Data-Based Decision Making in Multi-Tiered Systems of Support: Principles, Practices, Tips, & Tools

by Sarah V. Arden and Jill M. Pentimonti

Recent data indicate that students, especially those with disabilities, are struggling to demonstrate the kinds of growth educators would hope to see. In fact, for students with disabilities, 67% of fourth graders and 63% of eighth graders lack basic reading skills (National Center for Education Statistics [NCES], 2015). Such data are troubling, given that students' reading achievement at a young age is highly predictive of future academic success (e.g., Cooper, Moore, Powers, Cleveland, & Greenberg, 2014; La Paro & Pianta, 2000; Cunningham & Stanovich, 1997). Schools are being pushed, often with limited resources, to impact reading outcomes for students with disabilities, including students with dyslexia. One approach used by educators to positively impact student-level reading outcomes is through the use of Multi-tiered Systems of Support (MTSS). MTSS offers a framework to help schools prioritize instructional resources and time so that, ideally, *all* students would access instruction and demonstrate improved outcomes. Implementing the process of MTSS requires educators to make many decisions. And while each decision is important, perhaps none is more critical than those that involve data collection, data interpretation, and using data to inform instructional adaptation over time.

As schools have implemented tiered systems of support over the last two decades or so, one thing has become clear: Implementing MTSS within the infrastructure of authentic school systems is very challenging (Arden, Gandhi, Zumeta Edmonds, & Danielson, 2017). This could be due to a lack of guidance from policy makers around how to successfully implement MTSS (Balu et al., 2015; VanDerHeyden et al., 2016; Hauerwas, Brown, & Scott, 2013), or because many educators have not received in-depth training or practice opportunities to hone the nuanced data-based decision-making skills required (Cook & Odom, 2013): delivering instruction, monitoring progress, collecting and analyzing data, and adapting and intensifying intervention. In addition, MTSS requires schools to use fluid iterative processes of analyzing assessment data to adapt instruction in new ways (NCII, 2013). Asking teachers to demonstrate high levels of proficiency using data to drive instructional decisions is something both special and general education teachers have reported as very challenging (Fuchs & Vaughn, 2012; Young & Kim, 2010).

The health of any multi-tiered system of support relies heavily on the skill of the instructors to engage in data-based decision-making processes to inform their instructional decisions across core, Tier 2, and Tier 3 instruction. Without practitioners who can make sound, data-based decisions, schools will continue to struggle in their attempts to implement MTSS. In this article, we present a broad overview of the principles of data-based decision making and discuss practitioner-friendly tools and examples educators can use when engaging in the data-based decision-making process to inform their instructional choices within an MTSS framework.

Data-Based Decision Making in a Multi-Tiered System

In an MTSS framework, research-based core instruction (i.e., general education, grade-level curriculum) is delivered to all students followed by progress monitoring or assessment to check for understanding. For many students, this core instruction, or Tier I, will suffice to meet their instructional needs. Data from progress monitoring checks, however, may indicate that some students would benefit from extra support and instruction; this additional instruction (e.g., Tier 2 and potentially, Tier 3 at the most intensive levels) would be provided using a fluid and systematic approach that includes use of evidence-based instructional programs, instruction delivered with increasing intensity (i.e., in a smaller group, with more feedback, at a slower pace), ongoing progress-monitoring checks, and instructional adaptations based on *analysis of student-level data*. Research tells us that approximately 15% of students may require Tier 2 instruction at some point in their educational career and that 3-5% of students may require intensive Tier 3 instruction (Fuchs & Fuchs, 2006).

In recent years, data-based decision making has been recognized as an essential part of education (Espin, Wayman, Deno, McMaster & de Rooij, 2017; Mandinach, 2012). This recognition has occurred as educators have been encouraged to use scientifically based curriculum, assessments, and tools, rather than anecdotal evidence or opinions to make instructional decisions (IDEA, 2004). This new emphasis on evidence and data collection has resulted in increased access to an extensive range of educational data, including results from formative and summative assessments, state assessments, universal screeners, and progress monitoring probes. Research, however, suggests that many educators have not been taught how to interpret this wealth of data in a way that might lead to significant or meaningful instructional changes or improved student outcomes (Heritage, Kim, Vendlinski, & Herman, 2009; Olah, Lawrence, & Riggan, 2010). This dearth of data interpretation expertise leaves many schools data rich and information poor (Slotnik & Orland, 2010). This article attempts to remedy these limitations by providing practical tips, tools, and

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Abbreviation

MTSS: Multi-tiered Systems of Support

examples that can be used to guide practitioners as they engage in data-based decision making within MTSS.

Data-Based Decision Making in Core Classrooms

Core, or the primary level of Tier 1 instruction, focuses on delivering instructionally sound, critical curriculum to all students within the regular education classroom. Also, this core curricula should incorporate differentiated instruction to help students to access core instruction. In core, educators commonly make data-based decisions using *universal screening* and *progress monitoring*. Within the context of MTSS, *universal screening* is the first step in identifying students who may be at risk of academic failure. Universal screeners are brief assessments of targeted skills and are administered to all students in a school. Data from universal screeners are used to determine the effectiveness of the core curriculum, assess how students compare to their peers, and identify students at risk for poor learning outcomes. For schools to adequately identify students at risk using universal screening data, screening must be conducted more than once a year (e.g., fall, winter, spring) and include procedures to ensure implementation accuracy (i.e., all students are tested, scores and cut points/designs are accurate).

Although seemingly similar to universal screening, *progress monitoring* is significantly different. Progress monitoring should be used as an additional data source within a comprehensive core instructional program to monitor students' response to instruction, specifically in areas where data from a universal screener indicate they may need additional support. Progress monitoring should occur at regular intervals (monthly is recommended to assess progress on core instruction), to ensure that accurate and meaningful results are produced and that teachers can use these results to quantify short- and long-term student gains. Progress monitoring data can be used for two purposes: 1) to identify students just above the cut score and those scoring below the cut score and, 2) to identify students at-risk who need supplemental instruction based on response to instruction. With progress monitoring data, teachers establish long-term goals indicating the level of proficiency students should demonstrate. Following are suggestions to help practitioners effectively engage in data-based decisions:

- Identify valid and reliable screening and progress monitoring tools
- Ask the right questions, and
- Build a team that can fluently interpret data.

Let's look more closely at each of these suggestions:

Identify screening and progress monitoring tools. One of the most critical components to any kind of assessment of student progress is to ensure the tool used is valid (i.e., accurately measures the underlying construct it is intended to measure, such as decoding ability or comprehension skills), reliable (i.e., produces similar results under consistent conditions), and sensitive (i.e., accurately identifies students) enough to measure the intended outcomes. Although selecting these tools can feel overwhelming, there are many resources available to help educators in their selections. See Table 1 for suggestions.

Ask the right questions and build a climate of data fluency. Using screening and progress monitoring data to inform decision making in core instruction includes a number of essential but complex steps. First, it is best to infuse a climate of data fluency. Data fluency is defined as a common understanding and shared language between general education staff, intervention providers, special education staff, and school leaders around 1) the reasons behind data collection, 2) the value of collecting varied types of data, and 3) data analysis procedures that inform instructional decision making. After progress monitoring probes are administered, we suggest all relevant practitioners gather as a team and interpret the data to answer questions such as: Are students making progress at an acceptable rate? Are they meeting short- and long-term performance goals? Does the core instruction need to be adjusted and how can we tell? These simple questions can help teams avoid the pitfalls of becoming data rich and information poor by prioritizing how they analyze data to make decisions and which decisions are most relevant to their needs.

Build a team. To build a climate of data fluency and encourage collaboration, schools should develop teams comprised of interventionists, special education and classroom teachers, and administrators to analyze and interpret data. These teams should engage in a problem-solving process to analyze school-wide data from universal screening and progress monitoring assessments of students in Tier 1. These teams can assist teachers in planning and implementing differentiated instructional strategies on the basis of students' varying skill levels (Kovaleski & Pedersen, 2008). This teaming process should also be used for designing instruction and placing students into and out of tiered interventions (i.e., Tier 2 and Tier 3, see below).

We suggest that data teams convene after each benchmark (i.e., fall, winter, spring) to review school-wide, universal screening data, discuss the aggregate growth of students in each grade and as a whole. This team would also be responsible for suggesting instructional strategies and selecting students for tiered interventions. In order to be the most effective, we suggest these data teams include representatives across the grade levels, given the challenges some teachers face as they work to incorporate expectations for data use into their current practice (Fuchs & Young, 2006). See Table 1 for a link to customizable resources to support teams as they organize and run data meetings.

Data-Based Decision Making in Tier 2

Even when core instruction is well intentioned, research based, and instructionally sound, there will be a percentage of students who need additional help to demonstrate understanding of the skills being taught. In an MTSS framework, this support is often referred to as Tier 2 instruction. It is important to clarify that Tier 2 instruction constitutes more than differentiated core instruction; it is typically provided outside the general education classroom by an interventionist or other trained

TABLE 1. Resources for Data-Based Decision Making in an MTSS System

Topic	Purpose	Resource
Progress Monitoring & Universal Screeners	Increase knowledge and skills around progress monitoring in core instruction	**IRIS Modules:** https://iris.peabody.vanderbilt.edu/module/gpm/#content
	Increase knowledge and skills around progress monitoring in MTSS	**CRTI Implementer Series:** http://www.rti4success.org/resource/rti-implementer-series-module-2-progress-monitoring
	Selecting universal screening and progress monitoring tools	**NCII Tools Charts:** http://www.intensiveintervention.org/resources/tools-charts
Data Meetings	Protocols intended to support data team meetings, including an agenda and note taking template	**NCII Data Meeting Tools:** http://www.intensiveintervention.org/tools-support-intensive-intervention-data-meetings
	Data team meeting protocols with suggestions for customization and discussions around why students are not responding	**EBI Network RTI Meeting Documents:** http://ebi.missouri.edu/?page_id=382
	Increase knowledge and skills to set according goals and objectives	**NCII Goal Setting Module:** http://www.intensiveintervention.org/process/goal-setting
Instructional Guidance	Examples of how to deliver standards-based instruction for students across the tiers	**NCII Instructional One Pagers:** http://www.intensiveintervention.org/standards-relevant-instruction-multi-tiered-systems-support-mtss-or-response-intervention
	Ideas for ways to adapt instruction in qualitative and quantitative ways	**NCII Intensification Menu**: http://www.intensiveintervention.org/resource/designing-and-delivering-intervention-students-severe-and-persistent-academic-needs-dbi
	Increase knowledge and skills around diagnostic assessments and data-based instructional adaptations	**Diagnostic Assessment Guide:** http://www.intensiveintervention.org/resource/informal-academic-diagnostic-assessment-using-data-guide-instruction-part-4-identifying

staff. Tier 2 instruction generally refers to a standardized approach, protocol, or program that is 1) a valid instructional match for students receiving the instruction and, 2) delivered in a smaller group setting than core instruction, with increased duration, dosage, and intensity over time (NCRTI, 2010).

Students who require Tier 2 instruction would be those who have had access to differentiated instructional opportunities in the core setting and yet their universal screening and monthly progress monitoring data indicate they are not making adequate progress to master the skills (Shapiro, Hilt-Panahon, & Gischlar, 2010). Research tells us that when instructionally sound core instruction is delivered with fidelity, only 15% of students may need Tier 2 supports. Decisions about Tier 2 instruction should generally be made by the school data team during their problem-solving meetings and as part of their data analysis.

Developing effective Tier 2 systems. A critical role for the data team is to examine the aggregate school-wide screening and progress monitoring data and determine if the health of their system is intact. Teams can do this is by reviewing the number of students who are in need of Tier 2 instruction. If there are consistent patterns in the data that point to high numbers of students not making adequate progress (i.e., if more than 20-30% of students are not passing benchmark assessments or if most students in one grade level are failing to master a given skill), it might mean that the instructional practices used in core instruction need strengthening (NCII, 2013b). Using data-based decision making effectively can help to safeguard the allocation of instructional resources and allow for prioritized delivery of those resources when necessary.

The role of data teams. Data teams play a critical role for students who receive Tier 2 instruction. They are responsible for collecting and interpreting data for students who receive Tier 2, outlining the decision-making protocols and processes, and then initiating those processes. Examples of these protocols might include setting appropriate goals and desired instructional outcomes for students receiving Tier 2 instruction (see Table 1), graphing and reviewing student-level data to check for adequate progress, developing a menu of intervention decisions and intensification strategies interventionists can use when students do not respond to instruction (see Table 1), assigning a case manager to take responsibility for intervention plans, and building systems to facilitate co-ownership of the data-based decision-making process among general education teachers and the interventionists who typically deliver Tier 2. Research shows that when teams develop these kinds of data-fluent processes and procedures, schools have greater success sustaining data-based decision-making practices over time (NCII, 2013b).

Progress monitoring in Tier 2. Once a student begins to receive Tier 2 instruction, it is critical that progress monitoring occur at a more frequent pace compared to those students in

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core. It is suggested that students in Tier 2 receive bi-weekly progress monitoring probes (Fuchs & Fuchs, 2006). This frequency allows interventionists and data teams to document the impact of the intervention in a timely fashion (i.e., don't wait an entire school year before it is determined an intervention did not work) while simultaneously allowing a student to access the intervention for long enough for it to make an impact. Data from these bi-weekly progress monitoring assessments should be graphed and reviewed on an ongoing and regular basis to determine if the Tier 2 instruction is adequately meeting the student's needs. Research suggests that students faithfully receive Tier 2 intervention in small groups for six to nine weeks (depending on the grade, intervention schedule, duration, etc.) before educators determine if a student's response is adequate (Metcalf, 2013). If the graphed progress monitoring data reflect a response to the intervention, data teams should discuss ways to gradually release the instructional supports and slowly transition the student back into the general education setting. However, if the graphed progress monitoring data do not reflect an adequate response, data team members should discuss a number of options: 1) Is the student progressing at a speed that is not sufficient? 2) What is this student's history with intervention? Would he/she benefit from additional time in intervention or from instruction delivered in a smaller group? 3) Are the needs of this student so specific that intensive and specialized instruction outside of Tier 2 is required? (Fuchs, Fuchs, & Vaugh, 2014). If the answers to the first two questions are "yes," then data teams may want to continue delivering Tier 2 instruction with increased duration and/or in a decreased group size. If the answers are no, however, and it is determined that a student's needs cannot be met in Tier 2 based on data and responsiveness to instruction, then the data team can suggest a student receive Tier 3 instruction. In some cases, the recommendation for Tier 3 instruction is also when an evaluation for eligibility for special education is considered.

Data-Based Decision Making in Tier 3

Approximately 3-5% of students who receive valid, reliable Tier 2 instruction delivered with fidelity will continue to demonstrate the need for more intensive intervention. In the context of MTSS, this level of intervention is referred to as Tier 3 or intensive intervention. In some cases, students who demonstrate the need for this level of instruction are referred for a special education evaluation and in some cases Tier 3 is considered special education. Referral and evaluation processes vary from district to district and state to state, however, and are relatively unimportant for the purposes of our discussion about data-based decision making. Whether a student has a diagnosed disability, has been referred, or has not been identified as having a disability, instruction for students at the Tier 3 level often requires interventionists and data teams to engage in an iterative process of sophisticated intensification practices, in-depth diagnostic data reviews, and instructional adaptation (NCII, 2013b).

Progress monitoring at Tier 3. It is recommended that students who receive Tier 3 intervention have their progress monitored on a weekly basis to allow for interventionists to make a determination about the impact of their instruction and to make timely instructional adaptations. Understanding the sensitivity of the progress monitoring tool becomes very critical when progress monitoring at the most intensive, or Tier 3 level. Often students who require Tier 3 instruction perform far below their chronological age or grade level. Because of this, monitoring progress using grade level assessments will result in data with a decreasing slope or data that appear flat (i.e., no growth) because those tools are not sensitive enough to measure growth outside of the grade-level skills they measure. For example, if a fifth-grade student is preforming at the second-grade level but is given an assessment measuring skills at the fifth grade level, that assessment is too "blunt" to measure student outcomes and will result in flat or declining data. If that same student is given an assessment at the second-grade level, it should be sensitive enough to more accurately measure the true growth a student has made at his or her instructional level. It is the job of data teams to recognize this issue and make a determination to progress monitor out of grade level. It is also the role of the data team to ensure that the goals for students receiving Tier 3 instruction are set appropriately and not based on grade level or age level expectations but on the expectations of students' instructional levels and/or previous growth (NCII, 2013; see Table 1).

Diagnostic Assessment and Instructional Adaptations

Informal diagnostic assessments are important components of data-based decision making in Tier 3 instruction; the assessments help determine specific skills a student is struggling to master and estimates the instructional level of that student's performance. Diagnostic assessment in Tier 3 is intended to be informal and brief and can include error analysis, skills analysis, or other reviews of relevant data (NCII, 2013) and should reveal information about an individual student's needs, including a potential lack of foundational skills, a need for additional fluency practice, or an ongoing error in a hierarchy of skills that impacts accuracy. Results from diagnostic assessment should directly inform the intervention for students at the Tier 3 level as data teams and interventionists work to adapt instruction to meet these individualized needs. Once instruction is adapted, the decision-making process continues and progress is monitored, diagnostic assessment occurs based on student responsiveness, and additional instructional adaptations are made.

Data's Central Role

Given the need to support student growth in reading outcomes, many educators look to improve student results through the use of tiered systems of support. Central to MTSS framework implementation are decisions that involve data collection, data interpretation, and data use to inform instructional adaptation over time. While these decision-making processes are often complex, they can be implemented successfully. In this article, we have presented practical tips, tools and examples to guide practitioners as they use data to inform instruction.

References

Arden, S. V., Gandhi, A., Zumeta Edmonds, R., & Danielson, L. (2017). Toward more effective systems: Lessons from national implementation efforts. *Exceptional Children, 83*(3), 269–280.

Balu, R., Zhu, P., Doolittle, F., Schiller, E., Jenkins, J., & Gersten, R. (2015). *Evaluation of response to intervention practices for elementary school reading* (NCEE 2016-4000). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance. Retrieved from https://ies.ed.gov/ncee/pubs/20164000/pdf/20164000.pdf

Cook, B. G., & Odom, S. L. (2013). Evidence-based practices and implementation science in special education. *Exceptional Children*, *79*(2), 135–144.

Cooper, B. R., Moore, J. E., Powers, C. J., Cleveland, M., & Greenberg, M. T. (2014). Patterns of early reading and social skills associated with academic success in elementary school. *Early Education and Development, 25*(8), 1248–1264.

Espin, C. A., Wayman, M. M., Deno, S. L., McMaster, K., & de Rooij, M. (2017) Data based decision-making: Developing a method for capturing teachers' understanding of CBM graphs. *Learning Disabilities Research and Practice, 32*(1), 8–21.

Fuchs, D., & Fuchs, L. S. (2006). Introduction to response to intervention: What, why, and how valid is it? *Reading Research Quarterly*, *41*(1), 93–99.

Fuchs, D., Fuchs, L. S., & Vaughn, S. (2014). What is intensive instruction and why is it important?. *Teaching Exceptional Children*, *46*(4), 13–18.

Fuchs, D., & Young, C. L. (2006). On the irrelevance of intelligence in predicting responsiveness to reading instruction. *Exceptional Children*, *73*(1), 8–30.

Fuchs, L. S., & Vaughn, S. (2012). Responsiveness-to-intervention: A decade later. *Journal of Learning Disabilities, 45*, 195–203.

Hauerwas, L. B., Brown, R., & Scott, A. (2013). Specific learning disability and response to intervention: State-level guidance. *Exceptional Children, 80*(1), 101–120.

Heritage, M., Kim, J., Vendlinski, T., & Herman, J. (2009) From evidence to action: A seamless process in formative assessment? *Educational Measurement, 28*(3) 24–31.

Individuals with Disabilities Education Act (IDEA), 20 U.S.C. §§ 1401 *et. seq*. (2004.)

Kovaleski, J. F., & Pedersen, J. (2008). Best practices in data analysis teaming. In A. Thomas & J. Grimes (Eds.), *Best practices in school psychology V* (pp. 115–130). Bethesda, MD: National Association of School Psychologists.

Mandinach, E. B. (2012). A perfect time for data use: Using data-driven decision making to inform practice. *Educational Psychologist, 47*, 71–85. http://dx.doi.org/10.1080/00461520.2012.667064

Metcalf, T. (2013). What's your plan? Accurate decision making within a multi-tier system of supports: Critical areas in tier 1. *RTI Action Network*.

National Center on Intensive Intervention. (2013a). *Implementing intensive intervention: Lessons learned from the field*. Washington, DC: U.S. Department of Education, Office of Special Education Programs.

National Center on Intensive Intervention. (2013b). *Data-based individualization: A framework for intensive intervention*. Washington, DC: U.S. Department of Education, Office of Special Education. Retrieved from http://www.intensiveintervention.org/sites/default/files/DBI_Framework.pdf

National Center on Response to Intervention. (2010). *Essential components of RTI—A closer look at response to intervention*. Washington, DC: U.S. Department of Education, Office of Special Education Programs.

Olah, L., Lawrence, N., & Riggan, M. (2010). Learning to learn from benchmark assessment data: How teachers analyze results. *Peabody Journal of Education, 85*(1): 226–245.

Shapiro, E. S., Hilt-Panahon, A., & Gischlar, K. L. (2010). Implementing proven research in school-based practices: Progress monitoring within a response-to-intervention model. In M. R. Shinn & H. M. Walker (Eds.), *Interventions for achievement and behavior problems in a three-tier model including RTI* (pp. 175–192). Washington, DC: National Association of School Psychologists.

Slotnik, W. J., & Orland, M. (2010). Data rich but information poor. *Education Week, 29*(1). Retrieved from http://www.edweek.org/ew/articles/2010/05/06/31slotnik.h29.html

VanDerHeyden, A., Burns, M., Brown, R., Shinn, M. R., Kukic, S., Gibbons, K., ... & Tilly, W. D. (2016). Four steps to implement RTI correctly. *Education Week, 35*, 25.

Young, V. M., & Kim, D. H. (2010). Using assessments for instructional improvement: A literature review. *Education Policy Analysis Archives, 18*(19), 1–37. http://dx.doi.org/10.14507/epaa.v18n19.2010

***Sarah V. Arden, Ph.D.**, is a senior researcher at the American Institutes for Research, where she serves as the task lead for intensive technical assistance at the National Center on Intensive Intervention and as the interim Project Director for a U.S. Department of Education Office of Improvement and Innovation (i3) grant. She earned her Ph.D. in Special Education with a focus on Learning Disabilities and Behavior Disorders from the University of Texas at Austin, an M.A. in Special Education from California State University Fresno, and a B.A. in Organizational Communication at California State Polytechnic University San Luis Obispo.*

***Jill M. Pentimonti, Ph.D.**, is a senior researcher at the American Institutes for Research in Washington, D.C., where she serves as the lead of Knowledge Development for the National Center on Intensive Intervention, and as Principal Investigator for an Institute of Education Sciences grant. She earned a Ph.D. in Reading in Early and Middle Childhood from The Ohio State University, an M.Ed. in Reading from the University of Virginia, and an M.Ed. in Education from Northwestern University.*