448	473	581

TABLE 5
Predicted DL scores for children of various ages for Galileo® G3 assessment scales for 3 through 5 years

Predicted DL Score for Age: Galileo G3 Scales for 3 through 5 Years*						
Developmental Domain	Minimum Possible DL Score	Predicted DL Score				Maximum Possible DL Score
		36 Months	48 Months	60 Months	72 Months	
Approaches to Learning	382	464	509	554	600	641
Creative Arts	403	480	536	592	648	703
Early Math	390	441	490	538	587	677
English Language Acquisition	405	469	504	539	575	619
Language	348	419	469	520	571	631
Literacy	378	428	479	531	583	686
Logic and Reasoning	425	496	538	581	623	688
Nature and Science	363	424	473	522	571	689
Physical Development & Health	363	448	487	526	565	650
Social and Emotional Development	357	429	471	513	555	627
Social Studies	402	466	510	553	597	681
Technology	322	458	501	543	586	682
Galileo School Readiness	348	433	486	539	592	701

**Note: The G3 scales for 3 through 5 years can be used for children up to 6 years old.*

Conclusion: The study described in this research brief evaluated DL scores for a large nationwide sample of children assessed throughout the 2015-16 program year using the Galileo G3 scales for children ages 0 to 8 months, 8 to 18 months, 18 to 24 months, 2 to 3 years, and 3 through 5 years. The regression analyses conducted as part of this study established predicted DL scores for children of various ages for Galileo scales in a wide variety of developmental domains. Early childhood providers can use the information provided by this study to evaluate whether a child’s DL score is below, at, or above the predicted DL score for their age. Since the child’s DL score provides specific information about which capabilities the child is ready to learn, providers can then offer additional learning opportunities as needed to enrich learning for children at all levels.