Judith E. Rink

Teaching
Physical Education
for Learning

EIGHTH EDITION

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EIGHT EDITION

Teaching Physical Education

FOR LEARNING

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McGraw Hill Education

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TEACHING PHYSICAL EDUCATION FOR LEARNING, EIGHTH EDITION

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For my mother, Eleanor

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Preface

The lack of physical activity of children and youth has created a major health problem in the United States and in many countries around the world. Physical education programs have been given the responsibility to develop the skills, knowledge, and dispositions to prepare students for a lifetime of physical activity. Preparing students for a lifetime of physical activity is quite different from providing physical activity. If our job was to just provide physical activity, it would be relatively easy. If we are to ensure that students are active outside the school setting and as adults, physical education programs must carefully select what they teach and will need to teach that content effectively.

The focus of *Teaching Physical Education for Learning* is on the generic instructional skills teachers need to be effective in producing student learning. Teaching is a process that is both interactive and context specific. Teachers need the technical skills of teaching and need to apply them situationally to different content and to different student needs. In a sense that means that teaching skills are *necessary but not sufficient* to be an effective teacher.

While all educational programs have a responsibility for educational outcomes in the cognitive and affective domains of learning, the unique content of physical education is the development of motor skills and physical abilities. Recent research has documented the critical relationships that exist between motor skill abilities, particularly those fundamental skills that are the foundation of more complex motor skills, and levels of physical activity and fitness. To that end a major focus of this text is on the development of those skills.

While our understanding of basic instructional skills essential for effective teaching has not changed, all chapters in the text have been revised and updated to reflect changes in the national standards and the increased emphasis on developing skills for lifetime physical activity.

■ ORGANIZATION

The target audience for this text is the student who is learning to be a physical education teacher with the understanding that learning to be a teacher begins with understanding teaching as a process of selecting goals and designing educational experiences consistent with how students learn to help other students achieve those goals. The first two chapters are designed to develop these understandings and knowledge.

The second part of this text is organized by those instructional skills essential for effective teaching including designing learning tasks, presenting tasks, developing content, teaching during activity, teaching strategies, student motivation, planning, and assessment. These are the key chapters in the text.

The last part of the text introduces the idea of content-specific pedagogy and is followed by chapters that will help the teacher evaluate instructional skills and learn to observe both students and teaching. While basic instructional skills are generic and are applicable to all content areas, there is another body of knowledge that is content with pedagogical knowledge that is introduced briefly with some key ideas in the last section of this text but not made to be inclusive.

■ SUCCESSFUL FEATURES AND SUPPLEMENTS

Each chapter begins with an overview that sets the stage for the importance of the chapter. Chapters conclude with a summary of key ideas of the chapter and, questions designed to check student understanding of the materials, and references. The website that accompanies *Teaching Physical Education for Learning* includes an instructor's manual that provides some suggestions for using the chapter and describes student learning experiences that can be used to make sure that students can use the material in the chapter. It also includes a test bank of short-answer questions for the instructor, as well as PowerPoint presentations for each of the chapters.

The latest edition of *Moving into the Future: National Content Standards for Physical Education* can be packaged with *Teaching Physical Education for Learning* at the instructor's request. This resource is an ideal accompaniment for the text, as the standards define learning outcomes for effective teaching.

■ ACADEMIC REVIEWERS

I am indebted to the many friends, colleagues, and students with whom I have worked over the years. They are a continuous source of support and challenge for me and have played a major role in the development and growth of this text over the years. I am grateful to the reviewers who have challenged me to continue to make this text a better source for new generations of teachers.

Reviewers for this edition include:

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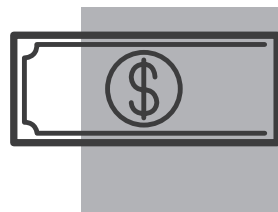
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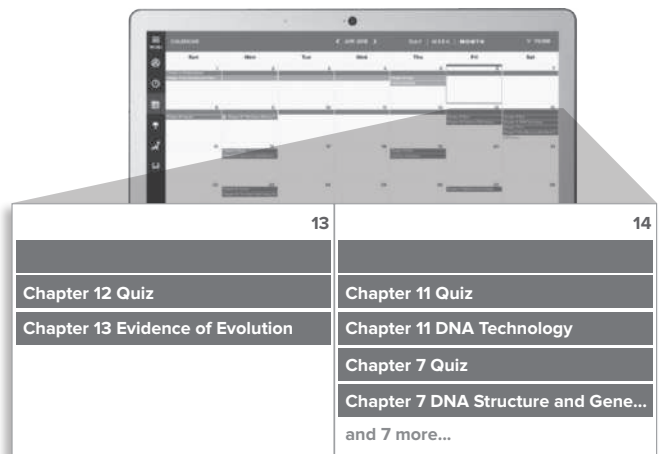
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	Chapter 7 Quiz
	Chapter 7 DNA Structure and Gene...
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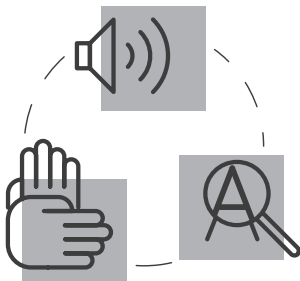
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Teaching
Physical Education:
An Orientation

OVERVIEW

Teaching can be viewed from many perspectives. The perspective teachers take when they look at the teaching-learning process determines what they will look at in that process and how they will look at it. Perspectives are important because they cause the teacher to see things in certain ways. This chapter establishes a perspective for this text. It is an overview on the purposes of physical education and on the instructional process, which other chapters in the text are developed.

CHAPTER 1 OUTLINE

- Teaching as a goal-oriented activity
  - Types of Goals
  - Establishing Realistic Goals
  - Choosing Instructional Processes to Meet Goals
  - Achieving Goals Through Processes
- Understanding the instructional process
  - Prelesson and Postlesson Routines
  - Movement Task–Student Response Unit of Analysis
  - Teaching Functions
  - Management and Content Behavior
- Value positions and beliefs in teaching
  - Personal Characteristics of a Teacher

The major purpose of physical education programs is to give students the skills, knowledge, and dispositions to lead a physically active life. In March 2015, the Society for Health and Physical Education (SHAPE America) launched the 50 Million Strong initiative to prepare all children to lead active and healthy lives. SHAPE America is the professional organization that represents physical educators nationally. The major goal of this initiative is that by 2029, all students (preK-12) will participate in at least 60 minutes of physical activity 7 days/ week that increases their heart rate enough to breathe hard at least some of the time. In 2014, only 27.1% of children were reaching this goal (CDC, 2015). Children who are physically literate have the ability, confidence, and desire to be physically active for life. At no time has this been more important to the health and well-being of our youth. This is the challenge of our profession.

The national standards for physical education (box 1.1) have been used extensively by states and local districts to articulate program goals related to this purpose. The five standards describe the skills, knowledge, and dispositions students will need to be physically literate and lead a physically active lifestyle. Each of the standards is broken down by grade level so teachers can identify what students at each age should know and be able to do. You will be expected to teach the standards to your students.

In order for you to be an effective teacher of these standards, you will need to develop the skills of an effective teacher. Table 1.1 lists the beginning teaching standards developed by SHAPE America (2017) that you

National Standards for K-12 Physical Education

Standard 1: The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.

Standard 2: The physically literate individual applies knowledge of concepts, principles, strategies, and tactics related to movement and performance.

Standard 3: The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.

Standard 4: The physically literate individual exhibits responsible personal and social behavior that respects self and others.

Standard 5: The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression, and/or social interaction.

Source: National Standards for K-12 Physical Education, SHAPE AMERICA – Society of Health and Physical Educators.

will be expected to acquire before you are certified to teach. Each chapter in this text addresses one or more of these standards. These standards are used to assess teacher preparation programs in physical education. A good teacher preparation program should give you the opportunity to develop these skills and technically should not let you graduate unless you have acquired the expected skills, knowledge, and dispositions. It is up to you to take advantage of the opportunities provided to you. For many college students, this requires a change in perspective from an *other-directedness* to a *self-directedness*. You will mature as a professional as you begin to want to learn as much as you can as a pre-service teacher and do the best job that you can because of your commitment to providing students with the best possible experience, not because someone else is requiring you to do something to develop these abilities.

Although it is reasonable for beginning teachers to learn a lot during their first few years from experience, it is not reasonable to expect that you will acquire these skills independently by practice alone. The college and university setting has the resources to help you acquire these skills, and during your initial preparation to be a teacher is the time that you should be working hard to develop these skills. Most people who decide to teach physical education do so because they are good at it, have enjoyed their past experiences with sport and physical education, and like to work with people. These are good reasons to choose

a profession. Because engaging in sport and physical activity is fun for most people, a misconception often exists that teaching physical education is easy, or at least easier than teaching any other content. Teaching physical education can be exciting, rewarding, and fun, but to do it effectively is not easy. Teaching is a complex activity. Its goal is student learning. The teacher has primary responsibility for directing the teaching-learning process. This is why teaching can become difficult. If a student is not learning, the teacher must find an effective way to reach this student.

There are many types of students and many types of skills, knowledges, and values that teachers will want to teach. Finding ways to reach objectives for learning with all students is a real challenge. Teaching is not an exact science. Teachers need to design and redesign experiences for their students based on their pedagogic goals and their knowledge of the learner, the lesson content, and the teaching-learning process.

Although teachers in schools play many roles other than instructing in a physical education class, *Teaching Physical Education for Learning* is primarily a text on instructional processes and the teaching skills required to execute those processes effectively, that is, what teachers can do to help students learn what teachers want them to learn. Several key ideas will be reinforced throughout this text. The first is that instruction is a *goal-oriented activity*. This means that the process is meaningless unless it is designed with a clear goal regarding what the student

TABLE 1.1

Beginning Teacher Standards

National Standards

For Initial Physical Education Teacher Education (2017)

SHAPE America—Society of Health and Physical Educators

Standard 1: Scientific and Theoretical Knowledge

Physical education teacher candidates know and apply discipline-specific scientific and theoretical concepts critical to the development of physically educated individuals.

Standard 2: Skill-Based and Fitness-Based Competence

Physical education teacher candidates are physically educated individuals with the knowledge and skills necessary to demonstrate competent movement performance and health-enhancing fitness as delineated in SHAPE America's K-12 Standards

Standard 3: Planning and Implementation.

Physical education teacher candidates plan and implement developmentally appropriate learning experiences aligned with local, state and national standards to address the diverse needs of all students.

Standard 4: Instructional Delivery and Management.

Physical education teacher candidates use effective communication and pedagogical skills and strategies to enhance student engagement and learning.

Standard 5: Impact on Student Learning

Physical education teacher candidates utilize assessments and reflection to foster student learning and to inform instructional decisions.

Standard 6: Professionalism

Physical Education teacher candidates demonstrate dispositions essential to becoming effective professionals.

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will learn. You will be asked to articulate what you want learners to learn as a result of what you do as a teacher.

The second key idea is that *instructional processes are specific to an intent*. This means that you select an instructional process to best accomplish a specific purpose. For instance, a teacher may decide to lead students through a problem-solving experience while teaching balance to help them understand principles related to base of support. The teacher selects *problem solving* as the instructional process rather than *telling* because the teacher's intent is not only that students know the information but that they are able to use this information in their balance activities. If you want students to lead a physically active lifestyle outside of your class and as adults, you will teach differently than if you want them only to know that physical activity is good for them. It is important for teachers to choose instructional processes appropriate to their goals. To do this, teachers must have a clear idea of what they want students to be able to do, and they must be able to implement instructional processes effectively for a given activity and group of students. This chapter explains the basic framework of the instructional process in physical education and identifies the skills needed to operate successfully within this framework.

■ TEACHING AS A GOAL-ORIENTED ACTIVITY

Instruction is guided by a long-term plan for student outcomes called the *curriculum*. When curricular decisions are not made or used to guide instruction, the instructional process is like a moving car without a destination. For this reason, curriculum and instruction are integrally related. Teaching as a goal-oriented activity begins at the curricular level. Many curricular decisions in today's educational climate are being determined by content standards described earlier.

Physical educators must explain and defend their role and program in the schools. Physical education programs are expensive in the facilities, equipment, and personnel they require. Growing opportunities for students to participate in sport activities outside the schools have caused educators, administrators, and taxpayers to view with uncertainty the contributions

of physical education programs to the overall educational picture. Research done by physical educators on the attitudes of secondary students toward physical education (and the products and processes of physical education programs) largely confirms the discrepancy between what physical educators promise and what they produce. Many physical education programs are not defensible. Lack of accountability for program goals in the schools has resulted in many poor programs of physical education: those without identifiable or defensible goals and programs that bear no relation to their stated goals. If physical education is to attain credibility as a truly educational program, the relationship between curriculum and instruction must be clearly defined and programs must be oriented toward clearly stated goals. The contrast between two elementary and secondary programs is made clear in box 1.2 (see p. 4), which describes two different programs, one defensible and one not defensible. Read the example and see if you can identify what it is that makes a program defensible.

Types of Goals

Educational program outcomes are commonly called **goals** when they refer to broad outcomes and **objectives** when they refer to more specific outcomes. Whereas curriculum objectives and, more recently, the national standards (box 1.1) usually define what the student should achieve as result of an entire program, instructional objectives usually describe what the student should achieve as a result of a single lesson or unit of instruction. Educational goals and objectives are used for both curriculum and instruction. They are usually classified under one of three interrelated categories according to the domain of learning that characterizes that particular goal or objective: psychomotor, cognitive, or affective. As you review the national standards, you should be able to identify which of the standards address which domain (figure 1.1).

Goals and objectives that deal with motor and physical abilities are termed **psychomotor objectives**. Standard 1 (box 1.1) is directly related to the psychomotor content of physical education. Psychomotor outcomes are the unique contribution of physical

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B O X 1 . 2

Defensible and Not Defensible Programs

Elementary—Defensible

The teacher has planned the day's lesson with psychomotor, cognitive, and affective objectives from a written plan that describes what the learning objectives for the day will be and how the lesson will proceed. The second-grade class will be working on combining locomotor patterns. Opportunities to practice the skills separately and then combine them are provided. The teacher also has planned to have each student develop a personal routine that will be shared with a partner and assessed using peer review.

Elementary—Not defensible

The teacher decides on the way to work: the second-grade class really likes to play with the parachute, so that is what the class will do today. The teacher thinks of all the fun things that the students like to do with parachutes and writes them down when he or she gets to work.

Secondary—Defensible

The teacher is teaching a unit on volleyball. The teacher has carefully planned the unit so that each day students work on some aspect of their skill development that they have decided, with the teacher, is a weakness. Each part of every day is also devoted to some gamelike or game play. At the end of each class the teacher and the students assess their play and skill and make a decision about what needs the most attention. The teacher plans the next lesson to work on those aspects of play that need attention.

Secondary—Not defensible

The teacher has been working on a unit in volleyball. The first day of the unit the teacher presented all of the skills of volleyball and is running a tournament for the rest of the unit. Some students are better than others, but the students really don't like to practice the skills. The teacher has decided that his/her role is primarily to keep the peace during play and to help the students deal with conflict that emerges on an individual basis.

Psychomotor Domain	Affective Domain
Motor Skills Fitness Outcomes	Feelings Values Social Behavior Attitudes

Cognitive Domain
Knowledge Strategies Tactics Cognitive Abilities
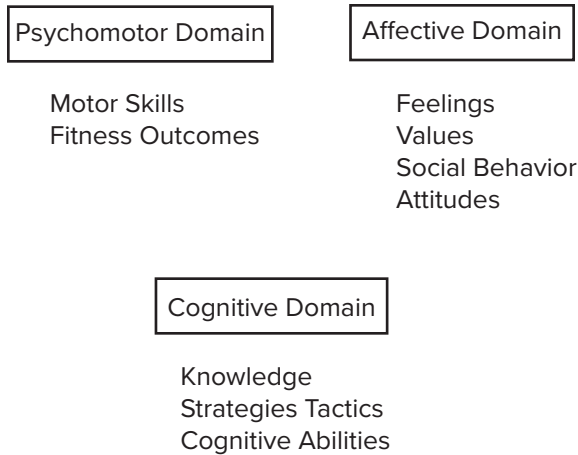
FIGURE 1.1
Physical education has responsibility for all domains of learning.

education to the education of the students. No other educational program emphasizes psychomotor objectives the way physical education does. Psychomotor objectives include motor skill objectives such as teaching fundamental skills (e.g., skipping, throwing, or rolling) or the complex skills required for sports (e.g., the basketball layup or back handspring). Psychomotor objectives also include fitness outcomes (e.g., arm strength, cardiorespiratory endurance, and flexibility). A psychomotor goal might be to play basketball at an intermediate level of ability or to reach a particular level of ability on a fitness test.

Cognitive objectives describe knowledge or ability levels in processing information. The national standards that are related to this outcome are primarily "standard 2 and standard 3." The physically literate individual applies knowledge of concepts, principles, strategies, and tactics related to movement and performance and the physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. Many aspects of performance in the psychomotor and affective domains (discussed next) are related to cognitive abilities that must be developed as well. Cognitive goals and objectives are intellectual and thinking related. They include

outcomes related to knowledge students should have (e.g., how to develop joint flexibility) and outcomes related to problem solving and creativity or the transfer of knowledge from one situation to another (e.g., how to apply zone defense to a six-on-six soccer game).

Affective objectives describe student feelings, attitudes, values, and social behaviors. The national standards directly related to affective outcomes are Standard 4: The physically literate individual exhibits responsible personal and social behavior that respects self and others and Standard 5: The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression, and/or social interaction. Objectives teachers have related to student feelings, attitudes, values, and social behaviors are affective objectives. A major goal of physical education is to prepare students for a lifetime of physical activity. Unless teachers address affective goals in their programs, students may be skilled and may even be knowledgeable but may choose not to participate.

Unlike sport programs outside the school, physical education also shares many cognitive and affective goals with all educational programs within a school. The teacher in physical education often has psychomotor, cognitive, and affective objectives in one lesson. Physical educators should help students to be thinking, caring, and sharing individuals. Lessons

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Physical education should prepare students for a life of physical activity.

that in part teach working productively with a partner, fair play, independent learning skills, and positive self-regard have objectives classified as affective. Chapter 9 in this text addresses these issues.

Chapter 10, "Planning," describes in detail how teachers can write goals and objectives for different purposes when planning both curriculum and instruction. At this point it is important to recognize that educational goals are concerned with each dimension of human development.

Establishing Realistic Goals

If the relationship between curriculum and instruction is to be maintained, the curriculum goals and objectives established must be appropriate to the instructional situation. Instructional programs cannot be conducted in a manner consistent with established goals if the goals set are hopelessly unattainable. Selecting realistic goals for a program is difficult in physical education. The field has the potential to contribute in many ways to educational goals and objectives. Physical educators can use active learning and physical activity to make major contributions to all domains of learning, and that makes it difficult to define our responsibility. Designating realistic goals has been a major problem for many programs. Physical educators for the most part have tried to be all things to all people. As a result, they have tended to accomplish little. For example, a representative high school curriculum guide for the ninth grade might list the following goals:

- Develop and maintain fitness.
- Develop skills for participation in six team sports, four individual sports, gymnastics, and dance.
- Teach students how to value themselves and interact with others in positive ways.
- Teach students how to be independent learners and problem solvers.
- Develop skills, attitudes, and knowledge related to participation in physical activity that will transfer to new skills and encourage lifetime participation.

If students in this ninth grade have physical education class two times a week, it should be apparent that even the first goal of fitness is not attainable within the confines of the assigned class time. If the sport, gymnastics, and dance objectives are divided by the time normally available in a school year, the extent of the problem becomes apparent. Each sport would have less than two weeks of program time. Enough time is not available to successfully complete even the simplest of the stated goals. The goals listed in this curriculum are worthwhile. Teachers should be setting their goals high. However, had the designers of this curriculum considered the instructional process needed to reach their goals, they would have realized that the goals stated were not attainable in the time allotted.

To attempt to meet all of these goals in one program can result only in accomplishing none of them, because the students need adequate time to experience any degree of success. The goals established for any program must be realistic to their setting, which often means that the teacher must choose between many worthwhile goals.

More realistic skill and fitness goals for this ninth-grade setting might have included the following:

- Students should be able to design personal goals for fitness with the help of the instructor and meet those goals by the end of the school year through a personal fitness program.
- Students should be able to attain a participant level of competency in one team sport and one individual activity of their choice.
- Students should be able to design and safely conduct a personal weight-training program.
- Students should participate on a regular basis in an activity of their choice outside of the physical education class for at least six weeks.

Choosing Instructional Processes to Meet Goals

Once the teacher has chosen goals and has translated those goals into objectives for instruction, the teacher must choose instructional processes that can

reach a specific objective. What should be clear from the ninth grade goals above is that the teacher will need to plan learning experiences that prepare the student to participate both in developing fitness and participating in activity outside of the physical education class. Instructional experiences and processes are chosen intentionally to reach specific goals. Although more occurs in classes than is intended, teaching processes are designed to be specific to their desired learning outcomes. It is impossible to discuss what to do or what is good instruction without discussing what the teacher hopes to accomplish.

One of the best examples of the specificity of teaching processes to desired outcomes occurs in the area of fitness. Fitness is developed only when certain criteria for workload, duration of activity, and intensity are met. The type of exercise is specific to the type of fitness desired (e.g., strength, muscular endurance, flexibility, or cardiorespiratory endurance). Most activities that develop strength do not also develop flexibility. The type of fitness is specific not only to the type of exercise but also to a muscle group.

Criteria for teaching processes involved in learning motor skills objectives are not as neatly defined as those for fitness, but they are beginning to emerge in the literature. Open motor skills (those that take place in changing environments, such as the basketball layup shot) require different processes from closed skills (those that take place in more stable environments, such as archery). Teaching for transfer of learning from one skill to another requires a different process from teaching that does not intend transfer. All motor skill learning involves processes that require consideration of certain prerequisites for learning, such as the amount and type of information students need, practice, and feedback that learners at different levels of development need.

Processes and criteria for meeting affective and cognitive objectives in physical education are not neatly packaged but are as specific as those for other areas. Physical educators have traditionally assumed that if learners are engaged in creative experiences, creative learning is occurring. They have assumed that learners engaged in social interaction with others are developing positive social interaction skills and that learners engaged in team sports will develop sportsmanship and self-discipline. Teachers have come to realize that merely engaging in an experience that has the *potential* to make a positive contribution to affective or cognitive goals does not ensure that these goals are met. Learning experiences must be designed and developed for specific outcomes: *What is not taught often is not learned*. Fair play, independent learning skills, problem solving, positive social interaction, and the development of positive self-concepts require specific conditions and processes. These goals should be designated, planned for, taught, and assessed, as with other kinds of content goals.

Achieving Goals Through Processes

Teachers can achieve psychomotor goals and objectives directly by teaching movement content. Physical educators can teach basketball, jumping, dance, or swimming by providing carefully planned and conducted experiences in basketball, jumping, dance, or swimming. A more difficult question concerns how the educator teaches creativity, positive self-concept, positive social interaction skills, love of activity, or fair play.

Sometimes a teacher might put the primary emphasis of a lesson on developing student

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Instilling a love of activity in students is a primary objective of the physical education program.

cooperative behavior or creativity through physical activity. A teacher might also plan an entire lesson using physical education content to teach a moral value or to positively contribute to the self-concept of students. Most often these affective concerns are taught in conjunction with psychomotor or fitness skill development. The teacher chooses a way to develop the lesson with students so that more than a psychomotor emphasis becomes the focus of the lesson. This means that although the primary content might be the basketball layup shot (and we design experiences to best teach the basketball layup shot), how the teacher goes about teaching this skill contributes a great deal to affective and cognitive goals. How students feel about basketball, themselves, and others; their knowledge of basketball; and their abilities to work independently, think creatively, and problem solve are all affected by the process the teacher chooses to teach the layup shot. If teaching the basketball layup were the only objective, teaching would be easy, or at least easier.

A teacher's goals must be more inclusive. Although no teacher would intentionally teach for negative affect in class, in many classes affective goals and cognitive goals related to learning activity are ignored. Teacher decision making in the instructional process is affected by the complex interrelationship between what to teach (content) and how to teach it (process). The two are not easily separated. The teaching process a teacher uses results in products many times not intended. Effective teachers choose processes because they are aware of the potential contributions of those processes to their comprehensive goals.

Little research has been done that links different pedagogic processes to specific affective and cognitive outcomes because of the difficulty of measuring such elusive and long-term products of instruction. Teachers, however, should be objective in assessing all the outcomes of their teaching. This necessarily includes affective and cognitive goals. Until teachers have a better understanding of the contribution of different instructional processes to these important outcomes, they must make informed decisions regarding teaching and carefully observe the products of these processes.

■ UNDERSTANDING THE INSTRUCTIONAL PROCESS

It is helpful in designing and implementing successful instructional programs to understand instruction as a process that involves both teacher and students in a highly interrelated set of events. If someone asked what happened in gym class today, how would what the teacher and students did be described? An example of a high school class described in observable events is shown in box 1.3. Many of

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B O X   1 . 3

Sample Secondary Lesson

- A bell rings. Students go to the locker room and gradually come into the gym after changing clothes and putting up their book bags and clothes they have brought with them.
- Some students remain on the fringes of the gym, talking with each other. Others begin playing with the balls.
- After a few minutes, the teacher asks the students to form squads. One student from each squad checks attendance and preparation for class and then gives the squad card to the teacher.
- The teacher asks for student attention and gives an overview of the day's lesson. After the over- view, the teacher describes and demonstrates a new skill to students. The teacher explains how the skill will be practiced and asks that students go to their area of the gym to practice. Students begin practicing.
- While students are practicing, the teacher observes the students' work, provides help to individuals, and occasionally stops the whole class to offer help on performance.
- The teacher asks one student to stop fooling around and get serious about the task.
- After students have had sufficient time for practice, the teacher calls the group together and asks the students to begin practicing the skill with a partner.
- The class puts the extra balls away, organizes into partners, and begins practicing the new task.
- The teacher resumes helping students with the task— sometimes individually and sometimes as a class.

you will find this example consistent with your own experiences.

Not all physical education lessons fit the description given. However, many physical education lessons share aspects of this record. First, "getting ready" and "ending" routines frequently stand apart from the lesson of the day. There are identifiable times when the lesson begins in earnest and when it ends. Second, there is usually a recurring series of events in which the teacher presents a movement task to the students, the students respond to that task, and the teacher observes and tries to improve performance. Third, two kinds of behavior and/or events are commonly present: (1) those that arrange or manage the environment in which the lesson is taught; and (2) those that work directly on the lesson content. Each of these aspects of instruction is described in the following pages.

Prelesson and Postlesson Routines

In most elementary classes, **prelesson** and **postlesson routines** are not as elaborate as in the secondary school. Elementary children usually do not have to put their books and clothes they carry with them in lockers, or change clothes for class, and taking attendance is sometimes not necessary. Lessons begin almost immediately. In instructional classes at the secondary level, however, teachers are required to perform tasks before class, such as checking attendance and determining whether the students are prepared for class. Usually this time is used also for announcements concerning after-school programs and events. In some cases, after-class routines include such duties as checking showers. Prelesson and postlesson routines should be accomplished in the least possible amount of time. Time used for these routines is time taken away from the lesson. If dressing and showering are necessary, time must be allotted for students to accomplish these tasks. If the tasks for a lesson do not require dressing before or a shower after, teachers can cut down or eliminate locker room time. Having something attractive for students to do when they get out of the locker room is another way to reduce time students spend in the locker room.

Movement Task–Student Response Unit of Analysis

Instruction in physical education technically begins when "getting ready" routines end. After the **set induction** of a class in which the teacher orients the class to what is to happen in the class for the day and why, the teacher will usually present a series of tasks that the students respond to with a movement response. This interaction unit of the teacher instructional task and the student response to that task helps us to describe the process of instruction in physical education. This cycle of events is described in figure 1.2.

The instructional task. At the heart of the instructional process in physical education is the **instructional task.** Instructional tasks in physical education are usually but not always movement tasks. Movement tasks are motor activities assigned to the student that are related to the content of the lesson. The teacher directive to "practice the volleyball set to yourself until you can do it three times in a row without moving out of your place" is an instructional task. "We're going to play keep-it-up in groups of six to see how long you can keep the volleyball up in the air using sets only" is also an instructional task. Instructional tasks are content. They are learning activities defined by the teacher either in an explicit (direct) or

Presentation of task
Organizational arrangements for task
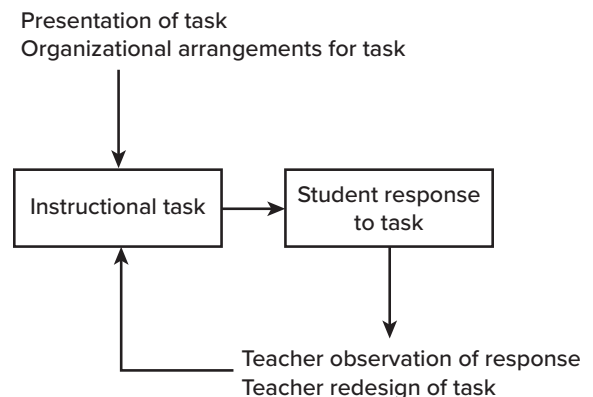
FIGURE 1.2
Instructional task–student response to task.

implicit (indirect) way. An observer should be able to watch a physical education lesson and identify "what the teacher asked students to do." In lessons taught by effective teachers, students should be able to identify rather specifically what they should be working on at any point in the lesson.

Teachers design instructional tasks as a progression of experiences to meet their objectives. Instructional tasks do not necessarily have to be communicated directly by the teacher, although they usually are. Task cards, other students, media, or all three can communicate tasks.

Organizational arrangements. In group instruction, not only must tasks be communicated, but the arrangements for practicing the tasks must also be communicated. Teachers must organize people, space, time (for practice), and equipment (when appropriate). They also should establish procedures for these organizational arrangements—how students will get equipment, how they will organize into groups, and how the space will be divided among students for practice. This is discussed in greater depth in chapter 3.

Student response. After the teacher has given students the signal to begin working on a task, student practice or work with the task begins. Once the students have begun to practice the instructional task, a major responsibility of the teacher is to observe and provide feedback to students on their performance, either individually or as a group. Initially when work begins on a task, the teacher is observing to see that the environment is safe, that students are working on the task, and that students have interpreted the task correctly. The teacher then must assess the responses of the student to the task to determine an appropriate next teaching move.

Many teachers may find that as a result of their observations of student responses, they must restate or clarify the task, handle organizational or safety problems, motivate the students, and maintain on-task behavior during student response time. Teachers select the next step in the lesson after assessing student performance on the previous task. Sometimes the next step is an entirely unrelated task (e.g., moving from the volleyball set to the serve), but most often the appropriate next step is to provide the students with additional information and an additional task focus to help them (1) improve the performance of the tasks they are currently working on, (2) increase the level of complexity or difficulty of the task, or (3) assess their ability in a self-testing or competitive situation. If a task with a new focus is assigned, the instructional task–student response cycle begins again. This process is called **content development** and is discussed in chapter 5.

Teaching Functions

Each instructional event in the sample secondary lesson (see box 1.3, p. 8) can be described in terms

Teachers play many different roles.

Courtesy of Judith Rink

of its contribution to the instructional task (box 1.4). Because the instructional tasks and the events (both direct and indirect) associated with them are so critical to the instructional process, many teaching skills are associated with this unit of interaction. We can begin to describe teaching behavior in terms of the function that teacher behavior performs in the teaching-learning process (box 1.5).

The chapters of this text are organized primarily by the concept of **teaching functions**. Many of the chapters are designed to consider each of these teaching functions separately. The concept of teaching functions is a useful concept because it allows us to focus on the purpose of a teaching behavior rather than on the specific behavior. Teachers can effectively perform a teaching function in many appropriate ways. We cannot prescribe the specific way in which teachers should perform a function. Teachers must choose how they will implement a lesson based on their pedagogic intent, their knowledge of the student, and their own skills and characteristics. Although specific behaviors are not prescribed, criteria for these functions that are general principles can be established (e.g., a good task presentation lets the students understand task requirements, practice arrangements, and goals). Guidelines can also be established for specific situations (e.g., beginning learners are not able to use specific information on motor skills and must be provided with more holistic descriptions of the tasks to be performed).

Guidelines and general principles are used appropriately when they are adapted to the specific context in which they are used.

When teachers perform teaching functions, they exhibit specific behaviors and employ specific methods. For example, a teacher might use demonstration, explanation, task cards, video, or other media to present a task to learners. Even though specific methods of presenting task behaviors or methods for individual teachers cannot be prescribed, the competency and appropriateness of teacher performance in using any of these methods of task presentation can be evaluated. Did the teacher describe or demonstrate the skill accurately? Was the level of presentation appropriate to the age and ability level of the students? Was the media selected appropriate and accurate? At the level of specific behavior, guidelines of appropriateness and competency can again be established.

In summary, teachers must perform particular functions essential for effective instruction. They can perform these functions in many ways and still be effective. We can evaluate the extent to which teachers adequately perform a function and, to some extent, the adequacy and appropriateness of their choice. Teachers decide what and how they will teach based on what they know, what they believe, and their unique personality, skills, and interests. This text is designed to increase the teacher's awareness of the factors involved (and the criteria that need to be considered)

B O X   1 . 4

Contribution of Instructional Events to Movement Tasks

Teacher behavior	Contribution to the task
Gives an overview of the lesson	Develops a learning set and motivation for students to engage in the movement tasks of the lesson
Describes a new skill	Helps students get a clear idea of the task and what they will be trying to do
Describes how students will be practicing the skill	Arranges the environment for the task (equipment, space, and people)
Moves from student to student	Provides information on performance of the movement task and makes suggestions on how to improve performance
Asks a student to stop fooling around	Maintains on-task behavior

Teacher Functions in the Teaching-Learning Process

Identifying outcomes: Identify learning goals and objectives. For example, the teacher identifies the learning goal "Change direction with a variety of locomotor patterns."

Planning: Design and sequence appropriate learning experiences and tasks to meet the identified goals. For example, the teacher sequences tasks that begin with defining different directions and then having students explore different directions with different locomotor patterns.

Presenting tasks: Present and communicate these tasks effectively so that students have a clear idea of what they are being asked to do and are motivated to do it. The teacher says, "This is moving forward. Who can show me a different direction?" (student demonstration). Can anyone think of another different direction?"

Organizing and managing the learning environment: Arrange and maintain the learning environment that maximally motivates student practice of the task. The teacher asks students to find a personal space and at his or her signal to try traveling in different directions.

Monitoring the learning environment: Provide students with feedback on their performance through accurate assessment of student performance in relation to the task. For example, the teacher says, "I see a lot of forward and backward."

Developing the content: Modify and develop the task further based on student responses to the task. The teacher says, "I see a lot of forward and backward, can you try moving sideways too?"

Assessing student performance: Determine the extent to which students meet objectives. At the end of the unit on locomotor skills, the teacher evaluates the ability of the student to use a variety of motor skills moving in different directions.

Evaluating: Evaluate the effectiveness of the instructional process. For example, the teacher determines how effective the instructional process has been in terms of the number of students who are able to use a variety of locomotor patterns moving in different directions.

in performing teacher functions appropriately and competently.

Management and Content Behavior

Some of the teacher functions just described are directly related to the content of the lesson; the purpose of others is to arrange and maintain a learning environment in which the content may be learned. Transactions directly related to lesson content are called **content behaviors**; those that arrange and maintain the learning environment are called **management behaviors**.

Content behavior contributes directly to the instructional task. Management behavior contributes to the task only indirectly by creating the conditions for learning. Examples of both content and management behaviors from our sample secondary lesson 1.2 follow in box 1.3.

Content behaviors are important because they directly address the essence of the physical education lesson—the content—and contribute directly to the intended lesson outcome. If the lesson content is a cartwheel, the teacher communicates information on the cartwheel, directs students to do tasks related to the cartwheel, gives students information on how

Content Behaviors

- The teacher describes how the task is to be performed.
- Students engage in the task.
- The teacher helps students with the task.
- The teacher modifies and develops the original task.

Management Behaviors

- The teacher gives directions for arranging the equipment, people, and space before practice of the task begins.
- The students get the equipment and organize themselves into partners.
- The teacher asks a single student to stop fooling around.

they have performed the cartwheel, and makes suggestions to them on how to improve their performance.

Management behaviors are concerned with two types of problems: conduct and organization. Teachers manage when they structure, direct, or reinforce the appropriate behavior of students, such as taking turns, following directions, or being supportive of their classmates. They also manage when they structure, direct, or reinforce arrangements for people, time, space, and equipment for the practice of a movement task. One kind of management deals with the conduct of students and another with the organizational arrangements for the class. The teacher who says "Walk, don't run" or "You're working very hard today" is dealing with conduct. The teacher who says "Get your rackets and go to a court" or "Everybody stop what they are doing" is dealing with the organization of the class.

Management behaviors are important because they create the learning environment. Teachers want a learning environment that will support the learning of lesson content. They also want a learning environment that contributes in a positive way to how the students feel about themselves, others, and the content of the lesson. No matter how good a teacher is at selecting appropriate tasks, explaining tasks, or providing appropriate feedback, it is all for nothing if the environment does not support the lesson's short- and long-term goals.

Directing content-related experiences and establishing and maintaining a learning environment (both with an eye to the student successfully achieving intended lesson outcomes) are the two most important functions of a teacher in the instructional process.

■ VALUE POSITIONS AND BELIEFS IN TEACHING

The first part of this chapter introduced you to a lot of ideas related to the teaching-learning process, which will be developed throughout this text. You are taking your first steps to becoming a professional teacher.

Different teachers have different beliefs about teaching that affect how they teach. Beliefs in teaching commonly have their roots in theories of learning

in psychology and philosophy and are concerned with issues related to what is most important for schools to teach and how people best learn. These theories of learning and the teaching methodologies spawned from their roots are explored throughout the text but particularly in chapter 2. Although national standards and state and local standards establish guidelines for program objectives, as a physical education teacher, you will have to decide how much of your program you want to devote to teaching students higher-level thinking skills, personal interaction skills, fitness, or movement skills. You will have to decide whether your job is to make learners fit or to give them the skills to make themselves fit, or a combination of these ideas. These decisions and many more are related to the idea of what is most important for schools to teach. They are largely curriculum decisions but are also related to learning theory and how you think people best learn. Inherent in these views of teaching is a continual tension between beliefs that characterize the teaching process as manipulative and teacher directed and those that emphasize a more student-centered orientation to teaching. Research is not likely to prove one of these views right and the other wrong, because at the heart of the question are the long-term products of education and the values of the teacher.

Contrasting ideologies are often helpful when discussing theories but may do the practitioner a disservice. The practicing teacher has many kinds of goals that require different approaches for different students. Most teachers find themselves at different times using procedures borrowed from many different theories. The important thing is that teachers choose procedures with an eye to their effect on both long- and short-term teaching goals.

Sometimes contrasting theoretic positions make it difficult for teachers to get beyond the "I believe" stage. Beliefs are important in determining behavior. Beliefs uninformed by experience and knowledge can inhibit growth. Teachers must be careful not to defend what they do (what processes they employ) solely in terms of a set of beliefs and must be willing to discard beliefs that are no longer useful when evidence to the contrary is present.

Personal Characteristics of a Teacher

Each teacher is an individual with his or her abilities, personality traits, and likes and dislikes. Educators that people think of as good teachers in their own experience are often very different individuals. Some are quiet and reserved, and others are more aggressive; some display their feelings clearly, and others are more subtle.

Personality and individual teacher characteristics influence the way teachers perform instructional functions. What is common to good teaching is that good teachers perform teaching functions in ways consistent with their goals, particular students, and teaching environments. As a general principle, learners need accurate, appropriate information on

Teachers must be willing to learn new skills.

how to perform the task required. Some teachers use student demonstration, some demonstrate themselves, some walk their students through a task, and some use media or verbal description effectively. The selection of how to give students this information is not as important as the appropriateness and accuracy of the information and the effectiveness of the communication.

Teachers will likewise motivate students in different ways. Some teachers write poems about how enjoyable the activity will be, some show films that show the end product, and some are so enthusiastic about what they are teaching that their enthusiasm infects the students. How the teacher chooses to motivate his or her students is less important than that the students have been successfully motivated.

Teachers are free to be themselves within the structure of required instructional functions. Teachers are not free to say, "It's just not me to try to motivate students or provide feedback, to take time to communicate clearly, or to establish a productive learning environment." Other teachers may be able to tolerate high levels of off-task behavior or noise in their gymnasiums, but successful learning cannot occur under these conditions. The instructional functions described in box 1.5 (p. 12) provide the minimal structure necessary for successful learning to occur.

Within the structure of these functions, teachers are free to use behaviors that satisfy personal concerns (e.g., a preference for a particular approach to learning) as long as these concerns facilitate the goal of education, which is successful learning. The effective delivery of instructional functions is not optional. These functions are necessary for successful learning and cannot be set aside for personal reasons. Attention to the psychomotor, affective, and cognitive goals of a lesson will facilitate the selection of techniques appropriate to the student and the situation, whatever the pedagogic orientation or personality the teacher chooses to use to enhance the learning process.

The chapters that follow in this part of the text are designed to fully explore the teacher functions described. Criteria are developed in terms of how the function must be performed if learning is to occur.

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SUMMARY

1. The goal of teaching is student learning.
2. Instruction is guided by curricular goals.
3. Goals and objectives are designed in three learning domains: psychomotor, cognitive, and affective.
4. Goals should be set realistically if they are to be useful.
5. Instructional processes are selected to meet specific instructional goals and objectives—they are specific to an intent.
6. Many teaching outcomes are the result of not only what is taught (content) but how it is taught (process).
7. Good learning experiences meet four criteria:
   - Have the potential to improve motor performance/activity skills of the students
   - Provide maximal activity or practice time for all students at an appropriate level of ability
   - Are appropriate for the experiential level of all students
   - Have the potential to integrate psychomotor, affective, and cognitive educational goals whenever possible
8. Physical education lessons revolve about an interaction unit called the instructional task–student response.
9. Two types of events—content behaviors and management behaviors—occur in large-group instruction. Content behaviors are those directly related to lesson content. Management behaviors arrange and maintain the learning environment.
10. The instructional functions teachers perform in a physical education setting are the following:
    - Identifying outcomes
    - Planning
    - Presenting tasks
    - Organizing and managing the learning environment
    - Monitoring the learning environment
    - Developing the content
    - Evaluating

CHECKING YOUR UNDERSTANDING

1. What is meant by the idea that teaching is a goal-oriented activity?
2. Identify the national standards for physical education. Into what categories are outcomes or goals in education usually divided? Give an example of each.
3. What is meant by the idea that goals should be realistic?
4. Why is the process that teachers choose to use to teach content important? What are some of the choices teachers have for process?
5. Why is the instructional task–student response unit of analysis so important in physical education?
6. What is the difference between management and content behavior? List three things teachers do that fall under each category.
7. What is the relationship between teaching functions and teaching skills? List two teaching functions teachers must perform, and describe two alternative behaviors teachers can choose to perform these functions.
8. What role do teacher value positions and beliefs play in what and how a teacher teaches?
9. What role does teacher personality play in teaching?
10. How does teaching differ from other occupations?

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2 Factors That Influence Learning

O V E R V I E W

Physical education programs should be making a major contribution to the development of a physically active lifestyle. A major contribution of our field is the development of motor skills for a lifetime of physical activity. To design educational experiences for students that result in learning motor skills, teachers must understand the nature of learning and the factors that influence learning. Although a comprehensive theory is not available that would predict or explain learning (or the lack of it) in all situations, information is available that can provide direction for educators in working with students toward learning goals. General principles of learning are modified by characteristics of the learner, the context in which teaching occurs, and the content to be taught.

This chapter discusses the factors related to the nature and process of learning, the nature of the content to be taught, and the nature of the learner. Concepts have been selected because they are considered essential to the teaching-learning process in physical education. Most general education course work focuses on general learning principles and emphasizes cognitive learning. For this reason learning motor skills is emphasized in this chapter.

CHAPTER 2 OUTLINE

- Motor skill competence and physical activity
- What is learning?
- How do people learn motor skills?
- Understanding the control of movement
- Stages of motor learning
- Requirements for learning a motor skill
  - Prerequisites
  - Clear Idea of the Task
  - Motivational/Attentional Disposition to the Skill
  - Practice
  - Feedback
- The nature of motor skill goals
  - Open and Closed Skills
  - Discrete, Serial, and Continuous Skills
- Issues of appropriateness in skill development and learning
  - Environmental Conditions
  - Learner Abilities
- Practice conditions
  - Whole or Part
  - Practice Variability
  - Massed and Distributed Practice
- Motivation and goal setting

- Transfer of learning
    - Bilateral Transfer
    - Intertask Transfer
    - Intratask Transfer
- Learner characteristics
    - Motor Ability
    - Intelligence and Cognitive Development

THE RELATIONSHIP BETWEEN MOTOR SKILL COMPETENCE AND PHYSICAL ACTIVITY

The obesity crisis in the United States has caused physical educators to think carefully about how to help people sustain high levels of physical activity throughout their life and how to provide the needed levels of daily physical activity for children and youth. Motor skill acquisition has always been a major goal of most physical education programs. Recent research supports the idea that motor skill competence is a primary mechanism promoting engagement in physical activity (Stodden et al., 2009).

Young children who have established or are establishing skill in fundamental motor patterns are more likely to be physically active and more likely to continue to seek opportunities for both physical activity and continued skill development. Children acquire competence in fundamental motor skills primarily through their experiences. Their home, family, environment, and socioeconomic status all affect the degree to which children entering school have acquired some level of competence in the fundamental motor skills they need to form the basis for a life of physical activity. The physical education program in school can be a major factor affecting the degree to which children acquire these skills. Many children do not obtain sufficient skill in fundamental motor patterns to be "motorically" competent adults, which both directly and indirectly affects their level of physical activity. This is becoming increasingly true as screen time often replaces physical activity time. Fundamental motor skills learned in the elementary school form the basis for learning more specialized skills in the secondary school. Participation in sport-related and individual activities as an adolescent is a good indicator of adult levels of physical activity.

While young children up to the age of seven do not have accurate perceptions of their own competence at motor skills, there is a relationship between a child's (and adult's) perception of his or her competence at motor skills and willingness to participate. As children begin to perceive a lack of competence, their willingness to engage in physical activities decreases. There is a two-way relationship between perceived competence and competence. If you don't perceive yourself competent, you are less likely to participate, and if you don't participate, you are less likely to become competent. As children get older, the relationship between competence and participation in physical activity is therefore likely to get stronger. Although we don't know exactly the level of skill needed to maintain a physically active lifestyle, we can speculate that it is not that of an athlete and that all the students we have in our physical education classes are capable, with good instruction, of reaching a level of skillfulness in motor skills that will sustain a life of physical activity.

WHAT IS LEARNING?

The process of learning involves the acquisition, participation, assimilation, and accommodation of something new. **Learning** is commonly thought to be a relatively permanent change in behavior, resulting from experience and training and interacting with biological processes. One of the problems teachers have in directing learning processes and in assessing learning is that learning cannot be directly observed. Learning can only be inferred from a person's behavior or performance. Performance is observable, whereas learning is not. This creates difficulty for teachers, because sometimes students have learned and are not performing according to what they have learned, and sometimes they have not learned but perform as though they have. For example, a student may demonstrate a motor skill when you are observing him or her but may not be able to produce that skill in any consistent way again. Likewise, a student may have learned the skill but may be fatigued and not demonstrate the motor skill. That is why the idea of *consistent observable performance* is important in determining whether learning has taken place. If students cannot demonstrate an ability consistently, they probably have not learned it.

Teachers have another major problem related to learning when they try to design learning experiences

for students and then try to assess whether they have learned. Students may be able to identify a rule on a written test and may not be able to apply that rule when they are playing the game. They may be able to demonstrate a motor skill on a skill test, but they may not be able to use that skill in a game situation. On the other hand, they may be able to use a skill in a game but may not be able to demonstrate proficiency in this skill in a test situation. Students may be able to tell you why and how to live a physically active lifestyle, but they do not lead a physically active lifestyle. To help explain this, educators talk about different levels of learning. Learning that takes place at a lower level (performance in a drill) may not be usable in a situation that demands a higher level of learning (performance in a game). Students may know why it is important to lead a physically active lifestyle but may choose not to. In this text you will learn how to specify the level of learning you are trying to teach and how to design experiences that lead learners from lower levels of learning to higher levels of learning. You will be able to design experiences that have a better chance of influencing consistent student behavior.

■ HOW DO PEOPLE LEARN MOTOR SKILLS?

Although physical education teachers will teach children many cognitive ideas and skills and can also make a major contribution to student attitudes and values as described in the national standards (Society of Health and Physical Education, 2013), teaching motor skills that contribute to an active lifestyle is the unique contribution of our field. Many ideas are generic to all kinds of learning, regardless of whether what is to be learned is motor, cognitive, or attitudes and values, but this chapter focuses primarily on how people learn motor skills.

Motor skills are acquired in many ways. Some skills, such as walking, are developmental skills that all children acquire as the result of a maturational readiness and environmental conditions that encourage their development. By the time children go to school, most of them can perform a large number of fundamental motor skills at some level, all without the assistance of a physical education teacher. The elementary physical education program will be responsible for the continued

Environmental design can elicit responses from students.

development of these skills. More specialized skills, such as sport and activity skills, and the skillful use of fundamental patterns (e.g., running a race, catching a ball, skating) develop largely as a result of learning.

Learning can take place independent of an intent to influence its occurrence; that is, a teacher is not necessary for learning to take place. Children can learn how to do many things, including developing more advanced motor skills, outside an instructional environment. They learn by interacting with their environment, experimenting, and imitating what they see other people do. But a large number of children will grow to be adults without ever fully developing the fundamental motor skills they need to be active. Most children, however, will develop their motor skill potential more fully as the result of instruction. Instruction is characterized by a specific intent to influence learning in a particular direction.

Effective instruction in motor skills can take many forms. Most people think of instruction as a "telling" process. The teacher tells and demonstrates to students how to do something, and students try to do it. Direct instruction was alluded to in chapter 1 as an orientation to teaching and has been shown to help people to learn motor skills. Teachers also have a variety of approaches to learning that may not be direct instruction that they can use to help students acquire motor skills. Some of these approaches encourage students to create or discover appropriate responses rather than duplicate a response the teacher has selected. A more recent emphasis, but not a new emphasis, stresses the role of

environmental design. This means that the teacher can *elicit* motor responses by designing the environment to bring out the skill. If students are ready, they will respond to the conditions of the task with an effective response. The teacher does not have to go through an analysis of the exact way the movement should be performed. The teacher who puts a target area on a mat or floor for people to jump to is encouraging specific movements without using a lengthy description of how that movement should be performed. The teacher who increases the height of the volleyball net encourages students to get under the ball. The teacher who says "squash" to encourage a soft landing is eliciting the process characteristics of the skill without having to describe what each part of the body is doing. The teacher who selects equipment appropriate to a particular learner is using environmental design.

Using an environmental design approach to skill learning requires that the teacher have a good grasp of task conditions and requirements and that he or she is able to design conditions and cues for performance appropriate for different learners. Students who learn in this manner do not necessarily process what they are doing at a conscious level. The motor response is a coordinated response of a dynamic system to both external (the environment) and internal (the abilities of the learner) conditions.

Although learning motor skills has many unique aspects, approaches to learning motor skills are, for the most part, consistent with general learning theories. Learning in physical education can be approached from a *behaviorist model,* an *information-processing model,* or a *cognitive strategy model.* Each of these models looks at the process of learning differently and therefore advocates different approaches to teaching.

A **behaviorist orientation** to learning stresses the role that the external environment plays in shaping behavior. The focus is on what the learner does that is observable. Behaviorists suggest that teachers should model good behavior and shape desired behavior by rewarding and positively reinforcing desired responses. Content is usually broken down into small parts the student can handle successfully, and more difficult material is added gradually, building on the success of the student. Most of your formal motor skill learning in your experiences as a student or athlete has probably been conducted by teachers or coaches who at least in part oriented their work with you from a behaviorist orientation.

Information processing stresses the importance of the internal cognitive processing of the learner. Information processors study how learners select, use, interpret, and store information. Information-processing theory also tries to understand how much information and the kind of information learners need at different stages of the learning process to be successful. Information-processing theory suggests ways in which teachers can present information to learners so that learners attend to important ideas, draw meaning from what they attend to, and integrate what they have learned in useful ways. Knowledge of how learners process information helps teachers and coaches to select appropriate cues and to design appropriate feedback for learners. Information-processing theories of learning are not incompatible with other theories of learning.

Cognitive theorists have attended to more holistic perspectives on learning and are interested primarily in how people solve problems, create, learn how to learn, and apply what they have learned. Cognitive strategy approaches to teaching stress problem solving, environmental approaches, and interactive models of teaching. Current classroom teaching strategies emphasize *constructivist* orientations to learning that focus on the role of the learner in mediating instruction and constructing personal meaning from the learning experience. Constructivists feel that students construct their understanding of what is to be learned by linking their past experiences and understandings with new material and by engaging in creative, goal-oriented problem-solving experiences. Sociocultural constructivists also say that knowledge is socially constructed and therefore educators should emphasize the social interaction of learners and cooperative learning orientation to teaching.

In physical education, teaching strategies that approach instruction from more of a behaviorist or information-processing model are usually referred to as *direct instruction models.* More *indirect* strategies of instruction use principles of learning that have their roots in work being done in cognitive strategies.

The focus of this text is on learning facilitated through both direct instruction and more indirect ways to help students learn. There are times when the teacher wants students to deal with the transfer

of learning and higher levels of learning, such as the development of problem-solving abilities. There are times when the teacher wants to attend more carefully to making the learning process more meaningful for the learner. Under these conditions, the teacher will choose methods of instruction based on what is known from cognitive strategy about how to facilitate this type of learning. There are also times when the teacher wants the student to master a motor skill in the most efficient way and wants to use direct instruction. The skilled teacher chooses an appropriate approach based on what he or she wants students to learn and the characteristics of the learner. Each of these approaches will be made more clear in chapter 8.

■ **UNDERSTANDING THE CONTROL OF MOVEMENT**

One of the more popular theories for explaining movement responses is known as dynamical systems. This theory is particularly relevant for teachers of motor skills. In this theory, movement is seen as a complex response that allows us to respond to different conditions and demands. The selection of a response is constrained by organismic, environmental, and task constraints. *Organismic constraints* include the maturational level and physical abilities of the learner. *Environmental constraints* would include those factors such as the physical environment (e.g., weather conditions, social environment). *Task constraints* would include factors such as the rules of the game, boundaries, equipment, and what the student thinks the task might be (Haywood & Getchell, 2014). From a teaching perspective, this theory explains why young children who do not have the strength to use a one-handed free throw choose a two-handed underhand pattern to shoot a basketball, why students asked to use a mature overhand throw pattern to a partner choose to toss it instead when put at a short distance to a partner, and why high school students may not give it their best effort when placed in an environment where they fear peer criticism. The teacher will learn to identify the constraints that operate in a task and manipulate the constraints to produce good movement responses.

■ **STAGES OF MOTOR LEARNING**

A useful way to describe how an individual learns a motor skill was developed by Fitts and Posner in 1967 and is still useful today. According to them, an individual goes through three stages before he or she can reproduce a skilled movement automatically.

The first phase is called the **cognitive phase,** because at this stage, the learner is heavily focused on processing how the movement should be performed. Demonstration is particularly useful for learners at this stage. Beginning learners have been observed with their tongue to the side of their mouth in intense concentration on what they are doing or completely oblivious to what is happening around them as they try to sort out what they must do to perform a movement. At this beginning level, the learner is concentrating on getting the general idea of the skill and sequencing the skill. The responses of the learner at this stage of learning are variable and also characterized by processing errors in performance.

The second phase of the learning process is called the **associative phase.** At this stage, the learner can concentrate more on the dynamics of the skill: getting the timing of the skill and coordinating the movements of different parts of the skill to produce a smooth and refined action. Learners at this level often find themselves attending to different components of the skill, such as the backswing in a tennis forehand or the hand position in a jump shot in basketball.

The third phase of learning a motor skill is called the **automatic phase.** At this point in the process, the learner does not have to concentrate on the skill. The processing has been relegated to a lower brain center, which frees the individual to concentrate on other things. The movement response does not require the attention of the learner. Many movements of adults are at an automatic phase. Many of you can ride a bike, shoot a basket, run, or serve a volleyball without even thinking about where the parts of your body are or what they are doing. Skilled basketball players are not concentrating on how to perform the layup shot; they are concentrating on how to get around the defensive players.

The stages of motor learning are significant ideas that should be part of the knowledge base for teachers

of motor skills. First, they are important because they alert the teacher to the idea that higher levels of functioning in cognitive learning result in increased cognitive processing, whereas higher levels of learning in motor skill acquisition result in less cognitive processing about how to do it (adding a sequence of numbers). The objective of motor skill learning is to have learners not focused on their response. Students who have acquired high levels of ability in motor skills should not have to think about how the skill is being performed. If students cannot get beyond this first phase of the learning process, they cannot concentrate on what is happening around them; this is why skills often fall apart after learners practice in simple conditions and then are expected to use the skill in more complex situations, such as a game. The skill is never developed to the associative or automatic phase.

Second, the stages of motor skill acquisition are important because they help the teacher define the needs of the learner at different stages. The teacher who knows what learners need can better interpret the responses of learners and meet the unique needs of learners through careful selection of an appropriate instructional process.

If you are going to teach a skill directly to learners at the cognitive phase, you have identified that the learners need a clear idea of what they are trying to do. You also know that they are so highly involved cognitively that (1) you must reduce the information you give them to only the essentials to get them started, and (2) you need to sequence the pattern for them. Although it is not always possible to do, beginning learners should be presented with the whole idea of the skill when possible and should practice it as a whole if meaningful work on any of the parts of the skill is to take place at the associative phase. Teachers who provide accurate demonstrations and sequence verbal cues for the learner, such as "get set," "racket back," or "swing through," help the learners to organize their beginning attempts at a skill. Teachers who provide the learner with cues that elicit the movement also facilitate the first stages of learning.

After beginning learners have developed some consistency with the pattern and have moved into the associative phase, they are more able to use additional information from the teacher on refining and coordinating aspects of the movement they are trying to learn. Work on such areas as timing, speed, force levels, direction, follow-through, and hand position becomes meaningful. For more complex skills, learners are in this phase for a long time and often return to it even after high levels of skill have been developed. The learner at this associative phase can work on one aspect or one part of the skill and still be able to perform other parts of the skill without much attention. Also, the learner at this stage can begin to concentrate on other things besides the skill, so the teacher can begin gradually to increase the complexity of the practice conditions, for example, by adding other skills, players, or rules to the practice. Working through this phase requires much practice. Teachers can facilitate the practice by helping learners to focus on what is important in skills and by providing feedback to learners on how to improve.

The student at the automatic stage of learning a motor skill does not have to concentrate on the movement. This learner can focus energy on other areas, such as offensive and defensive situations in sports, the target in activities such as golf and archery, or the aesthetic feeling of the movement in dance. The learner at this point is skilled at that movement.

■ REQUIREMENTS FOR LEARNING A MOTOR SKILL

If you are going to try to teach someone a motor skill directly, you must be alert to the idea of what people need to learn that skill. Most of these ideas will seem like commonsense, but they are often violated in practice and are not as easy for a teacher to do as it would seem. These requirements are summarized in box 2.1 and discussed next.

Prerequisites

For learners to learn the motor skill you are trying to teach them, they must have the prerequisites to learn that skill. Prerequisites for motor skills often involve already having mastered some easier related skills or abilities. Prerequisites also often involve having the physical abilities to do that skill, which for

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Requirements for Learning a Motor Skill

Prerequisites

Prerequisite motor abilities
Prerequisite physical abilities
Developmental readiness
Implication for the teacher: Do a task analysis to
determine the prerequisites of the skill.

Clear idea of the task

Students perform according to their cognitive under-
standing of how to perform a task.

    Implication for the teacher: Make sure students have
an accurate motor program from your communication.

**Motivational/attentional disposition to the skill
Learners must process what they are doing.**

Implication for the teacher: Eliminate repetitive drills,
design tasks that capture student attention, and
require the students to process what they are doing.

Practice

Practice is necessary for students to use information
on how to do the skill and to develop consistency of
performance. *Implication for the teacher:* Allow enough
practice time for students to use and process the infor-
mation you give them.

Feedback

Students need feedback on what they are doing to
work through a skill.

    Implication for the teacher: Teachers can help stu-
dents utilize feedback on knowledge of results and
performance inherent in a skill and can use teacher
feedback to maintain student focus and motivation to
continue practice.

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young children may only be a maturational ability or
something as simple as physical strength or flexibil-
ity. Prerequisite abilities are often not defined for the
teacher, which makes it imperative that the teacher do
a task analysis of a skill and engage in a consistent

process of trying to determine why a student is not
able to perform a skill. Learners may not be able to
catch a ball with a high trajectory because their eyes
have not matured to the point where they have the
ability to visually track the ball. Learners who cannot
learn a tennis serve may not be able to use an overhand
pattern in any sport. Learners who cannot get a serve
over a volleyball net or take weight on their hands in
gymnastics may not have the physical strength to do
so. Practice can only lead to frustration, because the
individual does not have the capability to do the skill
regardless of the amount of practice. Learners should
not be put in situations where they cannot succeed.

Clear Idea of the Task

    If learners have the prerequisites to learn a skill,
the next concern is whether they have a clear idea
of what they are trying to do. Most skill-learning
problems occur because the learner is operating with
false or incomplete information on what he or she
is trying to do. The body can perform the skill, but
the mind has not given the body the right directions.
Sometimes the directions given by our brain to our
body to execute a response are called **motor programs**
or an executive plan for the skill. Motor programs are
a memory representation for a pattern of movement
that is rather abstract and usually does not involve
a specific movement performed by a specific set of
muscles and limbs, but a pattern that is general to a
variety of responses. For example, you have a motor
program for writing that is usually carried out with
your hand holding an instrument such as a pen or
pencil. If, however, you were to write your name
in the sand with your foot, you would still be able
to read what you wrote. The motor program is an
important idea because it emphasizes the highly cog-
nitive role in motor skills. Most problems in learn-
ing a motor skill come from problems in the motor
program the learner has been given or the way he
or she has interpreted the motor program. Good
instruction facilitates the acquisition of accurate
motor programs. Good demonstrations and the care-
ful selection of information given to learners facilitate
accurate motor programs.
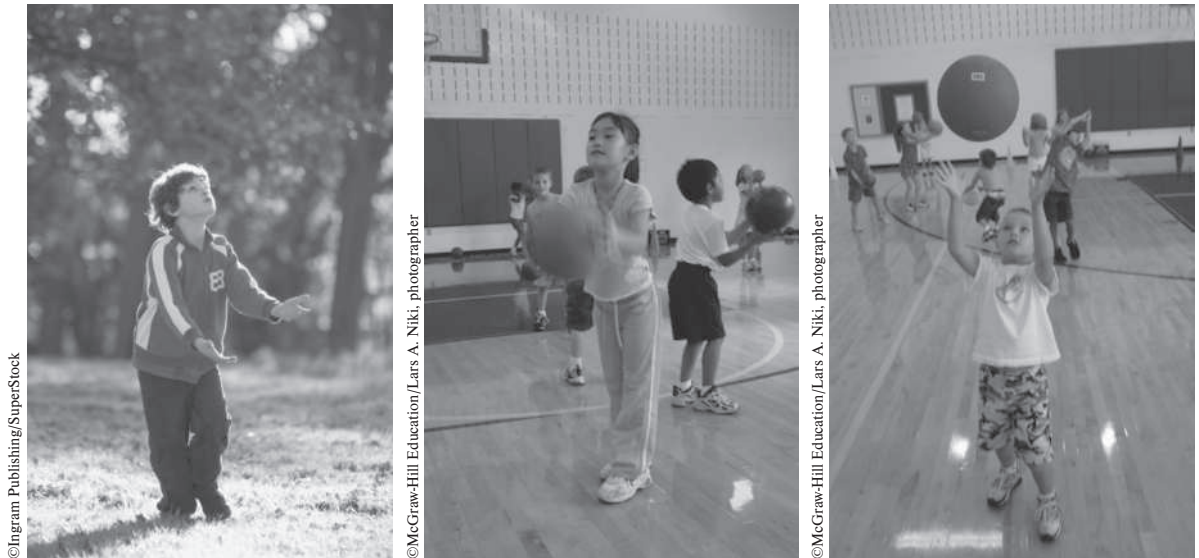
These three students are at three different developmental levels with the task "catch a large tossed ball."

Motivational/Attentional Disposition to the Skill

If students are to learn motor skills, they must be actively engaged in the learning process. This is facilitated if students are motivated to learn. Motivation usually involves a disposition to engage in a particular behavior. Motivation is a critical aspect of learning because learning is an active process. For learning to occur, the individual must be actively engaged in the process, and to do this learners must find the learning meaningful in some way. The critical component of learning is the active processing by the learner of what is to be learned. Although it is possible to design situations that force the learner to actively process what he or she is doing without the learner being highly motivated to learn a skill, it is easier to design situations that will result in active processing of behavior if the learner is motivated to learn. Chapter 9 will address issues of helping students develop motivation more specifically.

The notion of active processing is directly related to the cognitive aspects of motor skill acquisition. The motor plan is developed and refined by the learners actively processing what they are trying to do.

The teacher is trying to get the learners to attend to what is important in the skill, to focus the learners' attention on critical aspects. The teacher designs practice situations that will facilitate the learners attending to what they are trying to do. Repetitive practice of the same movements in the same way ultimately leads to the learners no longer processing what they are trying to do, which decreases the potential for learning. Success also plays a major role in motivating learners and maintaining attention on learning. Lack of success often decreases motivation, attention to the task, and therefore any potential for learning.

Practice

Once you have learned a cognitive fact, such as the capital of a country, chances are that if you take a test on your knowledge of that fact for ten consecutive days, you will be able to reproduce that piece of information with 100 percent accuracy. After you have learned how to do a basketball free throw and you do ten throws for ten days in a row, chances are that you will not be able to reproduce that skill with 100 percent accuracy. Because motor skills are

learned as motor programs that are more general and not specific to muscle groups, you are able to more easily adapt your movements to different situations, as well as perform skills with different muscle groups. But because motor programs are not learned as a specific set of instructions for a particular set of muscles, human motor performance is inconsistent and variable. Practice of motor skills is essential for developing and refining the motor program and reducing the variability. Practice should be designed to facilitate processing of motor information and move the learner to the automatic stage of motor skill learning. Practice increases the consistency of performance. More specific guidelines for practice are addressed in a separate section on practice later in this chapter.

Feedback

Motor learning theorists have often addressed the importance of the role of feedback in learning. **Feedback** is information the learner receives on performance. Feedback has been characterized as **knowledge of results (KR)** and **knowledge of performance (KP).** Knowledge of results is usually associated with information on the outcome of the movement, such as whether the ball went into the basket. Knowledge of performance is usually information the learner receives on the execution of the movement, how the movement feels, or the process characteristics of the movement. Learners can obtain information on both knowledge of results and knowledge of performance internally from sensory information, such as auditory, visual, or kinesthetic, or through information they receive externally from others. They can hear the results, see its results, or feel the movement. They can also be provided this information from external sources, such as a teacher or observer. Figure 2.1 describes the effect of different types of knowledge of results and knowledge of performance on the learner. The most desirable situation is to have the learner execute a skill correctly and also accomplish the goal of the movement. It is frustrating to the learners when they think they have performed correctly and still have not been effective in accomplishing the goal. It is difficult for the teacher to encourage students to perform correctly if the

Knowledge of performance
Was movement executed as planned?

		Yes	No
Knowledge of results Was goal accomplished?	No	Change strategy or plan.	Change everything.
	Yes	Repeat a successful performance.	Surprise!

FIGURE 2.1
Evaluative feedback.

students accomplish the goal of the movement when they have not performed correctly.

Externally provided feedback by the teacher has been thought of as a source of error detection. It has also been thought of as a source of reinforcement and motivation for the learner. Recognize that in a teaching situation, particularly with large groups of learners, individual feedback to the learner for error detection may not be as important as the role feedback plays in monitoring group instruction to maintain motivation and reinforce the task focus. The role feedback plays in error detection in group learning situations has not been supported, despite the emphasis it receives as part of the teaching-learning process. Feedback will be discussed as part of the instructional process in chapter 7.

■ THE NATURE OF MOTOR SKILL GOALS

How a teacher goes about teaching motor skill objectives to a class is largely determined by the type of motor skills the teacher is trying to teach. Movement skills have been dichotomized using several different criteria, such as fine or gross motor skills; simple or complex; fundamental or specialized; discrete, serial, or continuous; self-paced or externally paced; and open or closed. These characteristics have implications for what to teach and how to teach it. This section addresses some of these characteristics.

Open and Closed Skills

As stated by Fitts (1962), skills can be placed on a continuum according to their self-paced or externally paced nature. Self-paced skills, such as a dive, golf swing, gymnastics move, and the archery shot, are performed with the body and the object at rest before the execution of the skill. In other skills, such as punting in football, batting a ball, and executing a forehand tennis stroke, the body or the object is moving, and these skills are identified as having characteristics of externally paced skills. In skills that are at one of the extreme ends of the self-paced/externally paced continuum, both the body and the object are moving. These ideas are illustrated in figure 2.2.

Gentile (1972) modified Poulton's (1957) designation of open and closed skills for sports skills. **Open skills** are those skills regulated by variable or changing events in the environment. A layup shot in basketball is an open skill because the environment is rarely the same from one time to another and is unfolding during performance. In basketball, for example, the angle of entry to the goal, the speed, the number of defenders, and the distance from which the shot is initiated change from one time to another. If a skill is closed, the environmental conditions are relatively stable from one situation to another. The basketball free throw is considered more of a **closed skill** because environmental conditions, such as the distance to the basket, remain stable from one time to another. Figure 2.3 illustrates the nature of open and closed skills.

The ideas of self-paced/externally paced and closed/open skills are similar but represent two different characteristics. Most skills that are self-paced are closed skills, and most skills that are open skills are externally paced. However, a skill such as a golf putt can be self-paced but still have some aspects of open skills, because the golfer does have to adapt performance to such situations as different lies and distances.

The instructional goal of these different types of skills is different. Skills that are self-paced and closed require the development of consistency in stable movement conditions. Skills that are primarily externally paced and open require that the individual be able to perform in complex external environments. Closed skills performed in a variable environment, such as the golf putt, require that the learner be able to adapt performance to changing external conditions. These different goals are best met by different kinds of progressions and instructional objectives. How the skill is presented, how it is developed, and how it is practiced are affected by the nature of the skill.
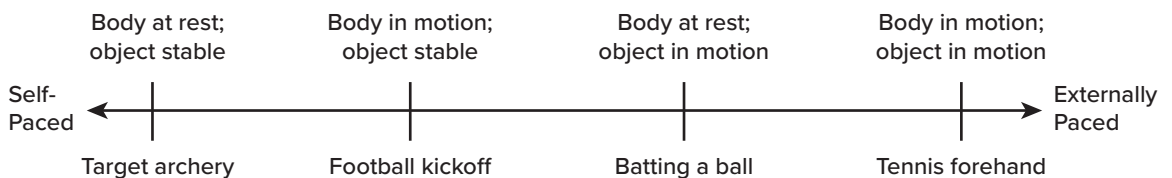

FIGURE 2.2
Continuum of self-paced and externally paced skills.
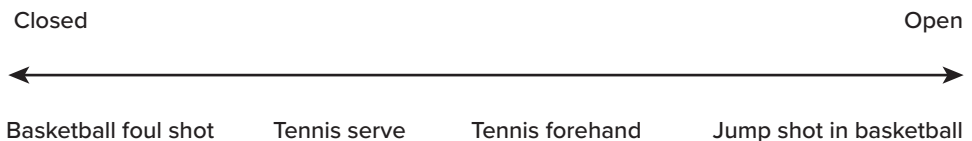
FIGURE 2.3
Nature of open and closed skills.

Generally speaking, the teacher will not want to practice closed skills in variable environments and will not want to practice open skills for stability. If the skill is self-paced and closed, such as a gymnastics vault or many target activities like bowling, the teacher may initially make the skill easier, but ultimately, practice must take place in the exact environment in which the skill will be used. If the teacher is teaching a layup shot, the teacher may initially reduce the conditions by not using defenders and by slowing down the speed of the movement. Eventually, however, the skill must be practiced in gamelike conditions if it is to be performed in gamelike conditions. This means the teacher may gradually add defenders, other players, and skills that precede and follow the layup, and practice doing the layup from different directions and distances from the basket. Open and closed skills are discussed further in chapter 3.

Discrete, Serial, and Continuous Skills

Another useful framework for teachers when they are thinking about the skills they are teaching describes the discrete, continuous, and serial nature of skills. Skills that are **discrete** are performed once, with a clear beginning and end. Their beginning or end is not governed by any movement preceding or following the skills. A javelin throw or vault in gymnastics is an example of a discrete skill. Different discrete skills that are put together in a series are usually called **serial skills.** Many motor skills, such as fielding a ball and then throwing it, or dribbling and then passing a basketball, are serial skills because they are usually performed with other skills. Dribble and shoot, field a ball and throw it, travel and jump are all skills that are used in combination with other skills. Teaching discrete skills requires that they be practiced together. **Continuous skills** have arbitrary beginning and ending points, such as basketball dribbling, swimming, and running. The teacher who wants to teach a discrete skill can focus on the beginning point and ending point of the movement and approach the skill as a closed situation (like the javelin throw). The teacher who wants to teach skills that will eventually be put into a serial relationship with other skills (such as the basketball dribble and pass or catching and then throwing a ball)

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Young students sometimes have difficulty understanding the importance of the quality of the toss to their partner's success.

must combine the skills early in a teaching progression and teach students how to prepare for the next skill during the previous one (transition). For example, if you want students to catch a ground ball and then throw it, they will need to learn how to place their feet and body so that they can come right up from the fielding situation into the throw.

These categorizations of movement skills used in physical education settings are important ideas that determine the goal of instruction for the teacher. The instructional section of this text will help you to plan instruction appropriate to the type of skill that you want to teach. At this point, you will need to be able to characterize skills according to these characteristics.

■ ISSUES OF APPROPRIATENESS IN SKILL DEVELOPMENT AND LEARNING

Most of the professional literature describes skills in terms of what a skill should look like when it is performed by a skilled person. Sport books describe how to dribble a soccer ball. Texts that focus on young children describe what a *mature* throw pattern should look like. This is useful information, but the ideas expressed in these sources are misleading in identifying skill goals to be taught to different learners. What follows are several key ideas to consider when you are thinking about instructional objectives for motor skills.

Environmental Conditions

Environmental conditions, sometimes referred to as task conditions, determine the appropriate process characteristics of most skills. The following Real World box describes the problem of task conditions. One of the first problems with using the descriptions of skills that are found in many textbooks as a guide for teaching a skill is that for all but closed skills in self-paced environments, the skill looks different and is adapted differently to different environments. Soccer dribbling looks different depending on whether you are closely guarded. If you are closely guarded, you will want to keep the ball close to you. If you are not closely guarded, you will want to move as fast as you can and therefore will keep the ball farther in front of you. The overhand throw pattern looks like the one shown in the book only when the individual needs maximum force production in the skill and is not performing serial movements (a skill before the throw or after it). If you want to throw a short distance or need to be concerned about getting an object to a target area accurately or quickly, variations of the overhand throw pattern are *appropriate.* The same foot forward as the throwing arm is appropriate for short distances where accuracy is at a premium. If you are fielding a ball before you throw it, the skill looks different. The environmental conditions of a task are critical factors that determine the most appropriate way to perform a skill.

THE REAL WORLD

Environmental Conditions of a Task

I tested students on their ability to use a drop shot in badminton. The students were effective in placing the shuttlecock where they wanted it. Their form did not reflect the full windup that they had been instructed to use. Upon reflection of why this might be so, it became clear that the windup is used in a game situation to disguise that the drop shot is going to be used. In the testing situation there was no such need to disguise the shot and the additional movement involved in the preparation served only to decrease accuracy.

Learner Abilities

Teachers face a second problem when using descriptions of skills found in sport books. Learners adapt the way a skill is performed to their abilities. Sometimes when you are working with young children and even some beginning learners, you will find learners using immature patterns because that is where they are developmentally. They may not have the physical ability to perform differently because of maturational problems or because of physical characteristics. When faced with the task of jumping forward as far as you can, young children will often jump with their arms in "high guard" position, which means wide and out to the side. They do this because balance is a problem for young children. Many 9-year-olds will still misjudge balls in flight because of lack of visual tracking maturity. A student not capable of handling the weight or length of a tennis racket will use two hands, and in fact the two-hand backhand in tennis was developed by an emerging tennis star who did not have the strength to do it the way it was "supposed" to be done. We usually consider these approaches inappropriate skill responses because they do not match the description we have of the way the skill is supposed to be performed. Actually, the responses of these learners are quite appropriate for their abilities. The notion that students should be practicing skills at a mature level of performance is a relevant idea. If, however, the teacher wants the student to practice and learn a mature level of performance, the conditions of practice will have to be adapted for that individual to be able to perform at that level. This means that baskets must be lower, balls smaller and lighter, and rackets shorter and lighter if mature performance is to be developed.

The notion that learners adapt skills to their abilities is also a valid observation for students who have abilities that allow them to reduce the skill to what we used to think was an immature performance. In skills that require much force production, teachers generally encourage the use of a mature pattern, such as differentiated rotation in the volleyball overhand serve. If, however, a student has the strength to get the ball over the net without using rotation, the student may be responding appropriately for the conditions.

The issue of appropriateness is important for teachers. There are many implications of this idea for teaching, such as the following:

1. If a teacher asks a student to demonstrate a particular motor response, the teacher must be sure that the motor response is appropriate for that situation and that learner. It is not appropriate for a teacher to ask learners to use a full overhand throw pattern in a practice situation where students are a short distance from each other. Also, it is not appropriate for a teacher to expect a child who cannot handle the weight of an implement to be able to manipulate that implement in a mature way unless the conditions are changed to facilitate that response.

2. The teacher must design progressions that include combining skills and must focus on helping learners to make the transition from one skill to another. How do you stop the basketball dribble if you are going to pass? Shoot? How do you place your feet to field a ball if you are immediately going to throw to your right? Left? How do you go from a run into a two-foot takeoff? How do you come out of a forward roll if you are going to go right into an arabesque? These issues are part of progressions that begin to focus on the appropriateness issue.

Many learners will automatically adapt their performance to the conditions of a task, but many will not and will need help. Serial movements, open skills, and externally paced skills all require that the teacher be sensitive to the conditions of the task in terms of what the task requires and the appropriateness of the response to those conditions based on the abilities of the learner.

■ PRACTICE CONDITIONS

Nearly everyone accepts the idea that to learn motor skills, you must practice them. In general, a direct relationship exists between the amount of practice and the amount of learning, assuming the task is an appropriate task. In general, when students in our physical education classes do not learn and they have a clear idea of how to do a skill, it is because they have

not had enough practice time. Although motor skill learning is remembered much longer than other kinds of learning, learning motor skills takes time. Effective teaching can facilitate that learning, particularly in the design of practice conditions. What follows are some general principles that teachers must consider when designing practice for motor skills.

Whole or Part

One of the first decisions teachers must make in designing practice for learners is whether it is better to (1) break up a skill into its parts and practice one part at a time or (2) practice a skill as a whole. In general, it is better to practice a skill as a whole. The rhythm and timing of a skill are maintained better when the whole skill is practiced. The more rhythmic the skill, the less appropriate practice of parts becomes. Sometimes, however, it is better to first practice the whole to give students the general idea of the skill and then break down the skill into parts. When safety is an issue, such as a back handspring in gymnastics, or when the skill is complex, such as the tennis serve, many teachers find that students learn the whole skill better if they have an opportunity to practice the parts. Unless safety is a real issue, learners should always be given an opportunity to get the feel for the whole skill before the skill is practiced in parts. From this framework, then, it can be concluded that there is a whole skill approach and there is a whole/part/whole skill approach. It is not often appropriate to use a part/whole approach.

Practice Variability

The manner in which teachers order and organize what is to be practiced for a given time can affect learning. Practice variability refers to the idea of changing either the environmental conditions of practice or the skills involved in practice. Each of these ideas will be discussed.

Varying practice conditions. The type of skill you want to teach determines to a large extent the amount of variability you want to have in practice. Variability of practice refers to the changing conditions of practice. The opposite of variability is drill and repetition of the same movement for a long period

in the same way. Practice can be organized so that many conditions are changing, such as changing the speeds, distances, and intent of practice, or so that the same movement is repeated (no variability).

In general, open skills should be practiced in variable conditions and closed skills should be practiced more repetitively in the same conditions (assuming a high level of student processing). Remember that open skills are those in which the learning goal is that the individual be able to adapt the skill to a variety of conditions (the basketball dribble, catching a thrown

Practicing with a passive defender increases the difficulty of the skill.

or batted ball), and the closed skill should be practiced to remove variability (bowling). Variability in practicing catching, for instance, can be added by changing the speed, distance, or direction the ball comes to the catcher or adding serial skills together, such as moving to receive the ball or throwing the ball after you catch it. A certain amount of variability exists in most practice situations because performers are not consistent to begin with. Adding too much variability, such as too much distance to throw the ball, may change the skill the learner uses (toss to a full overhand throw pattern in the case of throwing) or may make the practice inappropriate for particular learners.

Variability of practice is a critical concept for open skill development. Teachers who practice open skills in closed drill-like practice situations are running the risk that the learner will not be able to adapt his or her performance. For instance, a student who has practiced the chest pass in basketball from the same distance and from the same position in the center of the body may not be able to pass quickly from other than the chest level.

Teachers may want to reduce conditions of open skills initially for beginning learners to almost closed conditions, such as practicing skills without a ball or with reduced speed or space. This is advisable while the learner is in the cognitive stage of learning the skill. The important idea is that practice in these conditions should not be extensive, and the learners should not be left at this stage of learning and this level of practice if they are to be able to use the skill.

Varying skills. Some work in motor learning (Magill, 2007) suggests that if students practice more than one skill at a time, such as the long serve and short serve in badminton, they are more likely to learn both skills. This idea is based on a theory of *contextual interference*, which says that if you interfere with the rote characteristics of practice, you will encourage the learner to process the information more and therefore learn more. Although the phenomena of contextual interference are beyond the scope of this text, the idea is that practicing one skill and then another skill, such as two different skills in random order, causes the learner to increase the level of processing and therefore

increases the chance of learning. Rote repetition of the same skill decreases cognitive processing and therefore the amount of learning. Research is conflicting on how these concepts can best be applied. Other evidence would support the idea that for the complex motor skills taught in most physical education programs, beginning learners are better served by some repetition of practice of the same skill before being asked to practice unselected skills in combination (French, Rink, & Werner, 1990; Herbert, Landin, & Solmon, 1996). Highly skilled learners who may not be highly involved in processing the skill may benefit from more random practice. What this theory does stress is the importance of the learners processing what they are doing. Maintaining learner motivation and attention on what the learners are doing is critical. Unmotivated practice that comes from remaining on the same idea or task for extended periods is not supported.

Massed and Distributed Practice

The physical education teacher often must make decisions related to how long at one time students should practice a skill and how to distribute the practice over a unit of instruction. Although research in this area is limited (Magill, 2007), several ideas are significant for the teacher. Unfortunately, many units of instruction in physical education devote a day to the practice of a particular skill, such as the volleyball forearm pass, and then move on to another skill the next day, never returning to the forearm pass. Learners do not learn motor skills in this way. If the teacher has a twenty- or twenty-five-day unit in a sport, it is better for him or her to distribute practice of a skill over the unit and provide for practice of more than one skill a day after its introduction. This is called **distributed practice,** and although we don't know what the limits of this idea may be for what we do, we do know that distributed practice is better than massing the practice **(massed practice)** of a skill into a short amount of time. If we were to keep track of the number of times a first-grade student added 2 plus 2 over the year, we would find that adding 2 plus 2 would appear on student work sheets throughout the year. Repetition is a basic tenet of learning, and repetition over time ensures the development of skills.

Lessons that vary (1) the skills that are practiced and used and (2) the way in which skills are practiced have more potential to maintain student motivation for practice. Units that distribute the practice of a skill over time have a far greater potential to enhance learning. Yearly programs, particularly with young children whose abilities are changing at rapid rates, have a greater potential to enhance skill development if the teacher revisits skills and ideas throughout the year.

■ MOTIVATION AND GOAL SETTING

Although it is possible for a person to learn motor skills or other types of skills if he or she is not motivated to learn, learning is more likely to occur if the individual is motivated to learn. This is particularly true at the beginning stages of learning a motor skill, when cognitive processing of the skill is greater. If students are not motivated to learn, it is likely that they will not process what they are doing to the degree that is needed for learning to occur. Motivated students approach a learning task positively and with great intensity. Unmotivated students spend much of their time avoiding the task.

Motivation is a complex issue in the teaching-learning process. It is enhanced by good decision making on the part of the teacher as to what to teach and how to teach. Learner motivation is also related to the success levels of the students, their experience with the content being taught, the social dynamics of the group they are in, and learner personality and aspiration level.

Every teacher would like to have an entire class of students internally motivated to do well. Students at this level are largely students able to grow and approach new experiences positively. Many students we work with in schools are not able to do this for a variety of reasons. Although it is not always possible to know what all students need to be motivated learners, making the learning environment one that feels safe to individuals both physically and psychologically and having content that is both appropriate and interesting can go a long way in producing motivated learners.

Additional work done in the areas of attribution theory and locus of control can also provide some help for the teacher in understanding students and designing learning environments that encourage growth-producing behaviors and motivated students. One of the more recent efforts of research in teaching physical education has been to try to establish a theoretical understanding of motivation. The more theoretical bases of these ideas are expanded in chapter 9. The major ideas for the practitioner are as follows:

1. Attribution theory is concerned with questions related to what people attribute their success and failure to in a learning situation.
2. When students attribute their success to factors within their own control, they are more likely to be active participants in the learning process (effort, practice, difficulty of the task). These are primarily internal factors and are associated with a *mastery* orientation to learning.
3. When students attribute their success to factors outside their control (luck, genetics), they are less likely to be active participants in the learning process. These are primarily external factors and are associated with an *ego* orientation to learning.
4. The kinds of experience teachers provide can affect how students interpret their success or failure in learning experiences. Teachers can create a motivational climate that helps students to take a mastery or performance orientation to their learning experiences.
5. Perceived competence of the students (how competent they perceive themselves to be in a given task) also affects participation in a learning experience the teacher designs. Students are more likely to perceive themselves to be competent in a mastery-oriented learning environment and therefore put forth more effort.

■ TRANSFER OF LEARNING

The concept of **transfer of learning** refers to the influence of having learned one skill or ability on learning other skills and abilities. If you are a soccer player, are you more or less likely to do well in lacrosse? If you can throw a football, are you more or less likely to be able to serve a tennis ball? The influence of one activity can be positive, negative, or have no influence on the learning of another activity. Transfer can take many forms. When what you learn with one hand or foot transfers to the other hand or foot, as in the basketball dribble, it is called **bilateral transfer.** When what you learn in one skill or task transfers to another skill or task, it is called **intertask transfer,** as in tennis to racquetball. When what you learn from practice of a skill in one condition transfers to practice of that task in another condition, it is called **intratask transfer,** as in practicing the volleyball set with a trainer ball and then moving to a regulation ball.

Transfer of learning is important to teachers because the way the teacher designs curriculum, the way the teacher sequences the practice of skills, and the way the teacher presents tasks to learners can influence transfer of learning. The teacher will want to maximize the positive transfer of learning and minimize the negative transfer of learning.

Bilateral Transfer

It is commonly accepted that practice with one limb will affect practice with the other; that is, if you learn to dribble a basketball or soccer ball with one hand or foot, learning will transfer to the other hand or foot. Although the limb you practiced with will show the greater gain, both limbs will show improvement. Because physical education teachers deal with the learning of complex motor skills that sometimes need to be performed by both limbs, teachers often ask whether the skill should be learned with both limbs and, if so, should practice with the dominant limb or nondominant limb be first. Most of the research supports the idea that for many reasons, learners should practice first with the dominant limb. Only after a reasonable level of proficiency is acquired should the teacher introduce practice with the nondominant limb.

Intertask Transfer

The influence of learning one skill first before trying to learn another skill is measured by the amount of time it takes to learn the second after having

learned the first. If it takes less time to learn the second skill because the first one has already been learned, there is said to be a positive transfer from one skill to another. Although many of our assumptions about the positive transfer of one skill to another are handed down in terms of conventional wisdom rather than research efforts, it is commonly accepted that learning of fundamental skills, such as throwing, kicking, and jumping, should precede learning more specialized and complex sport skills, because there is a positive transfer from one to the other. The effect of transfer is largely determined by the number of component parts in one task that are similar to the other. The tennis serve, for instance, has many characteristics of the overhand throw pattern. The volleyball spike requires the learner to take a few steps into a one- to two-foot vertical jump before striking the ball. If the learner already has become proficient in running and jumping with a one- to two-foot takeoff, you would expect a positive transfer, from having learned these fundamental patterns, to the more specialized skill of the volleyball spike. Physical education curriculum should be based on an easy-to-more-difficult transfer of learning between skills.

Intratask Transfer

When the teacher develops progressions for teaching skills that go from easy to difficult or simple to more complex, the teacher is hoping that there will be a transfer from the practice at one level to the practice at another level. As discussed in the issues related to whether to teach the whole task or to break it down into parts first, there are many times when because of safety, the complex nature of the skill, or the complex nature of the way the skill is used in a game, the teacher will have to design a progression that goes from simple to complex. Teachers can determine if their progressions are successful by determining the extent to which practice in one situation transfers to the other. For instance, if students practice dribbling a soccer ball and shooting the ball into the goal in a practice situation, will they be able to do that in the game situation? If not, there has been

no transfer and the teacher will have to either find another way of practicing or add some other kind of practice that more nearly approaches the game situation. If the teacher designs a way to practice the toss in tennis, but when the whole skill is put together, there is no evidence that students can toss the ball correctly and then hit it, there has been no transfer from the practice of the toss to using the toss to serve the tennis ball.

Designing an effective curriculum and progressions for learning depends on the ability of the teacher to monitor carefully their effectiveness in terms of transfer. Transfer can also be facilitated if the teacher keeps in mind some general principles that will facilitate transfer:

1. *The more the practice situation resembles the game situation or the final task, the more likely transfer will occur.* This means that ultimately the teacher will have to analyze game situations and add components of the game situation to the practice situation. How to do this is discussed in detail in chapters 5 and 11.

2. *The more a skill is learned, the more likely there will be a positive transfer to the game situation.* This means that skills take a long time to learn. The more time devoted to what you want to transfer, the more likely that transfer will occur. Sometimes skills or abilities do not transfer because students have not learned them to begin with.

3. *Transfer can be facilitated by the teacher encouraging students to use information they already know and abilities they already have and by making task expectations clear.* This means that the teacher can encourage transfer by making the components of a task clear to learners; cognitively making the connection between skills, such as "This is like . . ."; and giving concrete examples of concepts that the teacher wants students to generalize from one skill to another. These ideas are discussed in detail in chapter 4, where task presentation ideas are developed, and in chapter 12, where the idea of teaching concepts for transfer is developed.

■ LEARNER CHARACTERISTICS

Motor Ability

One of the first observations that a beginning teacher of physical education makes as he or she tries to teach a group of learners a physical task is that any typical physical education class is usually made up of learners with great differences in ability. Unfortunately, too many physical education teachers assume that because a learner cannot do something when it is initially presented, the learner is incapable of learning. Teachers too often take their cue from students who have already done a skill or who do not need instruction. If a student does not learn, often it is because the teacher is not teaching effectively. Although teachers talk about the idea of general motor ability, it is more commonly accepted to consider that there is a set of motor abilities related to specific skills (Thomas & Halliwell, 1976). These specific capacities are related to physical abilities, such as gross body coordination, static and dynamic balance, strength of particular muscle groups, and eye/foot coordination. The importance of each capacity depends on the skill that is to be learned. It is also generally accepted that although the limits of these capacities are most likely set genetically (given at birth), their development is influenced by experience; that is, probably not everyone is capable of being an Olympic performer in a sport or activity, but most people are capable of developing their abilities to the extent that participation in the sport can be both successful and enjoyable. Many people whom physical education teachers considered incapable of learning motor skills as students are successfully engaged as adults in tennis, golf, racquetball, and other activities.

It is important that teachers do not "tag" students in their classes as being capable or not capable of learning. This is true for many reasons. First, there is no strong relationship between who learns a skill the fastest and who will ultimately be better at a skill. Second, teachers who communicate either positive or negative feelings to the student about what they are capable of doing can significantly affect learning. A third factor is related to working with children. Children who are older or mature earlier have increased abilities in many motor capacities that do not necessarily represent their potential. It is where they are at the time. Some students may be incapable of learning what teachers present because what teachers present is not appropriate for the students' stage of development. These same children who are developmentally not as mature as their classmates may have more potential than those who are mature. If they are turned off to activities and skills at an early age, they may never reach that potential.

Intelligence and Cognitive Development

Many teachers have wanted to draw relationships between movement abilities and intelligence of the learner. It is not true that students with high academic ability are also good at motor skills or that students with low academic ability are poor at them. Students of low academic ability may not learn in the same way as more academically oriented students and may need to be taught differently, but no direct relationship exists between motor ability and intelligence.

Several developmental factors related to cognitive functioning are critical concepts to teachers choosing how to approach teaching learners at different cognitive levels of development. The first of these is related to Piaget's levels of cognitive development (see box 2.2). Although a complete description of Piaget's levels of functioning is beyond the scope of this text, it is wise to remember that children do not think in the same way that adults do. Adults can use scientific thinking. They can deal with "if-then" relationships between ideas and can use abstract ideas. The very young child the teacher is likely to encounter in an elementary school (from kindergarten to Grade 2) does not necessarily think in a logical way. Children in this stage of development do not recognize points of view other than their own. I am reminded of an experience with a kindergarten child moving around the gymnasium pushing others out of his way. When the child was asked why he was doing this, he replied, "Because they are in my way."

Children who are 7–11 years of age are moving into what is called the *stage of concrete operations.* Children at this level of development can begin to order relationships between things and ideas and begin to reflect on their own behavior. Children at this

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Piaget's Stages of Cognitive Development

Stage 1: Sensorimotor intelligence

Prelanguage period of development. Prior to the end of this stage, objects do not have permanence and motor responses are random. The world exists only as the child acts upon it.

Stage 2: Preoperational intelligence
(approximately 2–7 years of age)

Beginning of the use of language and symbols to internally represent ideas and objects. Do not recognize points of view other than their own and are not logical in their reasoning processes.

Stage 3: Concrete operational intelligence
(approximately 7–11 years of age)

Can mentally represent objects, see the relationships between parts of an object and the whole, and organize objects by particular characteristics. Remain limited to concrete examples and observations of objects and ideas. Toward the end of this stage can deal with more complex notions of *sameness* and *differentness.*

Stage 4: Formal operational intelligence

Can create and understand hypotheses and "if–then" relationships. Can think scientifically and logically about an idea or problem. Understand other perspectives. Can reflect on their behavior and carry on conversations with self about their behavior.

stage can begin to think logically and handle causal relationships. Some evidence exists that learners with little experience in a content area may operate at a concrete level of operations regardless of their age.

Teachers who work with both students of elementary school age and older students who have little experience with a content area should keep learning active and concrete. Teachers should limit problem-solving activities and attempts to deal abstractly with ideas with which students have not had a great deal of experience. As students get older and as they become more experienced with content, work that is more abstract is appropriate.

SUMMARY

1. There is a high relationship between physical activity levels and the level of fundamental motor skills acquired by an individual.
2. Learning is a relatively permanent change in behavior, resulting from experience and training and interacting with biological factors.
3. Common theories of learning describe learning from a behaviorist, an information-processing, or a cognitive theorist perspective.
4. Motor learning is largely consistent with other types of learning, except that the goal of learning is to reduce the level of cognitive processing.
5. Learning takes place in three stages—cognitive, associative, and automatic.
6. To learn a motor skill, learners must have the prerequisites, have a clear idea of the task, be motivated, have opportunity for practice, and have feedback on their performance.
7. Motor skills can be open, closed, discrete, serial, or continuous.
8. An appropriate movement response depends on the conditions of the task and the ability of the learner.
9. Skills that are high in complexity and organization may be better learned if they are taught in parts after being presented as a whole. In general, it is better to practice skills as a whole if possible.
10. Open skills should be practiced in variable conditions and closed skills in less variable conditions.
11. In general, practice should be distributed over time for more learning.
12. Motivation increases the potential for learning.
13. In general, skills transfer from one limb to another.
14. Skill-to-skill transfer depends on the similarity between skills: the more similar the skills, the more likely the transfer.
15. Most learners are capable of developing motor skills to the extent that participation is enjoyable and successful.