CHAPTER 2

THE HISTORY AND DEVELOPMENT OF MASTERY LEARNING

Throughout history, teachers have struggled with how to make their instruction better and more appropriate for their students. By improving the quality and appropriateness of their teaching, many believed they could help virtually all of their students learn well. This optimistic perspective about teaching and learning can be found in the writings of early educators such as John Amos Comenius, Johann Heinrich Pestalozzi, and Johann Friedrich Herbart (Bloom, 1974). It's also the basic premise of mastery learning.

Mastery learning was created as a way for teachers to provide their students with higher quality and more appropriate instruction. Under these more favorable learning conditions, it was theorized that nearly all students would be able to learn well and truly "master" any subject (Guskey & Anderman, 2013). And, indeed, the impressive improvements in student learning experienced by teachers using mastery learning have confirmed many aspects of this theory (Goodwin & Miller, 2013). As a result, mastery learning continues to generate tremendous interest and enthusiasm among educators throughout the world.

In this chapter we explore the history and development of mastery learning. We consider the philosophical roots of mastery learning, its theoretical origin, and its research foundation. We also describe the essential elements of mastery learning, how these essential elements can be adapted to a wide variety of educational contexts, and the occasional misinterpretations of those essential elements. Finally, we outline the major steps involved in implementing mastery learning, as well as the qualities of mastery learning that make it so appealing to teachers at every educational level.

JOHN B. CARROLL'S "MODEL FOR SCHOOL LEARNING"

Although the basic tenets of mastery learning originated with the early Greeks, most modern versions can be traced to an article written by Harvard University professor John B. Carroll in 1963 entitled, "A Model for School Learning" (Carroll, 1989). In this seminal article, Carroll challenged long-held notions about *student aptitude*. He noted that most educators view student aptitude as the *level* to which a student can learn a particular subject. Students with high

aptitude would be able to learn the complexities of that subject, while those with low aptitude would be able to learn only the most basic elements. When aptitude is viewed in this way, students are seen as either good learners (high aptitude) or poor learners (low aptitude) with regard to that subject.

Carroll argued, however, that instead of indicating the *level* to which a student could learn, aptitude more accurately describes the *time* a student needs to learn that subject to a specified level. In other words, aptitude is really a measure of *learning rate*. According to Carroll, all students have the potential to learn quite well, but differ primarily in the time they require to do so. Some students are able to learn a subject very quickly while others may take much longer. When aptitude is viewed as an indicator of learning rate, students are seen not as good and poor learners, but rather as fast and slow learners with regard to a particular subject.

Carroll then proposed a model for school learning based on this alternative view of aptitude. He believed that if each student was allowed the time needed to learn a subject to some criterion level, and if that time was spent appropriately, then the student would attain that specified level of achievement. However, if not enough time was allowed or if the student didn't spend the time required, then the student would learn much less. The degree of learning attained by a student, therefore, could be expressed by the following simple equation:

$$\text{Degree of Learning} = f\left(\frac{\text{Time spent}}{\text{Time needed}}\right)$$

In other words, the degree of learning is a function of the time students spend on learning, relative to the time they need to spend. If the time spent is equal to the time needed, then learning would be complete and the equation would equal 1. But if the time spent is less than what is needed, then learning would be incomplete by that fraction.

Carroll then went one step further and identified the factors he believed influence the time spent and the time needed. He theorized that both are affected by characteristics of the learner and the instruction. Specifically, Carroll believed time spent is determined by a learner's *perseverance* and the *opportunity to learn*. Perseverance is the amount of time a student is willing to spend actively engaged in learning. Opportunity to learn is the time allotted to the student for learning. In other words, time spent is determined by the student's persistence at a learning task and the amount of learning time provided.

Carroll believed that time needed is determined by the student's *learning rate* for that subject, the *quality of the instruction*, and the student's *ability to understand the instruction*. Specifically:

$$\text{Degree of Learning} = f\left(\begin{array}{l} * \text{ Perseverance} \\ * \text{ Opportunity to learn} \\ \hline * \text{ Learning rate} \\ * \text{ Quality of instruction} \\ * \text{ Ability to understand the instruction} \end{array}\right)$$

As we described, learning rate is a measure of the time a student requires to learn the concepts or skills under ideal instructional conditions. If the quality of the instruction is high, then the student would readily understand and need little time to learn. If the quality of the instruction is poor, however, then the student will have greater difficulty understanding and will require much more time to learn. In other words, the quality of the instruction and the student's ability to understand the instruction interact to determine how much time a student needs to learn the particular concepts or skills.

Carroll's article was a major contribution to learning theory. It set forth new guidelines for research into the concept of aptitude and identified specific factors that influence learning in school settings (Carroll, 1989). His ideas about learning rate also prompted the development of numerous "personalized learning" programs that allowed students to progress through a series of learning units at their own, self-determined pace. Two of the best known of these personalized, "continuous progress" programs were *Individually Prescribed Instruction* (IPI), developed at the University of Pittsburgh (Glaser, 1966), and *Individually Guided Education* (IGE), developed at the University of Wisconsin (Klausmeier et al., 1968). Still, Carroll left unresolved the issues of how to provide sufficient time and improve instructional quality.

BENJAMIN S. BLOOM'S "LEARNING FOR MASTERY"

At this same time, Benjamin S. Bloom and his students at the University of Chicago were studying factors that contribute to differences in student achievement and ways to improve teaching and learning. John Carroll and Benjamin Bloom had been classmates during their years of graduate study at the University of Chicago and remained close friends. Carroll studied under renowned psychometrician Thurstone (1938)Thurstone, 1947 and graduated in 1941. Bloom worked with Tyler (1949), who was well known for his work in curriculum development and evaluation, and graduated in 1942.

Bloom was impressed by the optimism of Carroll's perspective on learners and particularly by the idea that students differ in terms of the *time required* for learning rather than their *ability to learn*. If aptitude was indeed predictive of the time a student requires to learn, Bloom reasoned that it should be possible to set the degree of learning expected of students at some mastery performance

level. Then by attending to the instructional variables under the teachers' control – the opportunity to learn and the quality of the instruction – teachers should be able to ensure that *all* students attain that mastery level. In other words, Bloom believed that if sufficient time and appropriate instruction were provided, virtually *all students could learn well*. The challenge for educators was to find practical and efficient ways to accomplish this.

While Carroll's ideas were evolutionary in learning theory, Bloom's ideas were truly revolutionary. Bloom recognized, of course, that many of the factor affecting students' learning lie outside of teachers' control. Nevertheless, by taking full advantage of those factors they do control, Bloom believed that teachers could have a much more powerful influence on students' success in learning environments.

Bloom's basic reasoning was this: In most traditional classroom settings, all students are provided with the same time for learning (i.e., opportunity to learn) and the same learning experiences (i.e., quality of instruction). This time and experience are appropriate for some students in the class, but are undoubtedly less so for others. Those students for whom the time and experiences are optimal learn quite well. But those students who need a bit more time, or who learn in a different way, achieve less well. Hence, *little variation* in learning time and experience for students results in *wide variation* in students' level of achievement.

However, if we varied the time provided and adapted the learning experiences to match student's individual learning needs, Bloom believed we could reduce the variation in student learning outcomes. In other words, if teachers differentiated their instructional activities to provide students with more suitable opportunities to learn and more individualized instruction, then a majority of students in the

class, perhaps as many as 95 percent or more, might be expected to learn very well and attain mastery.

Bloom was not suggesting that providing these favorable learning conditions would make all students the same. He recognized that the body of knowledge in any subject area is infinite, and students will always differ in how much of it they learn. However, a school's curriculum is finite. A curriculum identifies the particular subset of concepts and skills within that infinite body of knowledge that we want *all* students to learn well. By altering the time and learning experiences provided students, Bloom believed we could help nearly all learn excellently that finite set of concepts and skills specified within the curriculum. In other words, *all* students could learn excellently and truly "master" the curriculum.

THE ORIGIN OF BLOOM'S IDEAS

To determine how this theoretical ideal could be practically achieved, Bloom first considered how teaching and learning take place in typical group-based classroom settings. He observed that most teachers begin instruction at any grade level by organizing the concepts and skills they want students to learn into smaller learning units. These units are usually sequentially ordered and often correspond to a curriculum framework or "learning progression" (Mosher, 2011; Shepard, 2018). Teachers then teach the unit concepts and skills to all students in the same way, using the same instructional activities, engaging all students in the same set of learning experiences, and providing all with the same amount of time to learn.

After completing instruction on the unit, most teachers administer some form of quiz or assessment to judge how well students learned the unit concepts and skills. To the teacher, this assessment is primarily an evaluation device used to determine which students learned the unit's concepts and skills well and which ones didn't. Based on the results from the assessment, teachers sort students into performance categories and assign marks or grades that identify the level of learning each student achieved.

To students, however, this assessment has a completely different meaning. To them it signifies the end of instruction on the unit and the end of the time they need to spend working on those concepts and skills. It also represents their one and only chance to demonstrate what they learned. After administering and scoring the assessment, teachers record students' scores in their gradebook and begin instruction on the next unit where they repeat same process.

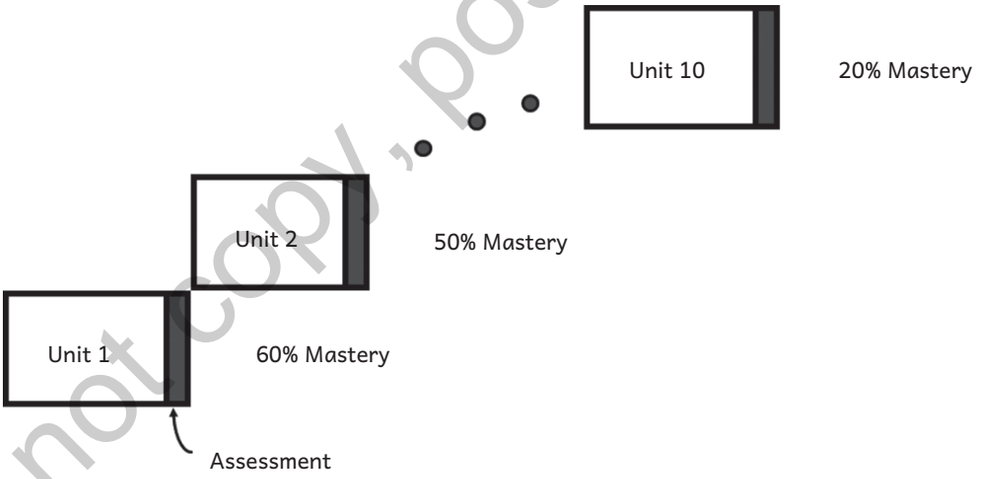
This teaching and learning process yields highly predictable results. The few students for whom the instructional methods and time were ideal learn excellently and perform well on the unit assessment. The largest number of

students for whom the methods and time were only moderately appropriate learns less well. Students for whom the instruction and time were inappropriate due to differences in their backgrounds or learning preferences, learn very little and perform poorly on the unit assessment. In other words, little variation in the teaching results in great variation in student learning.

Bloom found these results terribly disheartening. In conversations with teachers, he discovered that most were pleased if half of the students in a class learned excellently and received the highest grade (e.g., an A or a B; a rubric score of 4, or a "Distinguished" mark) on the unit assessment, showing they truly mastered the unit concepts and skills.

As instruction continues, results become even more disparate. If the learning units are sequential – that is, if students are expected to build on and extend the concepts and skills from one unit to the next – students who fail to master the first unit are unlikely to master the second unit. In addition, some students who did master the first unit may do less well on the second unit. Hence, the number of students who master the second unit is likely to be fewer. As teaching and learning proceed, a smaller number of students masters each subsequent unit. Figure 2.1 shows this sequence.

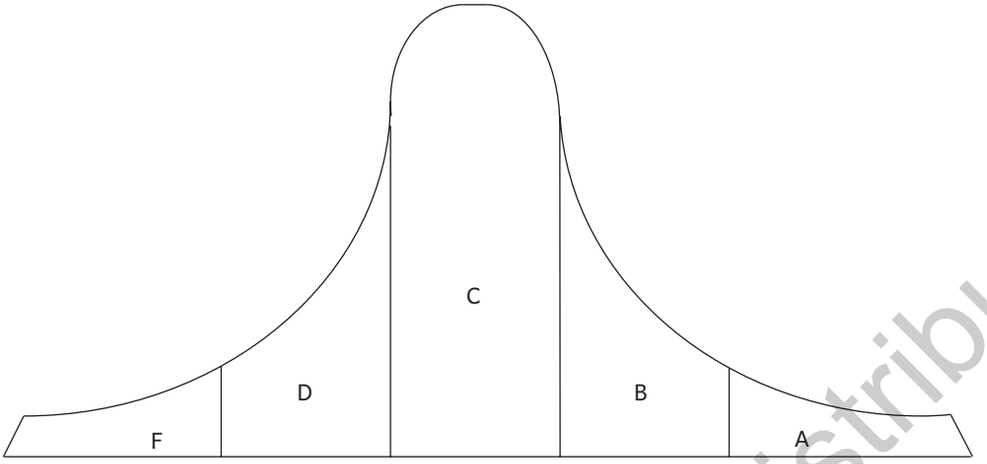
Figure 2.1 • *Instructional sequence in many traditional classrooms*



By the end of the term or grading period, Bloom found that only about 20 percent of the students in the class usually learn excellently and truly master important course or grade level goals or standards. Under these conditions, the distribution of achievement among students at the end of the instructional sequence looks much like the normal bell-shaped curve shown in Figure 2.2.

To attain better results and *reduce* this variation in student learning, Bloom reasoned that we must *increase* variation in the teaching. In other words, because students vary in their learning aptitudes and preferences, teachers

Figure 2.2 • *Distribution of achievement in traditional classrooms*



must diversify and differentiate instruction to better meet students' individual learning needs. The challenge was to find practical ways to do this within the context of group-based classrooms so that *all* students learn well.

In searching for such a strategy, Bloom drew primarily from two sources of evidence. First, he considered the ideal teaching and learning situation in which an excellent tutor is paired with each student. He was particularly influenced by the work of early pioneers in individualized instruction, especially Washburne (2014) and his "Winnetka Plan," and Morrison (1926) and his University of Chicago Laboratory School experiments. In examining this evidence, Bloom sought to determine what crucial elements in one-to-one tutoring and individualized instruction could be transferred to group-based classroom environments.

Second, Bloom looked at studies of the learning strategies of academically successful students, especially the work of John Dollard and Neil E. Miller (1950). From this research he tried to identify the activities of high achieving students in group-based classrooms that distinguish them from their less successful classmates.

The Theoretical Basis of Mastery Learning

1. One-to-one tutoring and individualized instruction
2. The learning strategies of successful learners

Bloom saw value in teachers' traditional practice of arranging the concepts and skills they want students to learn into learning units. This helped organize instruction and provided a framework for students' learning. He also considered it important for teachers to assess student learning at the end of each unit. But

the classroom assessments most teachers used seemed to do little more than show for whom their initial instruction was and was not appropriate.

Bloom believed a far better approach would be for teachers to use their classroom assessments as *learning tools*, and then to follow those assessments with a *feedback and corrective* process. In other words, instead of using assessments as evaluation devices that mark the end of learning in each unit, Bloom recommended using them as an integral part of the teaching and learning process to *identify* what students learned well, *diagnose* students' individual learning difficulties (feedback), and then *prescribe* remediation procedures (correctives).

This is precisely what happens when an excellent tutor works with an individual student. The tutor regularly recognizes the student for things that are done well. But if the student makes an error, the tutor first points out the error (feedback) and then follows up with further explanation and clarification (correctives) to ensure the student's understanding. Similarly, academically successful students typically follow up the mistakes they make on quizzes and assessments. They ask the teacher about the items or prompts they missed, look up the answer in the textbook or other resources, or rework the problem or task so that they don't repeat those errors.

With this in mind, Bloom outlined an instructional strategy to make use of this *feedback and corrective* process, labeling it "Learning for Mastery" (Bloom, 1968), and later shortening it to simply "Mastery Learning" (Bloom, 1971*a*). With this strategy, teachers first organize the concepts and skills they want students to learn into learning units that typically involve about a week or two of instructional time. Following initial instruction on the unit, teachers administer a brief a quiz or assessment based on the unit's learning goals. But instead of signifying the end of the unit, this assessment's purpose is to provide students and teachers with "feedback" on learning progress. To emphasize this new purpose, Bloom suggested calling it *a formative assessment,* borrowing the term from Michael Scriven (1967) who used it to describe different types of program evaluation. Formative means simply "to inform or to provide information." A formative assessment identifies for students and teachers precisely what was learned well to that point and where improvements are needed (Bloom et al., 1971; 1981).

Paired with each formative assessment are specific "corrective" activities for students to use in correcting their learning difficulties. Most teachers match these "correctives" to each item, group of items, or set of prompts within the assessment so that students need work on only those concepts or skills not yet mastered. In this way, the correctives are "individualized" and "personalized." They may point out additional sources of information on a particular concept, such as online resources, recorded lessons, or page numbers in a textbook or workbook where the concept is discussed. They may identify alternative learning

resources such as different textbooks, digital learning activities, alternative materials, or web-based instructional materials (DeWeese & Randolph, 2011). Or they may simply suggest sources of additional practice, such as study guides, computer exercises, independent or guided practice, or collaborative group activities.

Formative "Feedback" Communicates

1. What students are expected to learn.
2. What each student has learned well.
3. What each student needs to learn better.

With the feedback *and* corrective information gained from the formative assessment, each student has a detailed prescription of what more needs to be done to master the concepts or skills from the unit. This "just-in-time" correction prevents minor learning difficulties from accumulating and becoming major learning problems. It also gives teachers a practical means to vary and differentiate their instruction in order to better meet students' individual learning needs. As a result, many more students learn well, master the important learning goals or standards in each unit, and gain the necessary prerequisites for success in subsequent units.

When students complete their corrective activities after a class period or two, Bloom recommended they take a *second* formative assessment. This second, "parallel" assessment covers the same concepts and skills as the first, but is composed of slightly different problems or questions, and serves two important purposes. First, it verifies whether or not the corrective activities were successful in helping students overcome their individual learning difficulties. Second, it offers students a second chance at success and, hence, has powerful motivational value (Changeiywo et al., 2011). Figure 2.3 shows this teaching and learning process that incorporates formative assessments, feedback, and correctives.

Of course, some students will perform well on the first formative assessment, demonstrating that they've mastered the unit concepts and skills. For these students the teacher's initial instruction was highly appropriate, and they have no need for corrective work. To ensure their continued learning progress, Bloom recommended teachers provide these students with special "enrichment" or "extension" activities to broaden their learning experiences. Enrichment activities are typically related to the subject area or course, but may not be tied directly to the content of the learning unit. In many cases students self-selected their own enrichment activity that might involve developing a special project or report, digital academic games, or any variety of complex, problem-solving tasks. Figure 2.4 illustrates this instructional sequence.

Figure 2.3 • *Instructional process in mastery learning classrooms*

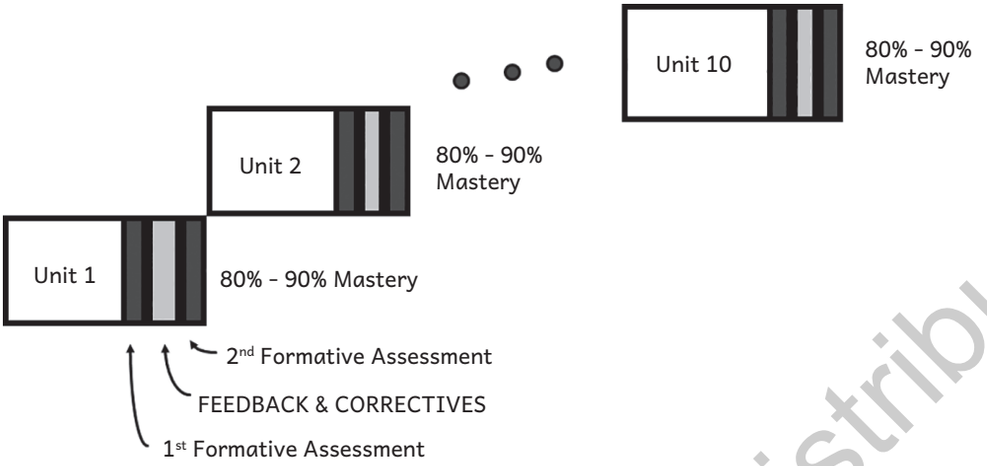
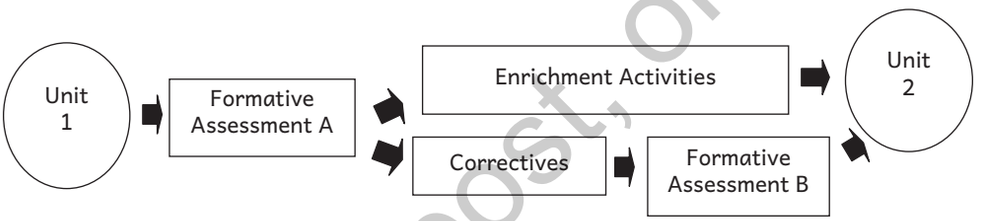


Figure 2.4 • *The mastery learning instructional process*

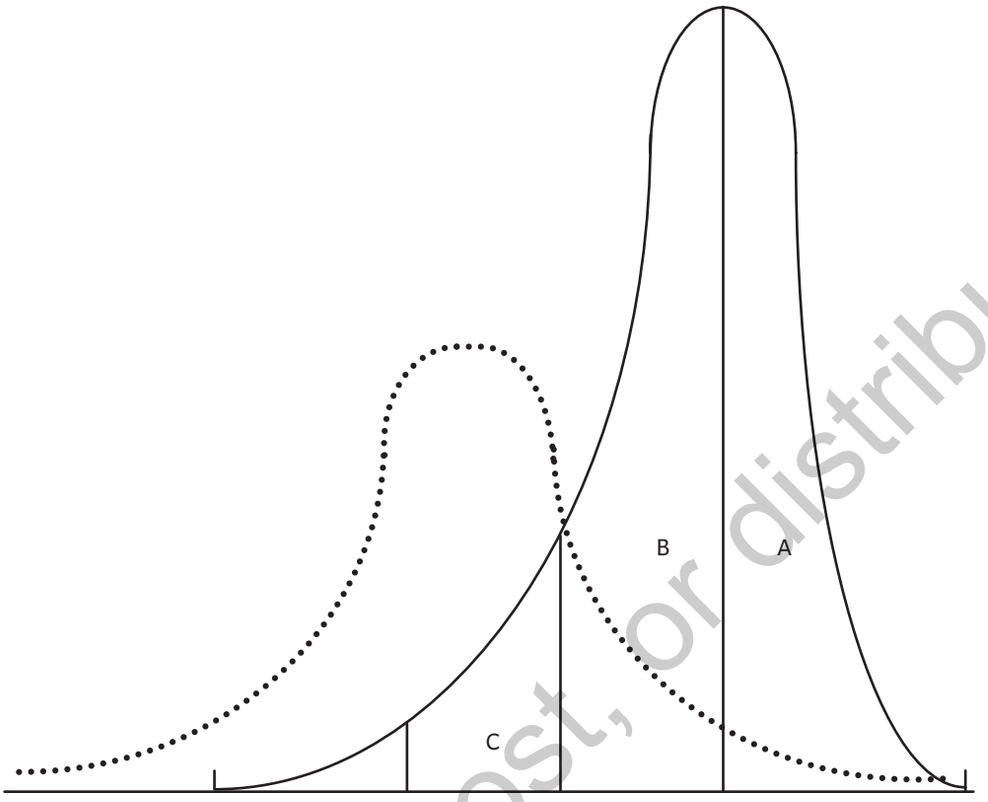


Through this process of formative classroom assessment, combined with the systematic correction of individual learning difficulties, Bloom believed *all* students could be provided with a more appropriate quality of instruction than is possible under more traditional approaches to teaching. As a result, nearly all students might be expected to learn well and truly master the unit concepts and skills or learning goals (Bloom, 1976). In turn, this would drastically reduce the variation in students' achievement levels, eliminate achievement gaps, and yield a distribution of achievement more like that shown in Figure 2.5.

Note in this figure that the grading standards have *not* been changed in any way. The same criteria of achievement are used to assign grades and comparable academic rigor is maintained. But under mastery learning conditions, Bloom believed 80 percent or more of the students in a class could reach the same high level of achievement that only about 20 percent do under more traditional approaches to instruction.

In describing mastery learning, Bloom continually emphasized that reducing variation in student' achievement does not imply making all students the same. Even under these more favorable learning conditions, some students undoubtedly will learn more than others, especially those involved in

Figure 2.5 • *Distribution of achievement in mastery learning classrooms*



enrichment activities that go beyond the curriculum. But by recognizing relevant, individual differences among students and then altering instruction to better meet students' diverse learning needs, Bloom believed the variation among students in how well they learn the specific concepts and skills articulated in a curriculum could eventually reach a "vanishing point" (Bloom, 1971b). In other words, *all* students could learn excellently and truly master the knowledge and skills prescribed in the curriculum. As a result, gaps in the achievement of different groups of students would be closed and perhaps eliminated completely (Guskey, 2007a).

THE ESSENTIAL ELEMENTS OF MASTERY LEARNING

After Benjamin Bloom described his ideas, several of his students took up the task of clarifying the mastery learning process (e.g., Block, 1974, 1971; Block & Anderson, 1975; Block et al., 1989). In addition, numerous programs based on mastery learning principles sprang up in schools throughout the United States and around the world (see Postlethwaite & Haggarty, 1998; Reezigt & Weide, 1990; Wu, 1994; Yildiran & Aydin, 2005; Yildiran, 2006).

Because of its growing popularity, however, the name "mastery learning" quickly became a buzz word in education. It was attached to a variety of

programs, materials, and curricula, many of which had little relation to Bloom's ideas. In addition, "mastery learning" consultants, many of whom had little understanding of Bloom's theory or the research that supported his work, began advising schools on how to implement "mastery learning" programs. As a result, the characteristics of programs labeled "mastery learning" varied greatly from setting to setting (Burns, 1987; Guskey, 2007b). In addition, educators interested in applying Bloom's ideas soon found it difficult to get a concise description of the essential elements of mastery learning and the specific changes required for successful implementation.

Programs with fidelity to Bloom's ideas are built on two essential elements: (1) the *feedback, corrective, and enrichment process*; and (2) *instructional alignment* (Guskey, 1987a, 2010). Although the appearance or format of these elements may differ from setting to setting, they serve a very specific *purpose* in mastery learning classrooms and most clearly differentiate mastery learning from other instructional approaches.

Essential Elements of Mastery Learning

1. Feedback, correctives, and enrichment
2. Instructional alignment

Feedback, Correctives, and Enrichment

The first essential element of mastery learning is the feedback, corrective, and enrichment process. Teachers who use mastery learning provide their students with frequent and specific *feedback* on learning progress through regular, formative classroom assessments. This feedback is both diagnostic and prescriptive. It reinforces precisely what students were expected to learn, identifies what they learned well, and pinpoints what they need to be learned better. To be effective, this feedback also must be appropriate for students' level of learning and cognitive development (Hattie & Timperley, 2007).

The U.S. National Council of Teachers of Mathematics (NCTM) emphasizes this same element in its standards for school mathematics. To overcome inequities in mathematics instruction, NCTM stresses the use of assessments that support learning and provide useful information to both teachers and students (National Council of Teachers of Mathematics, 2000). Meaningful feedback is also the basis of Assessment *for* Learning (Stiggins, 2005) and has been the focus of extensive research (Lipnevich & Smith, 2019).

Feedback alone, however, does little to help students improve their learning. Significant improvement requires feedback to be paired with *correctives*: activities that offer guidance and direction to students on how to remedy their learning problems (Guskey, 2008). Because of students' individual differences,

no single method of instruction works best for all. To help *all* students learn well, therefore, teachers must differentiate their instruction, both in their initial teaching and especially through corrective activities (Bloom, 1976). In other words, teachers must *increase* variation in their teaching to better meet the diverse, individual needs of their students in order to *decrease* variation in results.

To be effective, correctives must be *qualitatively different from the initial teaching*. Simply having students go back and repeat a process that has already proven unsuccessful is unlikely to yield any better results the second time. Corrective activities, therefore, must provide students with an alternative approach and additional time to learn.

The best correctives activities *present* concepts in new ways and *engage* students differently in learning than did the initial teaching. They should incorporate different approaches to learning, different learning preferences, or different types of intelligence (Moran et al., 2006; Samples, 1992; Sternberg, 1994). Evidence indicates that instructional videos and game-based activities can be particularly effective as correctives (Lin et al., 2013).

Most important, correctives are *not simply reteaching*, which often consists of the teacher restating the original explanation louder and more slowly (Guskey, 2003). Whether in a classroom setting or in online learning, correctives must provide students a differentiated form of instruction and a new way to learn (Parsons et al., 2013).

In addition, corrective activities should be effective in improving performance. A new or alternative approach that doesn't help students overcome their learning difficulties is inappropriate as a corrective and should be avoided. Developing effective correctives can be challenging, especially for teachers working alone. But many schools find that providing teachers with time to work collaboratively, sharing ideas, materials, resources, and expertize, greatly facilitates the process (Guskey, 2008).

Essential Characteristics of Effective Corrective Activities

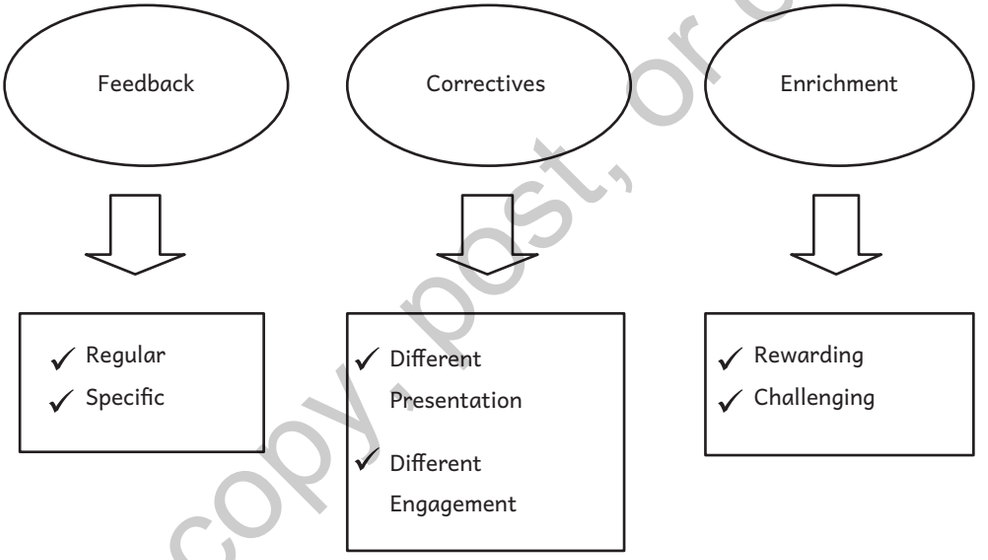
1. Present concepts and skills through new and different means
2. Engage students new and different ways
3. Are successful in helping students remedy learning difficulties

Most applications of mastery learning also include *enrichment* or *extension* activities for students who master the unit concepts and skills from the initial teaching. As described earlier, enrichment activities offer students exciting opportunities to broaden and expand their learning. Most important, they must provide an incentive for students to prepare for and do well on the first

formative assessment. Enrichment activities reward students for their learning success and challenge them to go further.

In most cases, enrichment activities are related to the subject or topic being studied, but they needn't be tied directly to the content of a particular unit. In many classrooms, students get to choose their own enrichment activities as an opportunity to explore aspects of the subject they find particularly exciting or interesting. Many teachers draw from activities developed for gifted and talented students when planning enrichment activities, both to simplify implementation tasks and to guarantee students high-quality learning experiences. Figure 2.6 summarizes the essential characteristics of feedback, correctives, and enrichment

Figure 2.6 • *Characteristics of feedback, correctives, and enrichment activities in mastery learning classrooms*



As we will discuss in detail in Chapter 6, teachers implement the feedback, corrective, and enrichment process in a variety of ways. Many use short, paper-and-pencil or online quizzes as formative assessments to give students feedback on their learning. But formative assessments also can take the form of essays, compositions, projects, reports, performance tasks, skill demonstrations, oral presentations, or any method used to gain evidence on students' learning progress. Mastery learning teachers adapt the format of their formative assessments to match the student learning goals.

What is vitally important, however, especially during the early stages of implementation, is that the corrective work *must be done in class, under the teachers' direction*. This helps students become acclimated to mastery learning

and better understand the process. But even more important, it shows students directly how the process benefits them.

Some teachers begin by dividing students into separate corrective and enrichment groups immediately after going over the formative assessment. Then they direct students in corrective activities, ensuring that every student who needs extra time and assistance is actively engaged, while the other students work independently on enrichment activities. Other teachers use a team-teaching approach with one teacher leading corrective activities while the other monitors enrichments. After students become accustom to the process, many teachers incorporate peer-tutoring and small-group study sessions where students work together (DeWeese & Randolph, 2011).

Other teachers use cooperative learning activities in which students work in teams to ensure all team members reach the mastery level. Inherent in the mastery learning process are the two necessary components of effective cooperative learning: *individual accountability* and *group responsibility* (Johnson & Johnson, 2009). Students' individual scores on the formative assessments ensure *individual accountability*. Offering the entire team special recognition or privileges if all team members attain mastery on the second formative assessment encourages *group responsibility* (Guskey, 1990; Mevarech, 1985).

Through the feedback, correctives, and enrichment process, mastery learning differentiates, individualizes, and personalizes instruction. In every learning unit, students who need extended time and opportunity to remedy learning problems receive these through the correctives. Students who learn quickly and find the initial instruction highly appropriate have opportunities to extend their learning through enrichment. As a result, all students experience more favorable learning conditions and more appropriate, higher quality instruction (Guskey, 2010, 2015; Bloom, 1977).

Instructional Alignment

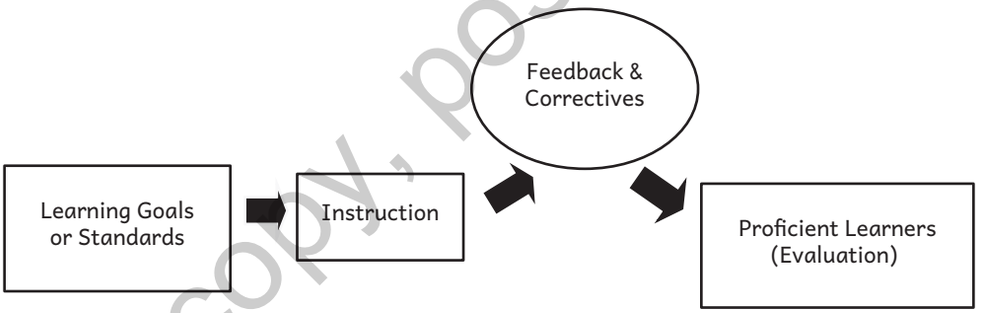
While feedback, correctives, and enrichment are essential, they alone don't constitute mastery learning. To be truly effective, Bloom stressed they must be combined with the second essential element of mastery learning: *instructional alignment*. Reducing variation in student learning and closing achievement gaps requires both clarity and consistency among all instructional components (Bloom, 1971*a*, 1974)

Bloom believed three major components make up the teaching and learning process. To begin there must be *clearly articulated learning goals or standards* that describe what students are expected to learn and be able to do. Next comes *instruction* – the learning experiences teachers plan to help students achieve those learning goals or standards. Ideally, those learning experiences result in

proficient learners – students who have learned well and whose achievement can be measured through some form of assessment or performance evaluation. Mastery learning adds the *feedback and corrective* component to help teachers determine for whom their initial instruction was appropriate and for whom an alternative approach may be needed. By providing these alternative approaches through correctives, more students can learn well and demonstrate their competence and proficiency at the end.

Although mastery learning is essentially neutral with regard to what is taught, how it is taught, and how learning is assessed or evaluated, it requires consistency or alignment among these instructional components, as shown in Figure 2.7. For example, if students are expected to learn higher level skills such as applying what they've learned in new contexts, solving complex problems, or developing thoughtful analyzes, mastery learning stipulates that instructional activities must be planned to give students opportunities to practice and actively engage in those skills. It also requires that students be given specific feedback on how well they learned those skills, coupled with directions on how to correct any learning errors they experience. Finally, procedures for assessing or evaluating students' learning should reflect those same higher-level skills.

Figure 2.7 • *Major components in the teaching and learning process*



Ensuring instructional alignment is a vital aspect of effective teaching and learning at any level (Polikoff & Porter, 2014). Suppose, for example, a language arts teacher offered students feedback on their compositions focusing solely on the mechanics of writing, especially grammar and punctuation. But then later, the same teacher evaluated students' writing achievement based on well they organized and presented ideas in their compositions. In this case, although students received regular feedback, that feedback wasn't aligned with the learning goals or the procedures used to evaluate their learning. Students might know and apply the rules of grammar and punctuation quite well, but be unable to express ideas meaningfully and coherently in their writing. They might even prepare a composition with perfect grammar and punctuation, but receive a low mark because of inadequate content or poor organization in their composition.

To ensure instructional alignment, teachers must make a number of crucial decisions. First, they must decide what concepts or skills are most important for students to learn and at what level. They must decide, for example, if they want students simply to know a set of basic skills, or if they want students to apply those skills in new and more complex contexts. Second, teachers need to decide what evidence best reflects students' mastery of those basic or higher-level skills. This provides the basis for developing the formative assessments and determining students' level of mastery.

Critics sometimes challenge teachers' abilities to make these crucial decisions about student learning. But the truth is that teachers already make these decisions every day, intentional or not. Every time they administer an assessment, grade a paper, or evaluate students' performance in any way, teachers are communicating to students what is most important to learn. Using mastery learning simply compels teachers to make these decisions more thoughtfully, purposefully, and intentionally.

The feedback mastery learning teachers provide their students is always aligned with the specified learning goals or standards, and the accompanying procedures used to evaluate students' learning. If the learning goals focus on the content and organization of students' writing and the manner in which they present their ideas, then the diagnostic feedback they receive and the prescriptive guidance they are offered to make whatever improvements are needed should have that same focus.

TEACHING TO THE TEST?

The element of instructional alignment has led some to criticize mastery learning as simply "teaching to the test." But that's really not accurate. The crucial issue is what forms the basis for teaching.

If a test or assessment provides the basis for teaching, and if what teachers teach is determined primarily by that test or assessment, then, indeed, you're "teaching to the test." Under these conditions, the content, format, and structure of the test or assessment dictate not only what is taught but also how it's taught. Proponents of what used to be called "measurement-driven instruction" (Airasian, 1988; Popham, 1987), today more commonly referred to as "data-driven instruction" (Halverson et al., 2007, 2009) advocate such an approach – provided, of course, the tests or assessments measure learning goals that are truly worth teaching to.

With mastery learning, however, it's not a test or assessment that determines the basis for teaching. Rather, it's the desired learning goals or standards. These learning goals or standards are generally determined by teachers or specified for teachers in their curriculum framework. Teachers who use mastery learning

simply ensure their instruction and the procedures they use to assess students' learning match those learning goals or standards. Thus, instead of "teaching to the test," mastery learning teachers more accurately "test or assess what they teach."

Admittedly, identifying the desired learning goals or standards requires teachers to make critically important decisions. They must decide, for example, precisely what concepts or skills are most important for students to learn and most crucial to students' understanding of the subject. But teachers also must recognize that in most instances, they are already making these decisions. Every time they administer a quiz, grade a paper, assess a task, or evaluate students' performance, teachers communicate to their students what is most important to learn. Using mastery learning simply compels teachers to make these decisions more explicitly, more thoughtfully, and more intentionally.

SUMMARY

Mastery learning is a philosophy and set of instructional strategies originated by Benjamin S. Bloom to help teachers ensure more of their students learn excellently and reach a high level of achievement. Bloom extended the ideas of John B. Carroll's theoretical model of school learning in developing mastery learning. He also drew on research of the crucial elements in one-to-one tutoring, successful individualized instructional programs, and the learning strategies of successful learners in group-based classroom environments.

The mastery learning model Bloom outlined includes procedures for providing students with regular feedback on their learning progress, paired with specific corrective activities designed to help students remedy their individual learning difficulties. Through the systematic use of these feedback and corrective procedures, combined with enrichment activities to extend the learning of fast learners, Bloom believed that 80 percent or more of the students in a class could reach the same high level of achievement that only 20 percent attain under more traditional instructional methods.

Two essential elements define mastery learning: the feedback, corrective, and enrichment process and instructional alignment. These elements must be core ingredients in an instructional program for it to be accurately labeled "mastery learning." The flexibility and broad-based application of these elements contributes to mastery learning's great appeal among teachers at all levels. Although not an educational cure-all, mastery learning significantly increases teachers' effectiveness and enhances their positive influence on student learning.

QUESTIONS FOR DISCUSSION

1. What changes in perspective or beliefs might be necessary for teachers to successfully implement mastery learning? How might these changes be initiated?
2. What obstacles might stand in the way of teachers who want to implement mastery learning? How could these obstacles be avoided or overcome? How might teachers contend with or work around obstacles that cannot be avoided?
3. Did any of your teachers use elements of mastery learning in their teaching? What elements did they use? At what level of education did they teach? How successful were you and your classmates in these classes? Can you think of ways those teachers might have been even more successful?
4. Are there subjects or areas of study in which you believe mastery learning might work best or might not work as well? Are there certain levels of education at which implementation might be more challenging? Why do you think so?

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