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CHAPTER NINE

Grouping and Differentiation

Mr. Arbuthnot is in fine form. He is presenting a lesson on long division to his fourth-grade class and feels that he's never been so clear, so interesting, and so well organized. When he asks questions, several students raise their hands; when he calls on them, they always know the answers. "Arbuthnot, old boy," he says to himself, "I think you're really getting to these kids!"

At the end of the period he passes out a short quiz to see how well his students have learned the long-division lesson. When the papers are scored, he finds, to his shock and disappointment, that only about a third of the class got every problem right. Another third missed every problem; the remaining students fell somewhere in between. "What went wrong?" he thinks. "Well, no matter, I'll set the situation right in tomorrow's lesson."

The next day, Mr. Arbuthnot is even better prepared, uses vivid examples and diagrams to show how to do long division, and gives an active, exciting lesson. He uses an interactive whiteboard to illustrate the key concepts. Even more hands than before go up when he asks questions, and the answers are usually correct. However, some of the students are beginning to look bored, particularly those who got perfect papers on the quiz and those who got none right.

Toward the end of the period, he gives another brief quiz. The scores are better this time, but there is still a group of students who got none of the problems correct. He is crestfallen. "I had them in the palm of my hand," he thinks. "How could they fail to learn?"

To try to find out what went wrong, Mr. Arbuthnot goes over the quiz papers of the students who missed all the problems. He immediately sees a pattern. By the second lesson, almost all students were proceeding correctly in setting up the long-division problems. However, some were making consistent errors in subtraction. Others had apparently forgotten their multiplication facts. Their problems were not with division at all; the students simply lacked the prerequisite skills.

"Well," thinks Mr. Arbuthnot, "at least I was doing great with some of the kids." It occurs to him that one of the students who got a perfect paper after the first lesson might be able to give him some idea how to teach the others better. He asks Teresa how she grasped long division so quickly.

"It was easy, "she says. "We learned long division last year!"

USING YOUR EXPERIENCE

CRITICAL THINKING List all of the ways in which Mr. Arbuthnot could be more effective in addressing student individual differences. Then list all of the ways in which he is effective in addressing student needs.

COOPERATIVE LEARNING Work with a group of four or five classmates. Pass a sheet of paper around the group, and ask each member to write down an idea to help Mr. Arbuthnot become more effective in addressing students' needs. After one idea is added, the sheet is passed to the next person in the group, who adds an idea and passes the sheet along, and so on. Share some of these ideas with the class.

WHAT ARE ELEMENTS OF EFFECTIVE INSTRUCTION BEYOND A GOOD LESSON?

INTASC 2 Learning Differences
INTASC 3 Learning Environments
INTASC 5 Application of Content
INTASC 7 Planning for Instruction
INTASC 8 Instructional Strategies

As Mr. Arbuthnot learned to his chagrin, effective instruction takes a lot more than good lectures. He gave a great lesson on long division, yet it was appropriate for only some of the students: those who had the needed prerequisites but had not already learned long division. To make his lesson effective for all of the students, he needed to adapt it to meet their diverse needs. Furthermore, the best lesson in the world won't work if students are not motivated to learn it or if inadequate time is allotted to enable all students to learn.

If high-quality lectures were all that mattered in effective instruction, we could probably just find the best lecturers in the world, record their lessons, and show the videos to students. But if you think about why video lessons would not work very well by themselves, you will realize how much more is involved in effective instruction than simply giving good lectures. First, the video teacher would have no idea what students already knew. A particular lesson might be too advanced or too easy for a particular group of students. Second, some students might be learning the lesson quite well, whereas others would be missing key concepts and falling behind. The video teacher would have no way of knowing which students needed additional help and, in any case, would have no way of providing it. There would be no way to question students to find out whether they were getting the main points and then to reteach any concept they had missed. Third, the video teacher would have no way of motivating students to pay attention to the lesson or to really try to learn it. If students failed to pay attention or misbehaved, the video teacher could not do anything about it. Finally, the video teacher would never know, at the end of a lesson, whether students had actually learned the main concepts or skills.

This analysis of video teaching illustrates why you must be concerned with many elements of instruction in addition to the presentation of information. You must know how to adapt your instruction to the students' levels of knowledge. You must motivate students to learn, manage student behavior, group students for instruction, and assess the students' learning.

To help make sense of all these elements of effective instruction, educational psychologists have proposed models of effective instruction. These models explain the critical features of high-quality lessons and how they interact to enhance learning.

Carroll's Model of School Learning and QAIT

One of the most influential articles ever published in the field of educational psychology was a paper by John Carroll titled "A Model of School Learning" (1963, 1989). In it, he describes teaching in terms of the management of time, resources, and activities to ensure student learning. Carroll proposes that learning is a function of (1) time actually spent on learning and (2) time needed to learn. Time needed is a product of aptitude, prior knowledge, and ability to learn; time spent depends on clock time available for learning, quality of instruction, and student perseverance.

Slavin (1995b) described a model focusing on the alterable elements of Carroll's model, those that the teacher or school can directly change. It is called the **QAIT model**, for quality, appropriateness, incentive, and time.

1. ***Quality of instruction.*** The degree to which the presentation of information or skills helps students easily learn the material. Quality of instruction is largely a product of the quality of the curriculum and of lesson presentation.
2. ***Appropriate levels of instruction.*** The degree to which the teacher makes sure that students are ready to learn a new lesson (that is, have the necessary skills and knowledge to learn it) but have not already learned the lesson. In other words, the level of instruction is appropriate when a lesson is neither too difficult nor too easy for students.
3. ***Incentive.*** The degree to which the teacher makes sure that students are motivated to work on instructional tasks and to learn the material being presented.
4. ***Time.*** The degree to which students are given enough time to learn the material being taught.

For instruction to be effective, each of these four elements must be adequate. No matter how high the quality of instruction, students will not learn a lesson if they lack the necessary prior

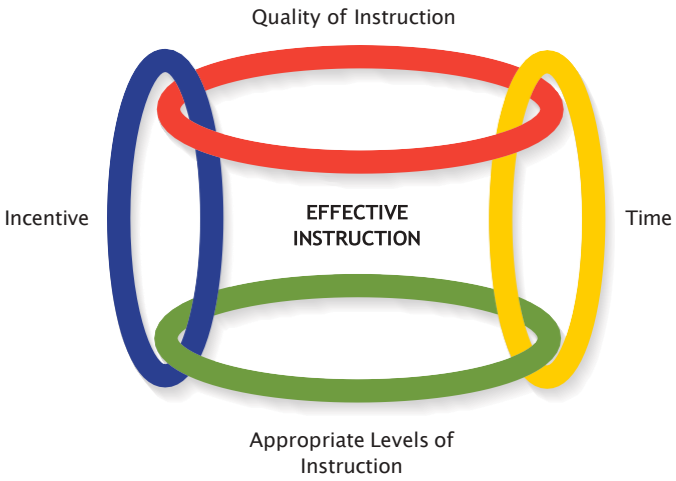

FIGURE 9.1 • 5IF QAIT Model

Each of the elements of the QAIT model is like a link in a chain, and the chain is only as strong as the weakest link.

skills or information, if they lack the motivation, or if they lack the time they need to learn the lesson. However, if the quality of instruction is low, then it makes no difference how much students already know, how motivated they are, or how much time they have. Figure 9.1 illustrates the relationships among the elements in the QAIT model.

QUALITY OF INSTRUCTION Quality of instruction refers to the set of activities most people first picture when they think of teaching: lecturing, calling on students, discussing, helping students with seatwork, and so on. Involving peers as peer tutors or cooperative learning partners may add to quality of instruction. Technology (such as videos, computer graphics, interactive whiteboards, or other digital content) may contribute to the quality of instruction, as can hands-on experiences, laboratory exercises, or computer simulations. When instruction is high in quality, the information presented makes sense to students, interests them, and is easy to remember and apply.

The most important aspect of quality of instruction is the degree to which the lesson makes sense to students, which you ensure by presenting material in an orderly, organized way. You need to relate new information to what students already know. You need to use examples, demonstrations, pictures, and diagrams to make ideas vivid for students. You might use such cognitive strategies as advance organizers and memory strategies. Sometimes a concept will not make sense to students until they discover it or experience it themselves or until they discuss it with others. Engaging students with the content, through cooperative activities, creation of new products, simulations, games, or technology, can help make lesson concepts understandable and memorable for students.

APPROPRIATE LEVELS OF INSTRUCTION Perhaps the most difficult problem of classroom organization is the fact that students come into class with different levels of prior knowledge, skills, and motivation, as well as with different learning rates (Tomlinson, 2008). This was Mr. Arbuthnot's main dilemma. Student diversity requires teachers to provide appropriate levels of instruction. Teaching a class of 30 students (or even a class of 10) is fundamentally different from one-to-one tutoring because of the inevitability of differences among students that affect the success of instruction. You can always be sure that if you teach one lesson to the whole class, some students will learn the material much more quickly than others. In fact, some students might not learn the lesson at all; they might lack important prerequisite skills or adequate time (because to give them enough time would waste too much of the time of students who learn rapidly). Recognition of these instructionally important differences leads many teachers to search for ways of individualizing or differentiating instruction, adapting instruction to meet students' different needs, or grouping students according to their abilities. Some of the solutions typically used to accommodate individual differences in learning rates create problems of their own that could be more serious than the ones they are meant to solve (Willingham & Daniel, 2012). For example, you might give all students materials appropriate to their individual needs and allow students to work at their own rates, perhaps using computer-assisted instructional software designed for this

purpose. This solves the problem of providing appropriate levels of instruction, but it creates serious new problems of managing the activities of 20 or 30 students doing 20 or 30 different things. Alternatively, you might group students within a relatively narrow range of abilities (e.g., Redbirds, Bluebirds, and Yellowbirds). However, this creates problems, too, because when you are working with the Redbirds, the Bluebirds and Yellowbirds must work without supervision or help, and students in the low groups may feel stigmatized and may lack positive behavioral models.

Adapting to individual needs may require adjusting the pace of instruction so that it is neither too fast nor too slow. For example, you should ask questions frequently to determine how much students have grasped. If the answers show that students are keeping up with the lesson, you might move along a little more rapidly. But if students' answers show that they are having trouble keeping up, you might review parts of the lesson and slow down the pace, or provide additional instruction at another time for students who are not keeping up.

INCENTIVE Thomas Edison wrote that "genius is one per cent inspiration and ninety-nine per cent perspiration." The same could probably be said of learning. Learning is work. This is not to say that learning isn't or can't be fun or stimulating—far from it. But it is true that students must exert themselves to pay attention, to conscientiously perform the tasks required of them, and to study; moreover, students must somehow be motivated to do these things. This incentive, or motivation, might come from characteristics of the tasks themselves (e.g., the interest value of the material being learned), from characteristics of students (such as their curiosity or positive orientation toward learning), or from rewards provided by the teacher or the school (such as praise, recognition, grades, or certificates).

If students want to know something, they will be motivated to exert the effort necessary to learn it. This is why there are students who can rattle off the names, batting averages, number of home runs, and all sorts of other information about every player of the Chicago Cubs but know little about science or history or math. To such students, baseball facts are of great interest, so they are willing to invest substantial effort to master them. Some information is naturally interesting to some or all students, but you can do much to create interest in a topic by arousing students' curiosity or by showing how knowledge gained in school can be useful outside of school. For example, baseball fans might be much more interested in learning about understanding proportions if they realized that this information is necessary for computing batting averages.

Connections 9.1
The rewards and general principles of motivation are discussed throughout Chapter 10.

However, not every subject can be made fascinating to all students at all times. Most students need some kind of recognition or reward if they are to exert maximum effort to learn skills or concepts that might seem unimportant at the moment but will be critical for later learning. For this reason, schools use praise, feedback, grades, certificates, stars, prizes, access to fun activities, and other rewards to increase student motivation.

Connections 9.2
Principles of classroom management and discipline are discussed throughout Chapter 11.

TIME The final element of the QAIT model is time. Instruction takes time. More time spent teaching something does not necessarily mean more learning; but if instructional quality, appropriateness of instruction, and incentive are all high, then spending more time on instruction will pay off in greater learning. The amount of time available for learning depends largely on two factors. The first is *allocated time*, the amount of time that you schedule for instruction and then actually use to teach. The other is *engaged time*, the amount of time students pay attention to the lesson. Both kinds of time are affected by classroom management and discipline strategies. If students are well behaved, are well motivated, and have a sense of purpose and direction, and if you are well prepared and well organized, then there is plenty of time for students to learn whatever you want to teach. However, many factors, such as interruptions, behavior problems, and poor transitions between activities, eat away at the time available for learning.

HOW ARE STUDENTS GROUPED TO ACCOMMODATE ACHIEVEMENT DIFFERENCES?

In ASCD EZ
Learning Differences

From the day they walk into school, students differ in their knowledge, skills, motivations, and predispositions toward what is about to be taught. Some students are already reading when they enter kindergarten; others need much time and support to learn to read well. When starting a new lesson, you can usually assume that some students already know a great deal about the lesson's

content, some know less but will master the content readily, and some might not be able to master the content at all within the time provided. Some have the prerequisite skills and knowledge to learn the lesson, whereas others do not. This was Mr. Arbuthnot's problem: Some of his students were not ready to learn long division, whereas others had already learned it before he began. Some of his students lacked the basic multiplication and subtraction skills crucial for long division. Others learned it during the first lesson and did not need the second. If Mr. Arbuthnot stopped to review multiplication and division, he would be wasting the time of the better-prepared students. If he set his pace of instruction according to the needs of his more able students, those with learning problems might never catch up. How can Mr. Arbuthnot teach a lesson that will work for all of his students, who are performing within the normal range but differ in prior knowledge, skills, and learning rates?

Connections 9.3
To learn more about student differences in general intelligence, specific aptitudes, and abilities and learning styles, see Chapter 4.

Accommodating instruction to student differences, or *heterogeneity*, is one of the most fundamental problems of education and often leads to politically and emotionally charged policies (Atkins & Ellsesser, 2003). One solution, which some advocate, is simply to retain more children in a grade until they meet grade-level requirements. Many states, for example, are now requiring that children who are not reading at grade level by third grade be required to repeat the grade (Robelen, 2012). Some countries outside of North America attempt to deal with the problem of student differences by testing children at around 10 to 12 years of age and assigning them to different types of schools, only one of which is meant to prepare students for higher education. In the United States, a similar function is sometimes carried out by assignment of secondary students to college preparatory, general, and vocational tracks, in which students are assigned to a specified curriculum sequence within which they take all their academic courses. This **tracking** rapidly diminished in the 1980s and 1990s, but instead, most secondary schools place students in ability-grouped classes by subject area. In theory, a student may be in a high-level math class but in a middle- or low-level English class (Lucas & Gamoran, 2002). Many secondary schools allow students, in consultation with counselors, to choose the level of each class, perhaps changing levels if a course turns out to be too difficult or too easy. All of these strategies, which result in students' attending classes that are more or less homogeneous in performance level, are forms of **between-class ability grouping**. The predominant form of ability grouping in middle, junior high, and high schools, it is also sometimes used in elementary schools.

Another common means of accommodating instruction to student differences in elementary schools is **within-class ability grouping**, as in the use of reading groups (Bluebirds, Redbirds, Yellowbirds) that divide students according to their reading performance. The problem of accommodating student differences is so important that many educators have suggested completely individualized instruction so that students can work at their own rates, which has led to the creation of individualized computer-assisted instructional programs.

Each of the many ways of accommodating differences among students has its own benefits, but each introduces its own problems, which sometimes outweigh the benefits. Some student differences can be easily accommodated (Jackson & Lambert, 2010; Pollock, Ford, & Black, 2012; Tomlinson, 2014). For example, you can support different learning styles by augmenting oral presentations with visual cues—perhaps writing on a whiteboard or showing pictures and diagrams to emphasize important concepts (Mayer, 2008a). You can accommodate other differences in learning styles by varying classroom activities, as in alternating active and quiet tasks or individual and group work. You can sometimes work with students on an individual basis and adapt instruction to their learning needs—for example, by reminding impulsive students to take their time or by teaching overly reflective students strategies for skipping problematic items so that they can complete tests on time.

Differences in prior knowledge and learning rates are more difficult to deal with. Sometimes the best way to deal with these differences is to ignore them and teach the whole class at a single pace, perhaps offering additional help to low-achieving students and giving extra extension or enrichment activities to students who tend to finish assignments rapidly (see Guskey, 2011; Tomlinson, 2014). You can consciously vary the examples and questions used to accommodate a range of students in each lesson (Small, 2010). You can let students who do poorly on tests or other assignments redo them until they achieve adequate performance (Wormeli, 2011). Appropriate use of cooperative learning methods, in which students of different performance levels help each other,

can be an effective means of helping all children learn (Cohen & Lotan, 2014; Slavin, 2013; Webb, 2008). Some subjects lend themselves more than others to a single pace of instruction for all. For example, it is probably less important to accommodate student achievement differences in social studies, science, and English than in mathematics, reading, and foreign languages. In the latter subjects, skills build directly on one another, so teaching a heterogeneous class at one set pace might do a disservice to both low and high achievers; low achievers might fail because they lack prerequisite skills, and high achievers might become bored at what is for them a slow pace of instruction.

Between-Class Ability Grouping

Connections 9.4
Programs for students who are gifted and those who have special needs are discussed in Chapter 12.

Probably the most common means of dealing with instructionally important differences is to assign students to classes according to their abilities. This between-class ability grouping can take many forms. In most middle and high schools, students are grouped separately by ability for each subject, so a student might be in a high-performing math class and an average-performing science class. In high schools, between-class ability grouping may be accomplished by course placements. For example, some seventh, eighth, and ninth graders take Algebra I, whereas others who do not qualify for Algebra I take general mathematics. Elementary schools use a wide range of strategies for grouping students, including many of the patterns found in secondary schools. Often, students in elementary schools are assigned to a mixed-ability class for homeroom, social studies, and science but regrouped by ability for reading and math (Lucas & Gamoran, 2002). Elementary schools are less likely than secondary schools to use ability grouping between classes but more likely to use ability grouping within classes, especially in reading (Chorzempa & Graham, 2006). At any level, however, the establishment of separate special-education programs for students with serious learning problems is one common form of between-class ability grouping, as is provision of separate programs for students who are academically gifted and talented.

Certification Pointer
For teacher certification tests, you may be asked to describe the strengths and weaknesses of between-class ability grouping. You should know that research does not support most forms of between-class ability grouping.

RESEARCH ON BETWEEN-CLASS ABILITY GROUPING Despite the widespread use of between- class ability grouping, research on this strategy does not support its use. Researchers have found that although ability grouping might have slight benefits for students assigned to high-track classes, these benefits are balanced by losses for students in low-track classes (Ireson & Hallam, 2001; Oakes, 2005; Slavin, 1987b, 1990).

ON THE WEB

The National Association for Gifted Children's position statement on ability grouping can be found at nagc.org. Also see NEA's Research Spotlight on Academic Ability Grouping (nea.org).

Why is between-class ability grouping so ineffective? Several researchers have explored this question. The primary purpose of ability grouping is to reduce the range of student performance levels that teachers must deal with so they can adapt instruction to the needs of a well-defined group. However, grouping is often done on the basis of standardized test scores or other measures of general ability, rather than according to performance in a particular subject. As a result, the reduction in the range of differences that are actually important for a specific class may be too small to make much difference (Oakes, 2005). Furthermore, concentrating low-achieving students in low-track classes seems to be harmful because it exposes them to too few positive role models. Many teachers do not like to teach such classes and might subtly (or not so subtly) communicate low expectations for students in them (Weinstein, 1996). Studies find that teachers actually do not make many adaptations to the needs of students in low-ability groups (Ross, Smith, Lohr, & McNelis, 1994). Several studies have found that the quality of instruction is lower in low-track classes than in middle- or high-track classes. For example, teachers of low-track classes are less enthusiastic and less well organized, teaching more facts and fewer concepts than teachers of high-track classes (Gamoran, Nystrand, Berends, & LePore, 1995; Oakes, 2005; Raudenbush, Rowan, & Cheong, 1993). Low-track classes are more likely to have novice teachers (Kalogrides & Loeb, 2013). Instruction in untracked mixed-ability classes more closely resembles teaching in high- and middle-track classes than that in low-track classes.

Perhaps the most damaging effect of tracking is its stigmatizing effect on students who are assigned to the low tracks; the message these students get is that academic success is not within their reach (Oakes, 2005). Students in lower-track classes are far more likely to become delinquent and truant and to drop out of school than are students of similar ability in middle-track or mixed placements (Oakes, 2005). Although these problems certainly exist in part because students in low-track classes are low in academic performance to begin with, this cannot be the whole story. For example, students who are assigned to the low track in middle or junior high school experience a rapid loss of self-esteem. Slavin and Karweit (1982) found that fifth- and sixth-graders in urban elementary schools were absent about 8 percent of the time. When these same students entered the tracked junior high school, absenteeism rose almost immediately to 26 percent, and the truancy was concentrated among students assigned to the bottom-track classes. The change happened too rapidly to be attributed entirely to characteristics of students. Something about the organization of the junior high school apparently convinced a substantial number of students that school was no longer a rewarding place to be.

One of the most insidious aspects of tracking is that low-track classes are often composed predominantly of students from lower socioeconomic backgrounds and from minority groups, whereas upper-track classes are more often composed of children from higher socioeconomic levels (Kalogrides & Loeb, 2013). A study by Yonezawa, Wells, and Serna (2002) found that even in high schools where students were theoretically given a "free choice" of academic levels, African American and Latino students disproportionately ended up in low-level classes. The creation of groupings that are so often associated with social class and race is impossible to justify in light of the lack of evidence that such groupings are educationally necessary.

Although individual teachers can rarely set policies on between-class ability grouping, it is useful for you to know that research does not support this practice at any grade level, and tracking should be avoided whenever possible. This does not mean that all forms of between-class grouping should be abandoned, however. For example, there is probably some justification for acceleration programs, such as offering Algebra I to mathematically talented seventh-graders or providing advanced placement or college classes in high school (see Chapter 12). Also, some between-class grouping is bound to occur in secondary schools, because some students choose to take advanced courses and others do not. However, the idea that having high, middle, and low sections of the same course enhances student achievement has not been supported by research. Mixed-ability classes can be successful at all grade levels, particularly if other, more effective means of accommodating student differences are used, such as within-class ability grouping, tutoring or other extra help for low achievers, and cooperative learning strategies, in which students work in mixed-ability groups.

Connections 9.5
Cooperative learning strategies are described in Chapter 8.

Untracking

For many years, educators and researchers have challenged between-class ability grouping at all levels. A number of guides to untracking and examples of successful untracking have been published (e.g., Burris, Heubert, & Levin, 2004; Fahey, 2000; Kugler & Albright, 2005; Oakes, Quartz, Ryan, & Lipton, 2000). **Untracking** recommendations focus on placing students in mixed-ability groups and holding them to high standards but providing many ways for them to reach those standards, including extra assistance for students who are having difficulty keeping up (Burris, Heubert, & Levin, 2006; Hubbard & Mehan, 1998). Appropriate forms of cooperative learning and project-based approaches have often been recommended as a means of opening up more avenues to high performance for all children (Slavin, 2013). Yet the road to untracking is far from easy, especially in middle and high schools (Cooper, 1998; Oakes et al., 2000; Rubin, 2003). In particular, untracking often runs into serious opposition from the parents of high achievers. Oakes and colleagues (2000) and Wells, Hirshberg, Lipton, and Oakes (1995) have pointed out that untracking requires changes in thinking about children's potentials, not only changes in school or classroom practices. Teachers, parents, and students themselves, these researchers claim, must come to see the goal of schooling as success for every child, not as sorting students into categories, if untracking is to take hold (Oakes et al., 2000). This change in perception is difficult to bring about; perhaps as a result, the move toward untracking is proceeding slowly at the secondary level (Hallinan, 2004).

Connections 9.6
Various forms of cooperative and project-based learning are described in Chapter 8.

Regrouping for Reading and Mathematics

Regrouping is a form of ability grouping often used in the elementary grades. In regrouping plans, students stay in mixed-ability classes most of the day but are assigned to reading and/or math classes on the basis of their performance in these subjects. For example, at 9:30 a.m. the fourth-graders in a school may move to different teachers so that they can receive reading instruction appropriate to their reading levels. One form of regrouping for reading, the **Joplin Plan**, regroups students across grade lines. For example, a reading class at the fourth grade, first semester reading level may contain third-, fourth-, and fifth-graders.

One major advantage of regrouping over all-day ability grouping is that students spend most of the day in a mixed-ability class. Thus, low achievers are not separated out as a class and potentially stigmatized. Perhaps for these reasons, regrouping plans, especially the Joplin Plan, have generally been found to increase student achievement (Gutiérrez & Slavin, 1992; Slavin, 1987b).

Within-Class Ability Grouping

Another way to adapt instruction to differences in student performance levels is to group students within classes, as is typical in elementary school reading classes. For example, a third-grade teacher might have the Rockets group using a 3–1 (third-grade, first-semester) text, the Stars group using a 3–2 (third-grade, second-semester) text, and the Planets group using a 4–1 (fourth-grade, first-semester) text.

Within-class ability grouping is very common in elementary reading classes (Chorzempa & Graham, 2006). Within-class ability grouping is rare in subjects other than reading or mathematics. In reading, teachers typically have each group working at a different point in a series of texts and allow each group to proceed at its own pace. In many math classes the teacher presents a lesson to the whole class and then meets with two or more ability groups, while other students are doing seatwork, to reinforce skills or provide enrichment as needed. In a strategy called mastery learning, teachers assemble a group for additional instruction after they have given a lesson, formatively assessed students, and identified those who are not meeting a mastery standard (typically, 80 percent correct) (Guskey, 2010). After "corrective instruction," teachers test again, hoping students will meet the mastery standards.

Certification Pointer
You may be asked on your teacher certification test to describe a technique for grouping students within a reading class to meet a wide range of student reading abilities.

RESEARCH ON WITHIN-CLASS ABILITY GROUPING Research on the achievement effects of within-class ability grouping has taken place largely in elementary mathematics classes. Most such studies have found that students in the ability-grouped classes learned more than students in classes without grouping (Slavin, 1987b). Students of high, average, and low achievement levels seem to benefit equally from within-class ability grouping. One study by Mason and Good (1993) found that teachers who flexibly grouped and regrouped students according to their needs had better math achievement outcomes than those who used permanent within-class groups. Surprisingly, there is little research on the effectiveness of reading groups, and that which does exist shows few benefits (Nomi, 2010).

The research suggests that small numbers of ability groups are better than large numbers (Slavin & Karweit, 1984). A smaller number of groups has the advantage of allowing more direct instruction from the teacher and using less seatwork time and transition time. With only three groups, seatwork time rises to at least two-thirds of class time. Teachers who try to teach more than three reading or math groups might also have problems with classroom management. Dividing the class into more than three groups does not decrease the magnitude or range of differences within each group enough to offset these problems (see Hiebert, 1983).

One interesting study by Chmielewski, Dumont, & Trautwein (2013) found that whereas top-track students had higher self-concepts than low-track students, the opposite was the case in within-class grouping, suggesting that within-class grouping does not have the stigmatization effect often seen in between-class grouping.

The main point to be drawn from research on within-class ability grouping is not that it is desirable but that if some form of grouping is thought to be necessary, grouping within the class is preferable to grouping between classes.

Retention

One of the most controversial issues in education is whether low-achieving students should be required to repeat grades. Approximately 3.5 percent of U.S. first-graders were retained in 2008–2009, and then 1 percent to 2 percent in each of grades 2 through 8 (Warren & Saliba, 2012). This means that about 14 percent of students are retained at some point before high school (Warren, Hoffman, & Andrew, 2014). Several states have recently passed highly controversial laws that require third-graders who are not reading at grade level to repeat a grade (Robelen, 2012), and this may be increasing retention rates in those states.

Proponents of holding back low-achieving students argue that this gives such students a "gift of time" to catch up and sets clear standards that they must strive to achieve. Students being considered for retention are usually given the opportunity to catch up in summer school or to receive other assistance leading to promotion, and it may be that the threat of retention brings many students into such services (March, Gershwin, Kirby, & Xia, 2009; McCombs, Kirby, & Mariano, 2009). Opponents note that students who are held back lose motivation; in fact, having been retained is one of the strongest predictors of dropping out (Allensworth, 2005; Jimerson, Anderson, & Whipple, 2002). Retention is disproportionately high among male students who are members of minority groups and/or come from disadvantaged homes (Beebe-Frankenberger, Bocian, MacMillan, & Gresham, 2004; Robelen, Adams, & Shah, 2012). There are also serious questions about whether tests used in many retention decisions are sufficiently reliable and valid (Penfield, 2010).

Is retention beneficial or harmful? In the short term, holding students back usually increases scores in a given school or district, not because students are learning more but because they are older when they take the test. For this reason, states and districts often report "dramatic gains" on state tests right after instituting a new policy of holding students back unless they meet a given test standard (Bali, Anagnostopoulos, & Roberts, 2005; McGill-Franzen, & Allington, 2006). In long-term studies, however, students who were retained typically end up learning less, or certainly no more, than similar low achievers of the same age who were not retained (Allensworth & Nagaoka, 2010; Burkam, Logerfo, Ready, & Lee, 2007; Hong & Raudenbush, 2005; Hong & Yu, 2007; Hughes, Kwock, & Im, 2013; Roderick & Nagaoka, 2005). The advantage that retained students initially have over their younger classmates tends to fade away within a few years (Allen, Chen, Willson, & Hughes, 2009; Moser, West, & Hughes, 2012).

The best solutions to the problems of low-achieving students involve neither retention nor "social promotion" (promoting students without regard to their levels of achievement). Instead, such children should be given special attention, diagnosis, and intensive interventions, such as tutoring, until their achievement falls within the normal range (Benson, 2014; Vaughn, Bos, & Schumm, 2014). An extra year of education is a very expensive intervention—for that amount of money, students can be given much more effective assistance (Reeves, 2006; Slavin, Lake, Davis, & Madden, 2011).

MyEdLab **Self-Check 9.1**

MyEdLab **Video Analysis Tool 9.1** Go to MyEdLab and click on the Video Analysis Tool to access the exercise "Differentiated instruction: grouping."

WHAT ARE SOME WAYS OF DIFFERENTIATING INSTRUCTION?

InTASC 2
Learning Differences

InTASC 8
Instructional Strategies

As alternatives to ability grouping, many proven strategies exist to improve the achievement of struggling students. This gets directly to the main problem that grouping is intended to solve. The array of proven approaches is particularly broad in reading, where many quite different approaches are known to be effective with struggling readers (Connor, Alberto, Compton, & O'Connor, 2014; Galuschka, Ise, Kreick & Schulte-Körne, 2014; Slavin, Lake, Davis, & Madden, 2011; Wanzek et al., 2013).

The problem of providing all students with appropriate levels of instruction could be completely solved if schools simply assigned each student his or her own teacher. Not surprisingly, studies of one-adult–one-student tutoring find substantial positive effects of tutoring on student

achievement (Slavin, Lake, Davis, & Madden, 2011). One major reason for the effectiveness of tutoring is that the tutor can provide **differentiated instruction**, tailoring instruction precisely to a student's needs. If the student learns quickly, the tutor can move to other tasks; if not, the tutor can figure out what the problem is, try another explanation, or simply spend more time on the task.

There are situations in which tutoring by adults is feasible and necessary. Cross-age peer tutors (older students working with younger ones) can also be very effective (Thurston et al., 2012). In addition, educational innovators have long tried to simulate the one-to-one teaching situation by individualizing instruction. Teachers have found a variety of ways to informally accommodate the needs of different learners in heterogeneous classrooms (Tomlinson, 2014b; Tomlinson & Moon, 2013). Individualized instruction methods, in which students work at their own level and pace, were popular in the 1960s and 1970s, and this type of instruction continues in many forms of computer-based instruction. Differentiation strategies are discussed in the following sections.

Differentiated and Personalized Instruction

Differentiated instruction (Doubet & Hockett, 2015; Parsons, Dodman, & Burrowbridge, 2013; Silver, Jackson, & Moirao, 2011; Tomlinson, 2014b; Tomlinson & Moon, 2013) adapts the content, level, pace, and products of instruction to accommodate the different needs of diverse students in regular classes. The philosophy behind differentiated instruction emphasizes that all children can reach high standards, but some may need tailored assistance to do so. Recently, the related term *personalized instruction* has been widely used. It adds an emphasis on adapting to students' interests, values, and circumstances (Dobbertin, 2012; Powell & Kusuma-Powell, 2012; Richardson, 2012; Wolk, 2010). Computers are frequently central to personalized or differentiated instruction, as they can provide the same learning content in many ways and at many levels, and can help teachers keep track of all students' progress (Grant & Basye, 2014; Gura, 2016).

For an example of personalization, you might ask a diverse class to write a biography of Gandhi but to provide materials on Gandhi at different reading levels. Or you might create a common math test for a heterogeneous class but include a few "challenge questions" for students with stronger preparation in math. During seatwork, you might focus on students known to have difficulties with prerequisite skills or provide them preteaching on those skills before class; for example, before a unit on decimals, you might arrange an extra session to review fractions with students who are not solid with the fraction concepts central to decimals.

Part of the idea of differentiation is that even though all students need to reach the same goals, some will take more time and others less time to do so. Differentiated classes may give students opportunities to redo projects on which they have done poorly, rather than just receive low grades (Guskey, 2011; Tomlinson & Moon, 2013; Wormeli, 2011).

Differentiation and personalization are increasingly being provided by means of digital devices. This topic is discussed further later in this chapter .

Peer Tutoring

INTASC 3
Learning Environments

Students can help one another learn. In **peer tutoring**, one student teaches another. There are two principal types of peer tutoring: **cross-age tutoring**, in which the tutor is several years older than the student being taught, and same-age peer tutoring, in which a student tutors a classmate (Topping, Duran, & Van Keer, 2015). Cross-age tutoring is recommended by researchers more often than same-age tutoring—partly because older students are more likely to know the material, and partly because students might accept an older student as a tutor but resent having a classmate in that role. Sometimes peer tutoring is used with students who need special assistance, in which case a few older students might work with a few younger students. Other tutoring schemes have involved, for example, entire fifth-grade classes tutoring entire second-grade classes (Thurston, Tymms, Merrell, & Conlin, 2012). In these cases, half of the younger students might be sent to the older students' classroom, while half of the older students go to the younger students' classroom. Otherwise, peer tutoring may take place in the cafeteria, the library, or another school facility.

Peer tutoring among students of the same age can be easier to arrange and has also been found to be very effective (Rohrbeck et al., 2003). Among classmates of the same age and performance level, reciprocal peer tutoring, in which students take turns as tutors and tutees, can be both

practical and effective (Fantuzzo, King, & Heller, 1992; Greenwood, Terry, Utley, Montagna, & Walker, 1993; Mathes, Torgeson, & Allor, 2001; Van Keer & Vanderlinde, 2013).

Adequate training and monitoring of tutors are essential. For a practical guide to peer tutoring, see Topping, Duran, & Van Keer, 2015. Some studies have found greater achievement gains for tutors than for tutees (Rekrut, 1992)! As many teachers have noted, the best way to learn something thoroughly is to teach it to someone else.

Connections 9.7
For more on reciprocal teaching, see Chapter 8.

ON THE WEB

For articles and resources on peer tutoring, visit the Peer Tutoring Resource Center at peertutoringresource.org and the Center for Effective Collaboration and Practice at cecp.air.org.

Tutoring by Teachers

One-to-one adult-to-child tutoring is one of the most effective instructional strategies known, and it essentially solves the problem of appropriate levels of instruction. The principal drawback to this method is cost. However, it is often possible to provide adult tutors for students who are having problems learning in the regular class setting. Tutoring is an excellent use of school aides (Brown et al., 2005; Madden & Slavin, 2015; Vadasy, Sanders, & Tudor, 2007); some school districts hire large numbers of paraprofessionals precisely for this purpose. In fact, research has found few achievement benefits of classroom aides unless they are doing one-to-one tutoring (see Slavin, 1994). Volunteers who are willing to work every day and who are carefully supervised and trained in phonetic approaches can also improve student learning, though not usually as much as paraprofessionals (Morrow-Howell et al., 2009; Roskosky, 2010; Tingley, 2001).

There are some circumstances in which one-to-one tutoring by teachers is particularly justifiable, despite the cost, such as for first-graders who are having difficulty learning to read. Failing to learn to read in the lower grades of elementary school is so detrimental to later school achievement that an investment in tutors who can prevent reading failure is worthwhile. A recent review of research on programs for struggling readers in the elementary grades found substantial positive effects of a variety of tutoring and small-group interventions (Slavin, Lake, Davis, & Madden, 2011).

A program called **Reading Recovery** (Lyons, Pinnell, & DeFord, 1993) provides one-to-one tutoring from specially trained teachers to first-graders who are not reading adequately. This program has been found to bring most children placed at risk to adequate levels of performance and can have long-lasting positive effects. Reading Recovery is used in thousands of elementary schools in the United States, Canada, the United Kingdom, and other countries. Although there is little disagreement that Reading Recovery has a positive effect on the reading success of first-graders who are at risk (see May et al., 2015; Pinnell et al., 1994; Slavin, Lake, Davis, & Madden, 2011), there are conflicting findings on the maintenance of these gains beyond first grade. A major long-term evaluation of Reading Recovery in London found strong immediate effects that had faded away by the time the children were 10 years old (Hurry & Sylva, 2007). There have also been questions about the cost-effectiveness of Reading Recovery (Hiebert, 1996; Shanahan, 1998) and about whether positive effects for small numbers of first-graders represent the best use of limited funds for an entire age group of children (see Hiebert, 1996; Schacter, 2000). However, if you see Reading Recovery as a starting point for a series of interventions designed to get at-risk children off to a good start, rather than as a cure that lasts forever, then there is no question that it greatly improves reading performance at a critical period in children's development.

In addition to Reading Recovery, several other programs have successfully used certified teachers, paraprofessionals, and even well-trained and well-supervised volunteers to improve the reading achievement of first-graders (Morris et al., 2000; Slavin, Lake, Davis, & Madden, 2011). A phonetic tutoring program called Reading Rescue has produced substantially better outcomes for first-graders than either a small-group remedial program or no intervention (Ehri, Dreyer,

THEORY INTO PRACTICE

Effectively Using Peer Tutoring Methods to Meet Individual Needs

Peer tutoring is an effective way to improve learning for both tutee and tutor, and no one doubts the value of this strategy for meeting individual needs within a classroom. However, it takes more than simply pairing off students for peer tutoring to result in improved learning.

To establish a tutoring program, recognize that specific skills need to be developed in both the tutors and the tutees. Whether the tutors are same-age peers, older students, or even adults, use care in selecting tutors. Consider not only the knowledge base of the tutors (i.e., their proven proficiency with the subject matter) but also their ability to convey knowledge clearly.

Typically, training will include basic instruction in modeling, prompting responses from tutees, using corrective feedback and praise/reinforcement, alternating teaching methods and materials (i.e., using multisensory methods), and recording and reporting progress. Students who receive tutoring need to be clear about their role in this process. It would be counterproductive to force any student into a tutorial relationship. Therefore, initially select only students who express a willingness to work with a tutor. Steadily make tutoring a part of the natural learning activities within a classroom or an entire school. Tutees and tutors should understand that the goal of the activity is to have each tutee reach a clear understanding of the concepts, not merely complete an assignment. To augment the preparation, you might want to use various role-playing activities during the training process. Demonstrate appropriate forms of instruction, feedback, reinforcement, and so on; then allow the participants to practice under supervised conditions. Corrective feedback within this controlled environment will allow you to feel more confident as the tutor-tutee pairs work together without your direct supervision.

Flugman, & Gross, 2007). An Australian program that used a combination of curricular reform, Reading Recovery tutoring, family support, and other elements showed significant effects on first-graders' reading performance (Crévola & Hill, 1998). A follow-up of a tutoring program for second- and third-graders found lasting effects on some reading measures eleven years later (Blachman et al., 2014).

One-to-one tutoring is nearly always very effective, and tutoring models that use structured phonetic methods are much more effective than other tutoring methods (Blachman et al., 2004; Brown, Morris, & Fields, 2005; Ehri et al., 2007; Slavin et al., 2011; Wanzek et al., 2013). Programs that supplement one-to-one or small-group tutoring by paraprofessionals with specially designed computerized content are particularly effective (Chambers et al., 2008, 2011; Madden & Slavin, 2015). Phonetic programs delivered by paraprofessionals with or without computers are almost as effective as tutoring given by certified teachers (Jenkins, Peyton, Sanders, & Vadasy, 2004; Markovitz et al., 2014; Vadasy, Sanders, & Tudor, 2007). Smaller positive effects have been found in studies of phonetic tutoring to groups of three to eight children (Hempenstall, 2008; Mathes et al., 2003, 2005).

Volunteers can be effective as tutors, but effects are smaller than those achieved with paraprofessionals (Jacob, Armstrong, & Willard, 2015; Morrow-Howell et al., 2009). A lot of time is required for the recruitment, training, and supervision of volunteers, but using them may help build community connections. Tutoring by adults, both individually and in groups of two or three, has also been found to be effective for primary-age students struggling in math (Fuchs et al., 2008).

Certification Pointer

For your teacher certification test, you will probably need to demonstrate your understanding of appropriate applications of cross-age tutoring. For example, you might be asked to identify the curricular goals for which cross-age tutoring would be appropriate, and how you would structure the tutoring so that it would be effective.