Using Diagnostic Data to Inform Intervention Planning

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Introduction

Data-based individualization (DBI) is a systematic approach to intensifying and individualizing interventions for students who require more support. Diagnostic data represent the third step in the DBI process. When progress monitoring data indicate that a student is not making adequate progress in an intervention, educators use diagnostic data to learn more about the student's strengths and areas of need. Diagnostic data can help educators answer questions such as:

- What skills and strategies does the student need to master?

- Is the student learning the content or strategies that I'm teaching?

- What are the student's strengths that we can build on to make the intervention more successful?

- What is the purpose or function of the student's behavior?

Based on diagnostic data, educators develop a hypothesis about why the student has not yet responded to the intervention. The hypothesis is a proposed explanation for the student's lack of progress and serves as a starting point for intervention adaptation (Step 4 of DBI). Educators often have an overall sense of student needs, but it is important for them to use data to develop a hypothesis for why the student has not yet made sufficient progress. Diagnostic data can help make this process more systematic by providing the information necessary to develop a hypothesis that is accurate, specific, and actionable.

In this brief, we offer recommendations to support educators to efficiently collect, analyze, and use diagnostic data within DBI. These recommendations are not meant as a step-by-step process and teams may implement the recommendations in varying order or simultaneously. Throughout this brief, we focus on informal diagnostic data sources (e.g., student work samples, classroom observations) that are easier to use and require less training than formal, standardized diagnostic measures. However, in some cases, formal diagnostic assessment data may be necessary to gather more in-depth information about students' needs. In addition, although we include some information about diagnostic assessment for behavioral needs, we focus primarily on academic diagnostic assessment. A resource from the National Center on Intensive Intervention (NCII), Example Diagnostic Tools, provides more information about common diagnostic data sources that may be used in the DBI process.[1]

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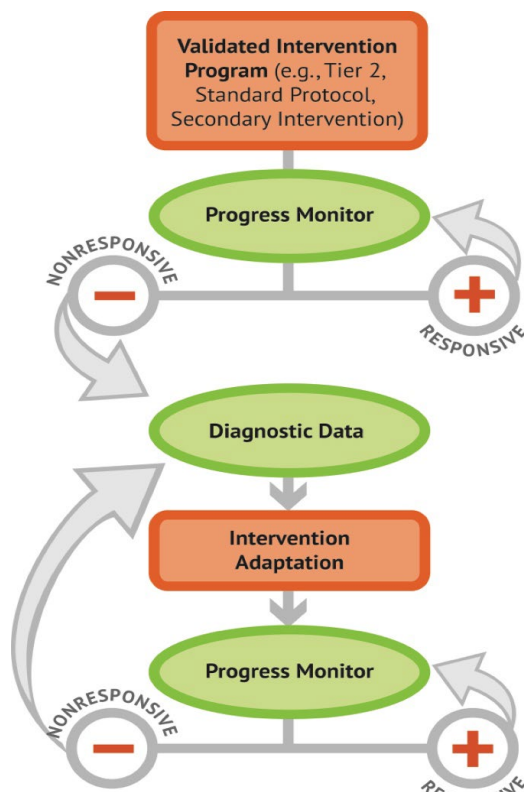
[1] NCII does recommend specific diagnostic tools. The tools listed on the website are examples of common diagnostic tools.

Recommendation 1: Review Intervention Fidelity

My student's progress monitoring data show that she isn't making the kind of growth we were hoping for; her trend line is below the goal line. The intervention program is evidence based and targets the right skills, but there have been lots of interruptions to my intervention sessions, and she has missed several sessions due to absences. Between the interruptions and her not attending consistently, we have not gotten through the content of the intervention as I had intended. What should I do now? — *Teacher*

As you begin thinking about why your student has not yet made the progress you hoped for, it is important to first consider the fidelity of implementation of the intervention. Fidelity of implementation refers to the extent to which the intervention is delivered as planned. Fidelity data are important because they allow teams to rule out inconsistent implementation as a potential cause for a student's lack of progress.

What does it mean to collect fidelity data? Validated interventions may include fidelity checklists to allow educators to document the delivery of specific intervention components. Teams also may collect data on adherence to the intervention plan that the team developed, using tools such as NCII's Student Intervention Implementation Log. If the intervention has not been delivered with fidelity, the team should first consider how to strengthen consistent implementation of the intervention. For example, the team may consider how to support the student to improve attendance during the intervention or consider strategies to promote students' engagement during intervention sessions. The NCII resource Clarifying Questions to Create a Hypothesis to Guide Intervention Changes: Question Bank provides several guiding questions related to fidelity that teams may use to clarify or narrow the hypothesis.

FIVE ELEMENTS OF FIDELITY

Five elements of fidelity contribute to effective implementation:

1. Student engagement
2. Adherence to the intervention plan
3. Exposure/duration
4. Quality of delivery
5. Program specificity.

See the NCII resource Considerations for Effective Implementation: 5 Elements of Fidelity for more information about these elements.

Recommendation 2: Determine If You Need to Make Changes for the Entire Group or Only Individual Students

Several students in my math intervention group are not responding to the intervention in the way that I had hoped. The intervention is evidence based and aligned with the needs of the group, but most students in the group are not on track to meet their progress monitoring goal. I reviewed the lesson plans within the intervention, and I think these students need more explicit instruction so I'm going to incorporate more modeling and guided practice during the intervention sessions. —*Teacher*

Intensive intervention is often delivered to small groups of students with similar needs. In these cases, educators should consider the extent to which most students in the group are responding to the intervention. If progress monitoring data indicate that the majority of students in a group (e.g., three students in a group of five) are not responding, the team should work with the interventionist to develop a hypothesis and intensify the intervention for the entire group. If only a few students are not responding (e.g., one or two students in a group of five), the team may consider regrouping the lower performing students or providing additional

instruction for those students to boost their skills. Adapting the intervention for the group is more efficient than adapting an individual student's intervention.

To develop a hypothesis for why most students in the group are not making progress, the team should review fidelity data for the group, including the percentage of sessions completed as planned and the overall behavior and engagement of the group during instruction. The team also may collect or review data on the quality of instructional delivery, including the consistency with which the interventionist uses effective teaching practices (e.g., brisk pace, precise language, frequent opportunities to respond). In addition, the team may review data from progress monitoring assessments, work samples, or quizzes to determine if students are struggling with specific skills. If assessment scores are low for skills that the teacher has recently taught, the group may need more explicit instruction with clear modeling. Teams also may gather information through interviews with educators about their perceptions about what is contributing to the group's lack of progress. Furthermore, teams may consider the need for a reduced group size, increased opportunities to respond, or increased frequency or duration of intervention sessions.

EXAMPLES OF COMMON DIAGNOSTIC DATA SOURCES FOR LITERACY AND MATHEMATICS

- Error analysis of literacy or mathematics progress monitoring data

- Analysis of student work (e.g., classroom assignments, tests)

- Observation and anecdotal notes

- Student or family interviews or checklists

- Intervention or curricula-specific diagnostic tools

See the NCII resource Example Diagnostic Tools for more information.

Recommendation 3: Dig Deeper by Analyzing Existing Data

> One of the students in my intervention group isn't responding in the way I'd like. His last four progress monitoring data points have been below the goal line. I'm going to look back at his progress monitoring assessments from the past month and see if I get a better understanding of the types of errors he is making. I'm also going to look closely at the assessments included in the intervention program to see what content he's learning and what parts he's having trouble with. —*Teacher*

In some cases, it may be necessary to collect additional diagnostic data, such as through a phonics inventory, a behavior observation, or an interview; other times, educators can analyze data they have already collected. For example, educators may look for error patterns within progress monitoring data or student work samples to better understand the specific skills in which the student needs additional instruction and support. To conduct error analysis, educators review the types of errors that the student made on recent progress monitoring assessments or other work samples to identify patterns of errors. Exhibit 1 provides example guiding questions for conducting error analysis in reading, written language, and mathematics.

Exhibit 1. Guiding Questions for Error Analysis

Academic domain	Guiding questions for error analysis
Reading	▪ In which letter-sound patterns (e.g., CVC, CVCC, digraphs, blends, R-controlled vowels) does the student need additional instruction? ▪ Are there letter-sound patterns with greater than 10% errors? If so, focus on these.
Writing and spelling	▪ Are the student's errors mostly phonological (e.g., incorrect letter-sound relationships), orthographic (e.g., incorrect spelling patterns), or morphological (e.g., incorrect prefixes, suffixes, and root word combinations)?

Mathematics	▪ Is the error a onetime miscalculation or a more persistent error? ▪ Are the errors procedural (e.g., not aligning decimals) or conceptual (e.g., choosing the wrong operation)? ▪ What are the common error categories (e.g., misunderstanding of regrouping, applying whole number values to fractions)?

In addition to error analysis, progress monitoring data may be used to identify if the student is still acquiring the skill, needs to build fluency in the skill (i.e., performs slowly), or knows the skill but struggles to apply it. The Instructional Hierarchy (Haring & Eaton, 1978) has four phases of learning: acquisition, fluency building, generalization, and adaptation. Information about a student's phase of learning may help teams develop next steps for intervention adaptation (Burns, 2021).

▪ Students in the acquisition phase have low accuracy with a task (e.g., less than 90% for most facts or lower than 93% accuracy for reading connected text). Intervention adaptations for these students should focus on increasing explicit instruction with modeling and immediate feedback to improve accuracy.

▪ Students in the fluency building phase have sufficient accuracy with a task (e.g., greater than 90% accuracy for facts) but lack fluency (e.g., below benchmarks for correct digits per minute). Intervention adaptations for these students should focus on providing increased practice opportunities with the target skill to build fluency.

▪ Students in the generalization phase can accurately perform the skill with fluency but struggle to apply it in different contexts (e.g., when reading connected text or when presented with a word problem). Intervention adaptations for these students should focus on helping the student transfer the skill to novel contexts.

▪ Students in the adaptation phase can generalize the skill to new contexts and would be unlikely to need intensive intervention.

The learning hierarchy may also be used in conjunction with the Taxonomy of Intervention Intensity (Fuchs et al., 2017) to help teams identify the most appropriate intervention adaptations for a student who is not yet making adequate progress in an intervention (Burns, 2021).

▪ Intervention adaptations related to alignment (e.g., supplementing instructional materials to target specific skills) and comprehensiveness (e.g., increasing guided practice) may be most appropriate for students in the acquisition phase of the learning hierarchy.

▪ Intervention adaptations related to dosage (e.g., conducting more frequent intervention sessions) may be most appropriate for students in the fluency building phase of the learning hierarchy.

▪ Intervention adaptations related to attention to transfer (e.g., practice applying reading strategies using different types of texts) may be most appropriate for students in the generalization phase of the learning hierarchy.

Recommendation 4: Identify Connections Between Academics and Behavior

I've noticed an increase in off-task behavior for one of my students. She is always talking to her peers during instruction and shouting out. I feel like I've tried everything—politely asking her to stop, providing a correction when she calls out, and speaking with her in the hallway. My team recommended a token economy, but that has not worked either. I'm frustrated, and I think this is impacting my ability to teach and other students' ability to learn. —*Teacher*

Many students who require intensive intervention have co-occurring academic, behavioral, and social-emotional needs. Therefore, it is important that teams consider a student's academic, behavioral, and social and emotional needs in a holistic manner and identify ways in which these areas may interact. When a student displays challenging behavior, the diagnostic data step involves gathering information to help the team understand the function of the student's behavior. The function of the behavior refers to the purpose that the behavior serves for the student (e.g., access to attention or a preferred activity; avoidance of tasks or social situations).

Understanding the function of behavior may reveal a relationship between academic and behavior challenges. For example, if a student displays off-task behavior, such as calling out during instruction, the function of the behavior may be to escape from an unwanted academic task. To address this hypothesis, the team would identify intensification strategies related to increasing the instructional match and building the student's academic skills in that subject. To understand the function of the behavior, the team may use data to answer questions such as the following:

- What action or cause precedes the behavior?

- What are the conditions (time of day, setting, peer interactions, classroom dynamics) under which the challenging behavior occurs?

- What is the immediate reaction or consequence of the behavior?

For efficiency, this analysis of student behavior may be a relatively brief and informal process, such as conducting a problem-solving meeting, reviewing archival records of attendance and office disciplinary referrals, or conducting a brief interview. When the behavior is more severe, the team may need to use more complex and in-depth methods, such as a functional behavior assessment involving observations of student behavior. The NCII training module Focusing on the Function of Behavior Within the Context of DBI provides more information to assist educators in understanding how the function of behavior can be used within the diagnostic data step of DBI. In addition, NCII presents several example diagnostic tools for identifying the function of behavior, including interview protocols, checklists, and planning tools.

> **EXAMPLES OF COMMON DIAGNOSTIC DATA SOURCES FOR BEHAVIOR**
>
> - Student and parent/family interviews
> - Classroom observations
> - Antecedent, behavior, consequence checklists
> - Point sheets/behavior report cards
>
> See the NCII resource Example Diagnostic Tools for more information.

Recommendation 5: Gather Multiple Perspectives on Students' Strengths and Needs

> One of my students has not been making the type of progress that I would like in her reading intervention. I've reviewed several diagnostic data sources, including progress monitoring data, classroom work samples, and behavior observation notes, to get a better sense of what might be causing her challenges. I'm going to schedule a meeting to gather input from her other teachers about how she's doing in their classes. I'm also going to call home and see what concerns and input her parents may have. I'd like to know more about how to best support her and find out what strategies are working in other settings. —*Teacher*

The intervention team typically involves a core group of people with knowledge of the student, but in some cases, it may be helpful to involve additional people in the diagnostic data step of DBI. Educators may gather valuable information from the student's family, other educators, and specialists who work with the student, as

well as the student. Gathering multiple perspectives may help the team determine additional factors that may be influencing the student or identify strategies that have been effective in other classes or contexts.

Families can provide information about what motivates the student, including new interests, hobbies, and out-of-school activities. Families can also share feedback on the frequency of behavioral concerns at home and in the community and share strategies that have worked for supporting positive behavior at home. Furthermore, families can share information about changes in home life (e.g., new routines or living situation) that may be affecting the student. Other school personnel, such as school psychologists, counselors, social workers, paraprofessionals, and content-area teachers may give beneficial information about the patterns of success and challenges that they observe and offer their perceptions of the problem and experiences working with the student. In addition, professionals such as behavioral specialists or psychologists may conduct a formal observation when needed. When appropriate, both families and professionals may provide feedback about when the team should consider a referral for a comprehensive evaluation for students not currently receiving special education services.

Finally, the perspective of the student should be included whenever possible. When age- and developmentally appropriate, educators may use student interviews or self-ratings to gather more information about a student's strengths and areas of need. Student interviews may be particularly valuable when seeking to understand a student's motivation, feelings toward academics, or root causes of behavior. Moreover, having students graph their own progress monitoring data can be very motivating for students and may increase student buy-in and understanding of the purpose of the intervention and the intended outcomes. Finally, educators may gather information from the student during informal discussion, such as asking about the strategies the student is using to solve a problem and whether the strategies are successful from the student's perspective.

Conclusion

The team's actionable hypothesis should be developed as part of an intensive intervention meeting. It is critical that teams allow enough time for discussion, reflection, problem solving, and planning. Too often team meetings focus on sorting students into groups or other logistics and leave little time for discussing instruction. NCII has developed several resources to assist teams with establishing effective processes for intensive intervention meetings, including resources to support teams with organizing and using data before, during, and after the meeting. If the team finds that the existing data are insufficient, they may need to collect additional diagnostic data, including through formal standardized measures as appropriate.

The process of collecting, analyzing, and using diagnostic data is an essential part of the DBI process that helps educators understand a student's strengths and needs. With this information, educators can develop a hypothesis for why the student has not yet responded to the intervention and select adaptation strategies to intensify and individualize the student's intervention.

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