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CogAT® Using CogAT® Score Profiles to Differentiate Instruction

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School systems are always trying to make the most of their resources, which includes optimizing the uses and benefits of assessments into which school systems invest time and resources. In this article, we discuss how schools can improve classroom instruction by maximizing the benefits of their ***CogAT*** administration.

Famed researcher Dr. Julian Stanley advised educators to "avoid trying to teach students what they already know" (p. 221, 2000). This guideline may seem obvious at first, but teachers know firsthand the difficulties of serving the instructional needs of students with differing experiences and skill sets. Focusing on students with weaker skills can allow other students to become disruptive or disengaged. By providing adequate challenge and opportunity to learn for all students, teachers are differentiating instruction, which leads both to greater content knowledge and provides students with a wealth of motivational and metacognitive skills (Inman, 2007).

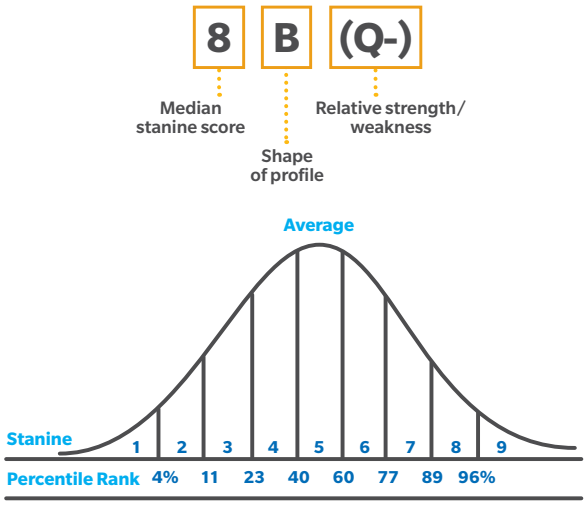
Many school districts who use ***CogAT*** do so mostly for gifted and talent identification processes. However, this limited use reduces the value of administering a multi-dimensional test, especially when using only the total score for identification. Instead of using ***CogAT*** solely for identification purposes, we highly recommend the use of ***CogAT*** test results by classroom teachers to differentiate instruction for all students. In this *Cognitively Speaking*, we will outline some basic principles for how this can be done.

CogAT Score Profiles and Scale Scores

CogAT's multidimensional battery provides educators with a key means of differentiating instruction. ***CogAT*** score reports include both a total reasoning score (that is, reasoning skills across domains) as well as Verbal, Quantitative, and Nonverbal Battery reasoning scores. As a result, we can use contrasts between students' three battery scores to learn more about their current strengths and how to adapt instruction to improve areas of weakness. The ***CogAT*** score profile provides the key to understanding each student's mix of cognitive strengths and weaknesses.

The ***CogAT*** ability profile score is comprised of a stanine score indicating overall ability, a code reflecting the profile shape,

CogAT Score Profile (Figure 1)



1. Overall ability (stanine scale)

Stanine 9 .....Well above average
Stanine 7–8.....Above average
Stanine 4–6.....Average
Stanine 2–3.....Below average
Stanine 1 .....Well below average

2. Shape of profile:

"A" Three battery scores about the sAme level
"B" One score aBove or Below others
"C" There is a substantial Contrast between two scores (a strength AND weakness)
"E" Extreme difference (> 24 IQ-like points)

3. Relative strength or weakness

V-/Q-/N- indicates a relatively lower battery score in that area
V+/Q+/N+ indicates a relatively higher battery score in that area

and an indicator for relative strengths and weaknesses (see Figure 1 for a breakdown of these three components). In addition to the profile, educators may choose to use the Battery and Composite scaled scores to make similar inferences. For example, the Age Percentile Rank (APR) could provide more nuanced distinctions than stanine scores once a teacher becomes very familiar with differentiating instruction.

Framework for differentiating instruction with CogAT

In the *Score Interpretation Guide*, ***CogAT*** author Dr. David Lohman outlines several myths about differentiation. The first two myths he highlights are "All students are pretty much alike," and "Every student is unique." As many teachers will attest, differentiating instruction with a fully personalized lesson for each student is unrealistic and unnecessary. On the other hand, teachers also know that tailoring instruction to student needs more broadly results in better learning outcomes for students. Therefore, the goal of differentiation is to identify some broad groupings or patterns among students that allow teachers to modify instruction efficiently to improve student learning (see also Tomlinson, 2001). ***CogAT*** score profile can provide educators with a general sense of student abilities, including specific strengths and weaknesses. They then may use this information to identify and select specific strategies for differentiating instruction.

Both the *Score Interpretation Guide*, the *Short Guide for Teachers*, and the *Interactive Ability Profile Interpretation System* on **CogAT.com** include rich information about ways of differentiating instruction for students by building on their strengths while using appropriate scaffolding to shore up weaker areas. These guides provide instructional suggestions for all profile levels (Stanines 1-9), as well as all areas of strength or weakness (Verbal, Quantitative, or Nonverbal). Teachers will find this information valuable when considering reasoning skills in classroom instruction. The following sections describe some specific strategies.

Differentiating by Overall Ability

Table 1 provides example descriptions and instructional strategies for students with different levels of general reasoning abilities. As you can see, the need for autonomy vs. scaffolding varies with the level of overall reasoning ability. Students with weaker reasoning skills will benefit from explicit coaching of learning strategies and how to tackle abstract problem solving. For students with stronger reasoning skills, autonomy and the motivation to persist in the face of challenges are critical to develop.

Interpreting and using overall ability to differentiate instruction is most informative when combined with other information. For example, students may be grouped by contrasting their achievement (or grades) with ability test performance to divide the classroom into students with different types of instructional needs. (See the *Short Guide for Teachers* and *Score Interpretation Guide* for more detail). In Table 2, we outline the broad implications of each of the four ability-achievement contrasts.

Table 1. Differentiating Instruction to Overall Ability

Median Stanine	Example characteristics	Example scaffolding strategies	Example adaptations to build on strengths
Below-average reasoning abilities (Stanines 1–3)	• Difficulty learning abstract concepts • Minimal or ineffective strategies for learning and remembering (tend to rely on trial-and-error)	• Require very specific directions for a new task • Provide more structure, coaching, support	Look for strengths in terms of specific interests and achievements. Even more than other students, those who are behind their peers in reasoning abilities often **learn more and sustain their efforts longer if the teacher discovers and builds on their interests.**
Average reasoning abilities (Stanines 4–6)	• Likely to use only previously learned methods when faced with new tasks • Difficulty transferring knowledge/skills	• Require some structure, coaching, and support, but also benefit from some independence	Help them develop the habit of analyzing new tasks to **detect relationships with previously learned tasks**. Do this by **modeling** the process for them.
Above-average reasoning abilities (Stanines 7–8)	• Ability to learn relatively quickly • Good memory, effective learning strategies	• Instruction that helps them plan the use of different strategies in different contexts • Partnering with more able peers, particularly on difficult problems or learning tasks	Recognize that these students generally profit most when allowed to discover relationships themselves. ***Guided* discovery methods work better** than more structured teaching methods.
Very high reasoning abilities (Stanine 9)	• Preference for discovery learning rather than highly structured learning environments (not necessarily solitary environments)	• Learning to persist in the face of difficulty can be an important affective or motivational issue for very able students. Working with an older and more experienced student (or adult) can be especially beneficial.	Carefully select **challenging instructional materials**, **special projects**, **or other enrichment activities**.

Table 2. Contrasting *CogAT* and Achievement Performance

Median Stanine	Low Grades or Low Achievement Scores	High Grades or High Achievement Scores
Average or Below ***CogAT*** Scores (Stanines 1 to 6)	Struggles with school content may affect this student's motivation or effort in the classroom. This student needs more support and structure in learning and may need remedial activities tailored to their interests to rebuild motivation and engagement.	This combination may indicate the student learns specific skills with appropriate instruction, but has more difficulty with unfamiliar problems and abstraction. This student needs more emphasis on transferring skills and abstract thinking.
High ***CogAT*** Scores (Stanines 7 to 9)	This student might have unmet needs in the classroom, including poor vision or hearing, or even a learning disability. This student also may be unchallenged or bored in the current classroom environment. Teachers should experiment with different strategies (acceleration, project-based learning, etc.) to re-engage this student.	These students require some structure, coaching, and support, but also benefit from some independence.

Differentiation Based on Shape and Relative Strengths or Weaknesses

In addition to overall ability, the ***CogAT*** Score Profile also indicates a student's relative strengths or weaknesses in terms of reasoning in Verbal, Quantitative, and Nonverbal (figural) representations. The shape code (A, B, C, E) also provides information about how strong a contrast is present. Many students will have an **A profile**, meaning that their three battery scores will be roughly similar in level. For these students, the recommendations made above on overall ability are most relevant, although teachers may still notice relative strengths on which they can build, including greater interest in reading, math, or science content. Many students also have **B-shaped profiles**, which indicates that one battery score is substantially different (above or below) the other two, or **C-shaped profiles**, which indicates that two of the battery scores are quite different (one strength and one weakness). An **E-shaped profile** is a more extreme version of the C profile and is uncommon (testing errors and other explanations should be ruled out). The B, C, and E profile shapes all point to more specific differentiations that can be made.

Table 3 shows examples of the adaptations that could be made in the regular classroom to respond to students' relative strengths and weaknesses. For instance, students may prefer to engage in projects that allow them to demonstrate areas of strong performance. However, it is important not just to support areas of current strength, but to also use a student's strengths to help them build up areas of weakness. For example, a student with a strength in figural reasoning and a weakness in verbal reasoning might enhance their learning in social studies by using timelines to diagram historical events. Concept maps may also be valuable learning supports for these students.

In addition to content, areas of weakness may be built up by appealing to student interests, such as a writing project that can be tailored to a student's interest in space exploration or world travel. Whenever a relative weakness is addressed, maintaining student motivation and engagement will be essential. Again, the *Short Guide* and *Score Interpretation Guide* provide full descriptions and many more instructional suggestions.

Table 3. Build from relative strengths and shore up weaknesses

Strength	Example adaptations	Weakness	Example adaptations
V +	Avoid pitfalls in math: Students with relatively strong verbal abilities often find it easier to memorize formulas than to build more abstract conceptual systems. These abstract systems lead to the ability to transfer mathematical knowledge to unfamiliar domains.	**V -**	Acquaint students with unfamiliar ways of conversing and writing by providing opportunities to imitate the speaking and writing styles of individuals they admire. Drama, poetry, and storytelling are particularly useful in this regard.
Q +	Provide opportunities for these students to contribute at high levels to group projects that require math skills. Group projects provide an avenue for building better verbal and spatial reasoning abilities.	**Q -**	If the difficulty reflects a lack of experience or the presence of anxiety, provide greater structure, reduce or eliminate competition, reduce time pressures, and allow students greater choice in the problems they solve. Experiencing success will gradually reduce anxiety; experiencing failure will cause it to spike.
N +	Encourage students to create drawings when solving problems in mathematics, concept maps when taking notes, or mental models of a scene when reading a text.	**N -**	Provide simple drawings that encapsulate the essential features of the visual mental model required by the problem. Then give students time to examine the drawing and to label it or coordinate it with the text.

One easy way of looking at a group of students to differentiate instruction is shown in Table 4. This simple chart consists of the median stanine from the *ability profile* score across the top and the profile type down the lefthand side, such as A ("sAme"), B+ (aBove), etc. By recording each student by *CogAT* profile score in the relevant box, it becomes easy to see which students have similar and dissimilar profiles and complementary strengths and weaknesses for instructional grouping.

Table 4

PROFILE TYPE	Stanine				
	1-2	3-4	5-6	7-8	9
sAme	Ro 2A	Susan 4A	Liza 5A Ralf 6A	Chris 7A	Pat 9A Rita 9A
aBove +	Cindy 2B V+		Ann 6B N+	Eva 8B N+	
Below -		Sam 4V N-	Todd 6B V- Dev 5B V-	Ivsa 7B N-	Joe 9B Q-
Contrast			Sara 6C Q+N- Art 5C V-Q+	Mika 8C V-N+	
Extreme	Lee 1E Q+	Torv 3E V+	Aria 6E V-N+		Riva 9E N-

Conclusions

Our recommendations for differentiating instruction are based on three core principles (see also Lohman, n.d.). First, all children have special talents that can be developed (i.e., that identifying talent is not a binary decision). In-class differentiation, in addition to pull-out and other specialized services, remains a key strategy for promoting the talent development of all students. Second, we are guided by the principle that identification measures should indicate readiness for greater challenges and not just current exceptional

performance. By pursuing differentiated instruction, ***CogAT*** scores may be used to develop unrealized talent in students who have not yet demonstrated exceptional achievement. This may disproportionately include students from underserved populations such as English learners.

The third core principle is that districts have the duty to maximize the benefits of assessment relative to testing time and other costs.

Using ***CogAT*** scores for differentiating instruction in the regular classroom can maximize the positive benefits of testing time on student achievement. ***This has important implications for districts considering universal screening procedures for gifted and talented services***. Many assessment coordinators in schools and districts recognize how important universal screening procedures are for increasing the diversity of students identified for gifted and talented programming. However, many districts struggle to allocate resources for expanding testing, and classroom teachers may not see the value of testing all students for gifted and talented identification. However, by making the ***CogAT*** results work for the benefit of all students and classroom teachers in a school, universal screening procedures can have positive benefits for all students and will better justify the investment of time and resources.

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