Response-to-Intervention and Mastery Learning: Tracing Roots and Seeking Common Ground

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Abstract: In this article we draw parallels between defined critical features of response-to-intervention (RTI) and the mastery learning approach described in the general education literature by Benjamin S. Bloom. We posit that these two processes include many common elements but that each incorporates unique elements that could potentially complement and strengthen the other. Finally, we outline the specific advantages a synthesis of these two processes offer both special educators and general educators in their efforts to enhance the effectiveness of instructional programs for all students.

Keywords: Mastery learning, response to intervention, instruction, assessment, reform

Special educators and general educators often live in different worlds. They follow different paths in their professional training and typically have vastly different experiential backgrounds. Special educators and general educators often see themselves as holding different roles in education, approaching instructional challenges differently, and frequently using different technical language to describe fundamentally similar concepts. Even when they use the same words, these words can have different meanings depending on the perspective of the user. Unfortunately, the evolution of these different languages and separate conversations has limited the opportunities for the two educational fields to co-construct processes based on the foundational elements from each field that have been shown to be effective in a variety of contexts. In no area is this more apparent than in current discussions of response-to-intervention (RTI).

Leaders in the area of RTI frequently use terms that are familiar to the community of special educators but initially may seem foreign to the majority of general educators. This does not mean, however, that they view classroom procedures differently from general educators or that the practices they advocate are novel or unknown. In most instances they are talking about specific aspects of best practice but in a way that general educators often find complicated and perplexing. While it makes no sense to argue about which of these languages is "correct," clarifying these commonalities will enhance communication, make collaboration easier, and offer huge benefits to students.

In this article we show how descriptions of the RTI process closely parallel the mastery learning process described by Benjamin S. Bloom. We also describe how each of these two processes includes unique elements that could potentially strengthen the other, and how together they offer both special educators and general educators opportunities to enhance the effectiveness of instructional programs for all students.

Response-to-Intervention (RTI)

Response-to-intervention represents a movement initiated by special educators to provide a systematic, tiered instructional process for students who are struggling in school but may not yet be identified for special education services. Introduced in response to federal legislation in 2004 (Individuals With Disabilities Education Improvement Act 2004), RTI offers opportunities for general and special educators to integrate a data-based, problem-solving approach for students who are experiencing learning difficulties.

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In the past, students perceived as struggling in general education classrooms were referred for evaluation for special education services. This evaluation typically consisted of examining the discrepancy between students' cognitive capabilities (aptitude) and their observed or documented level of performance in school (achievement). Students found to have a significant discrepancy were considered eligible for special education and frequently were served under the category of learning disabled. Eligible students often received these special education services through a separate system of instruction that may or may not have been aligned with the general education curriculum.

The problems associated with this discrepancy approach are well documented (see Moores-Abdool et al. 2008; Stanovich 2005). One frequently noted problem is that setting the level of discrepancy that determines eligibility for special education services is always an arbitrary process (Richards et al. 2007). Inevitably there are students who could benefit from some form of special services but will not receive them because they do not meet, perhaps by the slightest margin, the established discrepancy cutoff (Stuebing et al. 2002). This is particularly true for the youngest students who need intervention to prevent failure and often respond favorably to well-designed interventions.

A second problem commonly associated with the discrepancy approach is that students enter classrooms with widely varied skills and abilities that often differ across academic areas. Students who experience learning difficulties in one subject area may or may not have difficulties in other areas. The most effective interventions, therefore, focus on particular academic skills or specific learning disabilities (Kavale and Spaulding 2008). In other words, they address the needs of all students who are experiencing an identified learning difficulty, rather than only a select group of students who have been classified as eligible for special education.

RTI presents an alternative approach designed to address both of these problems. It is defined as "a promising new process of instruction, assessment, and intervention that allows schools to identify struggling students early, provide appropriate instructional interventions, and increase the likelihood that the students can be successful and maintain their class placement" (Mellard and Johnson 2008, 1). Rather than addressing a discrepancy between aptitude and achievement, RTI focuses on the development of specific learning skills. Its primary purpose is to distinguish students who may have a particular learning difficulty and then to address that difficulty directly with effective instructional strategies so that small learning errors do not become major learning problems.

In most instances, RTI is conceptualized as a three-tiered model with each tier distinguished by its intervention focus and intensity (Mellard and Johnson 2008). In Tier 1, all students receive high-quality, developmentally appropriate instruction within the general education classroom. In Tier 2, students whose classroom assessment results indicate that they are experiencing learning difficulties are given skill-specific interventions. These interventions typically involve small-group instruction on the identified area of difficulty, paired with individualized assistance. The effectiveness of Tier 2 interventions is also monitored through classroom assessment results.

Well-planned and implemented Tier 2 interventions are likely to remedy the learning difficulties of most students and allow them to return to the group-based instructional activities of Tier 1. For those few students for whom learning difficulties persist, however, Tier 3 provides more intensive intervention. This level of intervention may take place in the general education classroom or involve specialized assistance offered in an alternative setting. Tier 3 provides more intensive intervention designed to meet students' individualized learning needs. Through this three-tiered approach, it is believed that struggling students can be identified early and provided with appropriate instructional interventions that enhance their chances of success in the general education environment.

Mastery Learning (ML)

While the basic tenets of mastery learning can be traced to such early educators as Comenius, Pestalozzi, and Herbart (Bloom 1974), most modern applications stem from the writings of Benjamin S. Bloom. In the mid-1960s, Bloom began a series of investigations on how the most powerful aspects of tutoring and individualized instruction might be adapted to improve student learning in group-based classes. He recognized that while students vary widely in their learning rates and modalities, virtually all learn well when provided with the necessary time and appropriate learning conditions. If teachers could provide these more appropriate conditions, Bloom believed that nearly all students could reach a high level of achievement (Bloom 1976).

To develop such conditions, Bloom began with teachers' traditional practice of organizing curriculum content into instructional units and then checking on students' learning progress at the end of each unit. While he saw this as useful, Bloom believed teachers' checks on learning progress would be much more valuable if they were paired with a *feedback and corrective* procedure. In other words, instead of marking the end of the unit, Bloom recommended that these assessments be used as part of the instructional process to *identify* students' individual learning difficulties (feedback) and to *prescribe* specific remediation procedures (correctives).

Bloom outlined a strategy to incorporate this feedback and corrective procedure, labeling it "Learning for Mastery" (Bloom 1968), and later shortening the name to

simply "Mastery Learning" (Bloom 1971). Through this strategy, teachers first organize the important concepts and material students are to learn into instructional units, each taking about a week or two of instructional time. Following high-quality initial instruction, teachers administer a *formative* assessment designed to provide feedback to both teachers and students on learning progress. This formative assessment identifies precisely what students have learned well to that point and what they need to learn better.

Included with the formative assessment are explicit suggestions about what students should do to correct their learning difficulties. These suggested corrective activities are specific to items or prompts within the assessment so that students can work on those particular concepts they have not yet mastered. In this way, the correctives are individualized; that is, they are targeted to each student's identified learning needs. With the feedback and corrective information, each student has a detailed prescription of what more needs to be done to master the concepts or desired learning outcomes from the unit.

When students complete their corrective activities, usually after a class period or two, they are administered a second, parallel formative assessment that serves two important purposes. First, it verifies whether the correctives were successful in helping students remedy their individual learning difficulties. Second it serves as a powerful motivational device by offering students a second chance at success.

Bloom also recommended that special enrichment or extension activities be planned for students who master the unit concepts from the initial teaching. Enrichment activities provide these students with exciting opportunities to broaden and expand their learning. Although they are usually related to the subject area, enrichments need not be tied directly to the content of a particular unit. The best enrichments are both rewarding and challenging to students.

Bloom believed that nearly all students, when provided with the more favorable learning conditions of mastery learning, could truly master academic content (Bloom 1976; Guskey 1997). A large body of research has borne him out: When compared with students in traditionally taught classes, students in well-implemented mastery learning classes consistently reach higher levels of achievement and develop greater confidence in their ability to learn and in themselves as learners (Anderson 1994; Guskey and Pigott 1988; Kulik, Kulik, and Bangert-Drowns 1990).

Elements Shared by RTI and ML

Although developed at different times, drawn from different theoretical traditions, and described in different ways, RTI and ML share many common elements. Research has consistently linked these elements to highly effective instruction and student learning success (Guskey 2009; Marzano 2009; Rosenshine 2009). These shared elements include the following.

Universal Screening (RTI) and Diagnostic Preassessment with Preteaching (ML)

Most descriptions of RTI stress the importance of initiating the process with some form of *universal screening*. This involves administering a targeted assessment to all students prior to beginning instruction that is quick, inexpensive, and focused on critical knowledge, skills, and behaviors. Often, especially in the case of reading, the assessment is designed to be repeatable so that student progress can be tracked accurately and efficiently. The purpose of universal screening is to determine which students are at risk of learning difficulties and likely to require close monitoring during the instructional process.

Similarly, descriptions of ML typically advocate the use of a *diagnostic preassessment*. Like universal screening, this involves the administration of a quick and targeted assessment to all students prior to beginning instruction. In ML, however, the purpose of this preassessment is to determine if students have specific prerequisite knowledge and skills. In other words, it provides evidence as to whether students possess the entry-level skills needed to learn successfully the concepts and material in the current instructional unit. For those students whose preassessment results denote deficiencies, ML advocates stress that some time should be taken to directly teach ill-prepared students those specific prerequisite concepts and skills. In other words, teachers should affirm the conditions for success before instruction begins.

Leyton (1983), a student of Bloom, studied the impact of taking time to directly teach identified prerequisite skills to entering students. In his study, preassessments measuring the knowledge and skills that teachers considered to be prerequisites for learning success in their classes were administered to all students. For half of the students, results were used to help students identify and then review the prerequisite concepts and skills they had not learned well. The assessment and review lasted about a week and a half. The other half of students began learning new material immediately, but at a somewhat slower pace. After nine weeks of instruction, all students were administered the same cumulative, summative examination.

Leyton compared the two groups by considering the number of students under each condition that attained a mastery standard (80% or more correct) on the summative examination. Across instructional conditions, from 50 percent to more than 100 percent more students reached the mastery standard when they were directly taught the prerequisite knowledge and skills at the beginning of the instructional sequence. Because Leyton's

study was conducted in only a few subject areas (mathematics and foreign language) and under tightly controlled conditions, these results must be cautiously interpreted. Still, when viewed in light of other similar research (Deshler and Schumaker 1993; Vockell 1993), they demonstrate the potential benefit that relatively brief preteaching can offer students whose prerequisite knowledge and skills might be weak or deficient.

High-quality, Developmentally Appropriate Initial Instruction (Tier 1 in RTI and Group-based Instruction in ML)

Every description of RTI and ML emphasizes the importance of engaging all students in high-quality, developmentally appropriate instruction in the general education classroom using strategies gleaned from evidence-based research studies. In descriptions of RTI this is generally considered Tier 1, the first level of intervention, and sometimes referred to as primary prevention (Fuchs and Fuchs 2006). Such instruction should be multifaceted; adapted to the context; tied to students' interests and experiences; differentiated according to the knowledge, skills, dispositions, and background characteristics of students; and should actively engage students in meaningful learning activities (Astleitner 2005; Conroy et al. 2008, Sandall, Schwartz, and Joseph 2001).

Progress Monitoring (RTI) and Formative Assessment (ML)

Another element shared by both RTI and ML is regular and systematic monitoring of student learning progress. In an effort to cover required content, some teachers feel they cannot take the time to regularly assess student learning progress. As a consequence, some students may go for weeks without grasping key concepts and skills (Duke 2008). In some subject areas, especially mathematics and reading, the results can be disastrous.

In RTI *progress monitoring* serves two important purposes. First, it is used to determine if students are appropriately benefiting from the instructional program. Second, results from monitoring form the basis for building more effective instructional programs for those students who are not benefiting. In essence, progress monitoring provides an indication of students' "response" within the RTI framework (Mellard and Johnson 2008).

In many classrooms using RTI, progress monitoring checks are administered weekly, although they might be more frequent depending on the subject area and the nature of the class. Although these assessments can take a variety of forms ranging from skill demonstrations to short quizzes, all must be curriculum-based (Stecker, Fuchs, and Fuchs 2005) and instructionally sensitive (Popham 2007). In other words, they must measure the concepts and skills included in the established school curriculum and must provide evidence on the effectiveness of the learning activities in which students are engaged.

Progress monitoring in ML classrooms is accomplished through the regular administration of formative assessments. Bloom (1968) borrowed the term *formative* from Scriven (1967), who used it to describe evaluation activities performed *during* the implementation of a program in order to inform developers of potential problems. Formative assessments in ML classrooms are typically more structured than the daily "checks for understanding" that teachers employ while presenting lessons. They are generally administered after a week or two of instruction and are designed to address the most important learning goals from an instructional unit. The primary purpose of classroom formative assessments is to give students diagnostic and prescriptive feedback on their learning progress (Hattie and Timperley 2007). Even some RTI advocates note that "the principles of RTI are met by using formative assessments" (Barnes and Harlacher 2008, 424).

Similar to the progress monitoring checks in RTI, formative assessments vary in form depending on the subject area, the grade level, and the learning outcomes involved. The feedback they provide reinforces precisely what students were expected to learn, identifies what they learned well, and describes what needs to be learned better (Guskey 2003). Essentially, formative assessments offer specific information to guide improvements in learning. By reviewing the questions answered incorrectly or the criteria not met, both teachers and students gain individualized information about learning progress (Bloom, Hastings, and Madaus 1971; Bloom, Madaus, and Hastings 1981). This also shows exactly where attention needs to be focused so that all students meet the learning goals set for the unit. Researchers such as Ainsworth and Viegut (2006); Howell and Nolet (2000); Marzano (2003); Smith, Smith, and DeLisi (2001); and Stiggins (2008) similarly emphasize the vital nature of feedback from such assessments *for* learning.

Appropriate, Evidence-based Intervention (Tier 2 in RTI and Corrective Instruction in ML)

Engaging all students in high-quality, evidence-based initial instruction in the general education classroom is likely to help most learn well and master the important concepts and skills from the unit. But no matter how carefully teachers plan and deliver this initial instruction, some students may still experience learning difficulties and need additional assistance. The RTI progress monitoring and ML formative assessments help identify those particular students and their specific learning difficulties. To remedy those difficulties, these students move to an alternative instructional level referred to in RTI as Tier 2 intervention or *secondary prevention* (Fuchs and Fuchs 2006) and in ML as *corrective instruction* (Bloom 1971).

The goal of both Tier 2 intervention and corrective instruction is to help students achieve the grade-level performance objectives established for the learning unit. Both take place in the general education classroom, but may be directed by another teacher or instructional aide. Both emphasize the use of small-group instruction with individualized assistance organized according to the needs and skill level of the students involved. Both also stress that instruction at this level must be qualitatively different from the initial instruction, offering students an alternative approach and additional time to learn. ML specifically requires that corrective activities present concepts differently and involve students in learning differently than did the initial instruction. In other words, these activities should incorporate different learning styles, learning modalities, or types of intelligence.

Many teachers find providing appropriate Tier 2 intervention or corrective instruction quite challenging. Studies show, for example, that while teachers recently have improved in their ability to draw appropriate inferences about students' levels of understanding from assessment results, most remain uncertain about the next instructional steps (Heritage et al. 2009; Goertz, Olah, and Riggan 2009). Many schools find, however, that giving teachers time to work collaboratively—sharing ideas, materials, and expertise—greatly enhances the quality of planned Tier 2 intervention and corrective activities (Guskey 2008; Murawski and Hughes 2009).

One major difference between RTI and ML applications relates to the amount of time students spend involved in these alternative instructional activities. Some RTI advocates indicate that "Tier 2 interventions should have a nine to twelve-week duration and can be repeated as needed" (Mellard and Johnson 2008, 81). Alternatively, ML proponents recommend substantially less time, suggesting that "the time needed to implement a supplemental (corrective) plan will be about 10% to 20% of the time spent implementing the original plan" (Block, Efthim, and Burns 1989, 189). So in ML classrooms, if the original instructional unit was a week or two in length, corrective instruction might last one or two days. Bloom (1974) believed that intense, individualized assistance offered early in an instructional sequence would help most students remedy learning errors before they accumulate and become major problems. As a result, students would require much less time in remediation in later units. This also would allow students involved in corrective work to return to group-based instruction more quickly and not fall further behind their classmates.

Additional Progress Monitoring (RTI) and Second Formative Assessments (ML)

Both RTI and ML approaches require frequent assessment of student learning progress to check on the effectiveness of intervention strategies. The precise frequency of these assessments varies among applications and may be affected by the severity of students' academic difficulties (Barnes and Harlacher 2008). Vaughn and colleagues (2007) report that in most RTI applications, assessments to monitor the progress of students in Tier 2 interventions occur two times a month.

Similarly in ML classrooms, upon completion of corrective work, students are administered a second formative assessment. This assessment is parallel to the first in that it addresses the learning goals from the instructional unit but includes slightly different problems, questions, or prompts. Bloom (1984) believed this would help students see that the learning goal involves understanding important concepts and skills rather than simply memorizing answers to particular questions or prompts. This second formative assessment serves two important purposes. First, it verifies whether the correctives truly helped students overcome their individual learning difficulties. Second, it offers students a second chance at success and, hence, has powerful motivational value.

Elements in RTI and ML That Complement Each Other

In addition to the elements shared by both RTI and ML, each possesses unique elements that complement and could potentially strengthen the other. These elements address aspects of RTI or ML that some critics consider drawbacks and suggest may result in potential problems. Adding these elements through synthesized implementation could add greatly to the effectiveness of each and provide the means to enhance student success.

Specialized, Highly Intensive Instruction (Tier 3 in RTI)

If the results from additional progress monitoring (RTI) or second formative assessments (ML) indicate that certain students are still experiencing learning difficulties, they then move to the most intensive level of intervention in Tier 3, or *tertiary prevention* (Fuchs and Fuchs 2006). At this stage, the parents are consulted and those students who are not responding adequately may be referred for Individualized Education Program (IEP)/special education evaluation (Fuchs and Fuchs 2005). Some RTI advocates consider Tier 3 synonymous with special education (Mellard and Johnson 2008), while others stress that special education is one of a variety of options (Barnes and Harlacher 2008). All agree, however, that Tier 3 interventions are designed to provide the most intensive, most highly individualized evidence-based instructional programs to address students' identified learning needs. Ideally, this tier is flexibly structured to allow students to move in and out as their needs change relative to the requirements of the general education curriculum (O'Connor, Harty, and Fulmer 2005). In some cases, however, it also may

involve a modification of learning goals for individual students.

Most descriptions of ML programs do not include this most intensive level of intervention. In his earliest descriptions of the ML process, however, Bloom (1968) stressed that the learning problems of some students are so severe that they require specialized assistance beyond what can be offered in most general education classrooms. He estimated this might be 5–10 percent of the student population, depending on the school. For these students, Bloom recommended individualized assistance, especially in the form of one-on-one tutoring, specifically targeting each student's identified learning needs. He also recommended that efforts be made to return these students to the general education classroom as soon as their learning problems were resolved.

Enrichment or Extension Activities (ML)

In describing the ML process, Bloom (1974) recognized that the high-quality, differentiated, developmentally appropriate instruction teachers offer in general education classrooms is likely to prove effective for many students. These students will be able to demonstrate their mastery of the unit concepts and skills on initial formative or progress monitoring assessments and have no need for corrective work. To ensure their continued learning progress, Bloom recommended that teachers provide these students with special enrichment or extension activities to broaden their learning experiences.

Enrichment activities often are self-selected by students and might involve special projects or reports, academic games, or a variety of complex but engaging problem-solving tasks. They allow fast learners to explore topics and activities that might be of keen interest but lie beyond the established curriculum. Many teachers draw from activities developed for gifted and talented students when planning enrichment activities, both to simplify implementation tasks and to guarantee these students high-quality learning experiences (Block and Anderson 1975; Whiting, Van Burgh, and Render 1995).

In the context of RTI, enrichment activities offer several advantages. First, they provide fast learners with opportunities they might not have in other classes where the only option available to students who learn well is to move on to the next curriculum unit. Based on the idea that learning is not a one-dimensional process, enrichment activities allow these students opportunities to learn subjects at a deeper level than might be set forth in the school curriculum.

Second, students engaged in enrichment activities gain valuable depth of learning but do not necessarily move ahead in the school curriculum. This makes it easier for students involved in corrective work, or Tier 2 intervention, to regain their place in the general education classroom when they return. Otherwise, they would be placed in the impossible situation of having to remedy problems from past instructional units while trying to keep up with the new concepts and skills presented in a new unit.

The challenge for teachers in implementing enrichment or extension activities is to ensure that these activities provide truly valuable learning experiences for students. It would be highly inappropriate to have fast learners simply bide their time, doing more, harder problems or completing busy work while other students are engaged in correctives, or Tier 2, intervention. Enrichment activities provide these students with opportunities to pursue their interests, extend their understanding, and broaden their learning experiences. Even if enrichment involves engaging in peer tutoring, research evidence indicates that students who serve as peer tutors benefit as much or more from the experience as the students they help (Bowman-Perrot 2009; Wright and Cleary 2006).

Conclusion

Consensus appears to be growing on what is likely to work best in efforts to provide early identification, instruction, and remediation for all students. Both special educators and general educators are beginning to see the value in selecting instructional interventions by skill rather than by student. Both also see the how important it is to determine if low achievement may be the result of the lack of appropriate instruction rather than a unique learning deficiency.

RTI and ML offer educators powerful tools in their efforts to help all students learn well. In crossing the gap from research to practice, however, both RTI and ML can be presented as narrow, constricted, and separate models rather than sets of flexible, research-based principles that guide educators to better practice (Barnes and Harlacher 2008; Guskey 2009). Even when practitioners understand these guiding principles, they are likely to confront varying language describing the elements that are truly essential to successful implementation. Through this synthesis of the core elements of RTI and ML, we hope to show that the differences between the practices advocated by special educators and general educators may not be as great as many think. In fact, although they are described using a different vocabulary, the critical features of response-to-intervention and mastery learning share common roots that are often missed. We believe that recognizing these commonalities will facilitate communication and prompt great collaboration in efforts to help all students learn well.

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