

PGA PROFESSIONAL GOLF MANAGEMENT



PGA™



ADVANCED TEACHING AND GOLF CLUB FITTING LEVEL 3 COURSE MANUAL

PGA Professional Golf Management

Advanced Teaching and Golf Club Fitting

Course Manual

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TABLE OF CONTENTS

INTRODUCTION	1
Course Organization	1
Course Manual	1
Seminar	1
Work Experience Activities	1
Knowledge Test	2
Learning Outcomes	2
Course Materials	2
Preparing for the Level 3 Seminar	4
PART 1: KNOWLEDGE OF LEARNING	5
LESSON 1-1: MENTAL PRACTICE AND MOTOR IMAGERY	6
Learning Outcome	6
Reading Assignment	6
What are Mental Practice and Motor Imagery?	6
Types of Motor Imagery	7
Keys to Effective Mental Practice and Motor Imagery	8
Evaluating Students' Imagery Level	8
Figure 1-1: Example of Four Dimensions of Imagery	9
Figure 1-2: Scorecard to Rate Dimensions of Imagery	9
Training Vividness of Students' Images	9
Training Students to Control Images	10
Evidence of the Benefits of Mental Practice	11
Mental Practice Benefits for Beginners in Golf	12
Mental Practice Benefits for Enhancing Muscular Power	12
Mental Practice Benefits in Rehabilitation Settings Involving Relearning	12
Mental Practice Benefits as a General Preparation Strategy	13
Why is Mental Practice Effective?	13
Conditions That Enhance the Benefits of Mental Practice	14
How Should Mental Practice Be Used in Relation to Physical Practice?	15
How Long Should Students Engage in Mental Practice?	15

At What Speed Should Golf Skills Be Mentally Practiced?	16
Should Attention Be Focused on Form or Outcomes When Mentally Practicing?	16
When Should Mental Practice Be Used in Relation to Physical Practice to Optimize Performance?	17
Could the Effects Attributed to Mental Practice Be Due to Modeling?	18
LESSON 1-2: OPTIMIZING THE TRANSFER OF GOLF SKILL LEARNING TO PLAY	19
Learning Outcome	20
Reading Assignment	20
Introduction to Basic Transfer of Learning Concepts	20
Proactive Transfer	20
Figure 1-3: Proactive Transfer	20
Retroactive Transfer	21
Figure 1-4: Retroactive Transfer	21
Direction and Amount of Transfer	22
Factors Affecting Transfer of Golf Learning	23
Time Between Original Learning and Transfer	23
Structural Similarity of Golf Skills and Conditions	23
Figure 1-5: Stimulus and Response Generalization	24
Similarity of Skill Goal and Cognitive Processing	25
Perceived Similarity of Goal Skill, Goal, and Conditions	26
Skill Level Reached in Original Learning	26
Ability to Learn to Transfer General Factors	27
Performance Difficulty in Original Learning and Transfer	28
Emphasis Placed on Speed and Accuracy During Original Learning	29
Part-to-Whole Transfer	30
LESSON 1-3: LEARNING TO MAKE SWING CHANGES	32
Learning Outcome	32
Reading Assignment	32
Pre-Swing Changes	32
Nature of a Pre-Swing Change	33
Some Changes are Easy and Some are More Complicated	33
Swing Changes	34
The Need to Progress Through the Phases of Learning	35

Figure 1-6: Phases of Golf Skill Learning	35
The Need to Learn a Modified or New Motor Program	36
Figure 1-7: Modifying an Existing Motor Program	36
The Need for Physical Practice to Learn a Modified or New Motor Program	37
An Approach to Making Swing Changes	41
Key Questions to Ask Before Making Swing Changes	41
Approaching the Student About Learning Major Swing Changes	42
LESSON 1-4: THE MENTAL GAME	44
Learning Outcome	44
Reading Assignment	44
How Players Mentally Get in Their Own Way When Playing	44
Trying Too Hard to Ensure Shot Outcomes	45
Focusing on the Wrong Things	45
Playing with Doubt or Lack of Confidence	45
Playing with Overconfidence	46
Playing with Fear	46
Unwilling to Accept Poor Swings and Shot Outcomes	46
Having a Negative, Non-Appreciative Attitude	46
Managing Emotions Ineffectively	47
Playing with Excuses	47
Having Unrealistic Goals or Expectations	47
Placing Too Much Importance on Playing Outcomes	48
Using Illogical, Negative Self-Talk	48
How Players Mentally Get Out of Their Own Way When Playing	48
Use Logical and Positive Self-Talk	48
Set Realistic, Moderately Challenging Goals	49
Focus on the Present	49
Focus on What to Do	49
Play with Confidence	50
Make Wise Decisions	51
Accept the Poor Shot Outcomes with the Good Ones	51
Play Without Excuses	51

Focus More on the Process of Playing the Game Rather Than on Mechanics	52
Have a Positive, Appreciative Attitude	52
Manage Emotions Effectively	52
Focus on Only One Goal When Playing	53
Focus on the Elements of Pre- and Post-Shot Routines	53
Pre-Shot Routine	54
Post-Shot Routine	56
Accepting the Shot and Managing One's Emotions	56
Progressive Muscle Relaxation Techniques	57
Evaluating the Swing That Produced the Shot	58
Good Shots	58
Poor Shots	58
PART 1 REFERENCES	60
PART 2: KNOWLEDGE OF TEACHING	65
LESSON 2-1: ASSESSING STUDENT LEARNING	66
Learning Outcome	66
Reading Assignment	66
Assessment Defined	66
Purposes of Assessment	67
Identifying Current Knowledge	67
Diagnosing Challenges	68
Grouping Students	68
Measuring Progress	68
Providing Feedback	68
Types of Assessments	68
Methods for Assessing Learning	69
Instruments and Techniques	69
Asking Questions	70
Listen to Learn	73
Summary	74
LESSON 2-2: FOCUS AND FLOW: THE TEMPO OF TEACHING	75
Learning Outcome	75

Reading Assignment	75
Getting Focused	75
Starting and Sustaining Flow	76
Grabbing Their Attention	76
Developing an Interactive Lesson Climate	76
See and Support the Right Stuff	76
Keep It Flowing	77
Active Teachers and Dynamic Learners	77
Briskly Pace Lesson Activities	77
Keep Students Engaged	77
The Spice of Life	78
Timing is Everything	78
Make Transitions Smoothly	79
Expect Success	79
Avoid Momentum Blockers	80
Bringing It to a Close	81
Final Remembrances	81
Trailers and Teasers	81
Summary	82
LESSON 2-3: IMPROVING TEACHING	83
Learning Outcome	83
Reading Assignment	83
Reflective Teaching	83
Topics for Reflective Teaching	83
Reflective Teaching Techniques	84
Developing Teaching Skills	85
Analyzing Teaching	85
Figure 2-1: Sample Rating Scale for Teaching Skills	87
Figure 2-2: Sample Feedback Analysis System	89
Improving Teaching Skills and Routines	90
Increasing Knowledge of Teaching	91
Listen and Learn	92

Trust One's Instincts and Develop Intuition	92
Professional Associations	93
Coursework and Degree Programs	93
Summary	94
PART 2 REFERENCES	95
PART 3: KNOWLEDGE OF THE GAME	97
LESSON 3-1: INTRODUCTION TO SHORT GAME AND ON-COURSE TEACHING METHODOLOGIES	98
Learning Outcome	98
Reading Assignment	98
The Importance of Short Game Instruction	98
Determining a Starting Point	99
Helping Students Develop Realistic Expectations	99
Short Game Methodology Questionnaire Results	100
What Individuals Influenced You the Most and Helped Shape Your Short Game Methodology?	100
What Were Your Major Weaknesses When Teaching the Short Game Early In Your Career, and How Did You Overcome Them?	101
What Do You Do to Continue Your Development as a Teacher of the Short Game?	101
Rank the Order of Importance of the Following in Helping You Develop Your Short Game Methodology	102
Briefly Describe Your Short Game Methodology	102
How Much Do You Use Each of These Teaching Methods in the Areas of Chipping, Pitching, Bunker Play, and Putting?	103
Figure 3-1: Frequently Used Short Game Teaching Methods	103
What are the Most Common Pre-Swing Flaws You See, and How Do You Correct Them?	104
What are the Most Common In-Swing Flaws You See, and How Do You Correct Them?	105
Do You Teach Special Short Game Shot Techniques?	107
Do You Design Specific Practice Routines That Follow Short Game Lessons? If So, Describe One	108
How Long Do Your Short Game Sessions Typically Last?	108
What Percentage of Your Lessons are Short Game, As Compared to Full Swing?	109
Do You Schedule Short Game Lessons Independent of Full Swing Lessons?	109

Estimate the Percentage of Short Game Instruction Time Devoted to the Following Areas Over the Course of a Year	109
Do You Use Any Drills When Teaching the Short Game? If You Do, Name Your Favorite Drill for Each Short Game Area	110
Do You Use Any Training Aids or Teaching Aids When Teaching the Short Game? If You Do, Name Your Favorite Aid for Each Short Game Area	110
Do You Use Any Specific Assessment Tools or Skill Tests to Measure the Student's Skill Level? If So, What are They?	111
How Do You Determine That Student Learning is Taking Place?	111
Describe Any Unique Short Game Techniques or Programs You Use with Students	112
What Advice Would You Offer a New PGA Instructor to Help Improve His or Her Short Game Teaching?	112
Suggested Drills, Training Aids, and Games	113
Chipping	113
Pitching	114
Bunker Play	116
Putting	117
Suggested Reading	119
Pre-Seminar Activity: Short Game Methodology Questionnaire	119
The Importance of On-Course Instruction	123
Determining a Starting Point	123
Helping the Student Get the Most From the Experience	124
On-Course Methodology Questionnaire Results	124
Describe Your On-Course Instruction Methodology	124
Do You Prefer to Observe the Student Play a Certain Number of Shots Before Providing Feedback? If So, Describe Your Methodology	125
Do You Use Video During On-Course Instruction? If You Do, What Percentage of the Lesson Time is Devoted to Using Video?	126
Why Do You Use Video?	127
What Percentage of Your Lessons are Conducted on the Course, Compared to Those at the Practice Range?	127
Are Your On-Course Lessons Part of Your Full Swing or Short Game Lessons, or Independent of Them?	127
Do You Use Predetermined Discussion Points Based on the Student's Handicap or Skill Level? If So, Describe a Specific Example That You Used Recently	127
What Topics Do You Think are Most Important For Students at Each Skill Level?	128

Figure 3-2: Top Five On-Course Instruction Topics for Various Skill Levels	129
Add Any Additional Comments or Experiences that You Think Would Benefit a Level 3 PGA PGM Student	130
Suggested Reading	130
Pre-Seminar Activity: On-Course Methodology Questionnaire	131
Conclusion	133
LESSON 3-2: FITNESS AND PERFORMANCE	134
Learning Outcome	134
Reading Assignment	134
Junior Physical Evaluations	134
Junior Performance Tests	134
Figure 3-3: Abdominal Stability	135
Adult Physical Evaluations	136
Adult Evaluation Activities	137
Standing Pelvic Tilt	137
Figure 3-4: Standing Pelvic Tilt	138
Standing Pelvic Rotations	138
Figure 3-5: Standing Pelvic Rotations	139
Standing Torso Rotations	139
Figure 3-6: Standing Torso Rotations	140
Deep Squat	140
Figure 3-7: Deep Squat	141
Designing a Training Program	141
Components of a Physical Training Program	142
Energy Systems	143
Designing a Junior Training Program	144
Figure 3-8: Sample Junior Training Setup (Ages 5-7)	145
Figure 3-9: Sample Junior Training Setup (Ages 8-10)	145
Figure 3-10: Sample Junior Training Setup (Ages 11-13)	146
Designing an Adult Training Program	147
Figure 3-11: Sample Adult Training Program	148
LESSON 3-3: GOLF CLUB FITTING	150
Learning Outcomes	150

Reading Assignment	151
Purpose and Result of an Effective Golf Club Fitting	151
Golf Club Elements	151
Figure 3-12: The Effects of Club Components on Ball Flight	152
Lie Angle	152
Figure 3-13: Definition of Lie Angle	153
Figure 3-14: Dynamic Lie Angle and its Effect on Directional Control	153
Figure 3-15: Influence of Loft on Lie Angle	154
Figure 3-16: Effects of Club Length on Lie Angle	155
Figure 3-17: Effects of Centrifugal Force and Shaft Stiffness on Lie Angle	156
Figure 3-18: Dynamic Lie Angle Fitting Using the Lie Board	157
Figure 3-19: Impact of a Club on a Lie Board	159
Figure 3-20: Approximate Correction for Sole Mark from Face Centerline	159
Figure 3-21: Interpreting the Lie Board Mark on the Sole	161
Club Length	161
Shaft Stiffness and Flex Point	162
Figure 3-22: Shaft Bowing and Flexing	163
Figure 3-23: Shaft Flex Point	164
Loft Angle	164
Figure 3-24: Definition of Loft Angle	165
Figure 3-25: The Effect of Trajectory on Distance, Back Spin, and Roll	166
Head Design	167
Figure 3-26: Offset and Non-Offset Heads	167
Weight, Swing Weight, and Frequency	168
Figure 3-27: Frequency Machine	169
Grips	170
Figure 3-28: Fitting Grips	171
Individual Club Fitting Tasks	171
Set Make-Up	171
Putter Fitting	172
Figure 3-29: Common Putter Specifications	173
Wedge Fitting	173
Driver Fitting	174

The Club Fitting Model	176
Step 1: Conduct a Personal Interview	176
Step 2: Evaluate the Player's Clubs and Determine the Appropriate Lie Angle	176
Step 3: Evaluate the Golf Club Specifications for the Entire Set	177
Step 4: Fit the Putter	177
Step 5: Recheck the Lie Angle, Fit the Wedges, and Make Set Recommendations	178
Step 6: Perform a Follow-Up Evaluation	178
Conclusion	179
PREPARING FOR THE LEVEL 3 SEMINARS	180

INTRODUCTION

Teaching is at the heart of the game and the profession. The PGA of America's mission is to grow the game of golf, and therefore, all PGA Professionals are expected to be able to introduce people to the game by providing or supervising instructional services. Learning how to teach the game is a process that never truly stops. Excellent teachers constantly search for new teaching strategies and practices that succeed with many types of learners and players of differing levels of ability.

This course builds on the Level 1 and Level 2 teaching courses and emphasizes the seamless integration of learning, teaching, and game elements. It addresses the quality and flow of teaching in order to maximize positive student behavior change and skill transfer to the course. The course also covers elements of the mental game and more advanced shot-making. The club fitting component centers on effective processes and procedures for club fitting.

COURSE ORGANIZATION

The following course description illustrates how the various elements of this course fit together—from course readings to the Level 3 knowledge test. The course includes four elements: the course manual, seminar, work experience activities, and a knowledge test.

COURSE MANUAL

The course manual continues exploring the subjects of student learning, teaching, and golf club modification. You are required to complete the pre-seminar readings and activities in this manual in order to prepare you for the Level 3 seminar activities and corresponding discussions that follow directly from pre-seminar content.

SEMINAR

The *Advanced Teaching and Golf Club Fitting* seminar presents opportunities to practice and reinforce the concepts and applications presented in the course manual. In the seminar, you will participate in group activities that require you to assess and react to common scenarios associated with teaching golf skills. The seminar is designed to provide a forum in which to apply knowledge of teaching and learning in conjunction with PGA PGM faculty and PGA PGM participants. PGA PGM faculty will also review the requirements for completing the work experience activities and the knowledge test.

WORK EXPERIENCE ACTIVITIES

You will complete the work experience activities after attending the Level 3 seminars. These activities are designed to help you apply skills and knowledge from this course in your own work environment. On-the-job experience will vary, somewhat, depending on the PGA Golf Management University internship or PGA apprentice position.

KNOWLEDGE TEST

The Level 3 knowledge test will consist of multiple-choice and true/false questions covering the facts, concepts, and procedures presented in this course. Test registration dates and procedures are available online through the PGA Knowledge Center on PGA.org.

LEARNING OUTCOMES

The remainder of this manual will focus on pre-seminar activities. After completing the *Advanced Teaching and Golf Club Fitting* course manual, you will be able to:

- Explain the role of mental practice and imagery in the teaching, learning, and playing performance of golf skills
- Explain the theories and factors that influence the transfer of learning and playing performance of golf skills
- Explain how learning occurs when students try to make swing changes in a well-learned swing with implications for teaching and playing performance
- Explain how to teach students to learn an effective mental game to optimize their playing performance
- Use a variety of techniques to measure the current performance level of beginning to expert golfers
- Focus and maintain a consistent lesson pace to maximize student learning
- Analyze current teaching and develop effective instructional routines, knowledge, and skills
- Use a variety of teaching methodologies to meet the specific needs of the golfer
- Conduct a physical evaluation of a golfer and develop a corrective exercise program
- Demonstrate how to fit clubs to a golfer
- Conduct an effective club and ball flight performance evaluation and make recommendations to improve performance
- Explain the rationale for equipment changes, how they will affect the golfer, and the expected results
- Distinguish between the need to alter the golf club or to provide swing instruction in order to optimize performance

COURSE MATERIALS

To complete this course, you will need the following:

- An Internet connection for downloading documents and accessing online information about the course at the PGA Knowledge Center on PGA.org
- The *Advanced Teaching and Golf Club Fitting* course manual (PDF file)

Note: The lessons in this course may include learning activities that direct you to Web pages or other online files. The course provides live links to those pages. You may print this PDF file and

complete the course with your printed copy. However, it is recommended that you have this file available on your computer desktop as you go through the course. This allows you to click on live links as you encounter them.

The *Advanced Teaching and Golf Club Fitting* course manual contains three parts with a total of 10 lessons:

PART 1 – KNOWLEDGE OF LEARNING

Lesson 1-1 – Mental Practice and Motor Imagery: Describes the use of mental practice techniques in conjunction with physical practice and drills to optimize learning.

Lesson 1-2 – Optimizing the Transfer of Golf Skill Learning to Play: Expands upon the notion of transfer of learning, which was introduced in a previous course, and describes the practice and lesson techniques that bring about effective transfer.

Lesson 1-3 – Learning to Make Swing Changes: Examines the specific challenges involved in helping an experienced player make changes to a well-learned yet flawed golf swing.

Lesson 1-4 – The Mental Game: Examines the mental and psychological aspects of playing golf, from the standpoints of how to avoid mental pitfalls and how to use the proper mindset to support one's physical skills.

PART 2 – KNOWLEDGE OF TEACHING

Lesson 2-1 – Assessing Student Learning: Introduces various practices that teachers can use to understand what a student is learning, and use this understanding to continue the student's progress toward his or her golf goals.

Lesson 2-2 – Focus and Flow: The Tempo of Teaching: Studies the effect of lesson pacing and structure on student attention and progress.

Lesson 2-3 – Improving Teaching: Provides instructions and strategies for teachers to use to assess the quality of their teaching and continue their professional development

PART 3 – KNOWLEDGE OF THE GAME

Lesson 3-1 – Introduction to Short Game and On-Course Teaching Methodologies: Presents the results of two surveys of nationally recognized teachers and elaborates factors that have influenced their teaching methodologies.

Lesson 3-2 – Fitness and Performance: Describes the steps involved in evaluating a student's fitness level and designing an exercise program to assist the student's development.

Lesson 3-3 – Golf Club Fitting: Lists the steps involved in performing a club fitting, including how to conduct a performance evaluation and use the evaluation to match the golfer with the proper clubs

PREPARING FOR THE LEVEL 3 SEMINAR

This course manual takes approximately 40 hours of focused study. This is an estimate of how long it will take the average student to do the reading assignments and activities. The amount of time you spend may vary, depending on your study habits, reading comprehension, and personal commitment to understanding the material.

During the Level 3 seminar, you will be expected to demonstrate a command of the content presented in this course manual. Therefore, you will be required to bring the pre-seminar activities included in this course to the Level 3 seminars for review and discussion.

PART 1: KNOWLEDGE OF LEARNING

This course builds on the Level 1 and 2 courses, *Introduction to Teaching and Golf Club Performance* and *Intermediate Teaching and Golf Club Alteration*. It provides an even more nuanced discussion of the various components of practice, learning, and teaching. The first two lessons deal with mental practice and learning transfer. Mental practice, which is a crucial component of learning golf skills, is discussed as it relates to physical practice. Effective mental practice has a significant role in the acquisition and retention of motor skills, and the related notion of motor imagery is discussed in great detail. The concept of transfer is introduced in Lesson 1-2 and described extensively throughout the remainder of Part 1 due to its role in developing golf playing proficiency. Without proper transfer, it is difficult to take what was learned in a lesson context or on the practice tee out on to the course. Both positive and negative transfer are examined, as well as the various factors (such as teaching and practice conditions) that determine the degree and type of transfer.

Whether relatively inexperienced or very experienced, any player may have to make serious changes in his or her swing, which presents a number of special challenges for both the instructor and the golfer. This part of the course also delves extensively into the learning of swing changes—the various types of swing changes, different teaching methods, and the difficulties that come about in the process of teaching and learning these swing changes.

In the final lesson of Part 1, the discussion again turns to the mental game, which many professional players believe is just as important as the physical game. The discussion first looks at ways in which players mentally get in their own way during play, and subsequently examines ways in which they get out of their own way in order to play to the best of their ability.

LESSON 1-1: MENTAL PRACTICE AND MOTOR IMAGERY

Physical practice is absolutely essential for the learning and retention of golf skills and the transfer of these skills to playing contexts, but what about mental practice? Is mental practice as important as physical practice? Does it produce the same powerful learning, retention, and transfer effects? To what extent can golf skills be learned, retained, and transferred by mental practice alone? Additionally, what is motor imagery and what is its role in mental practice? This lesson addresses these questions and many more about the nature, use, and effects of mental practice on learning and performing motor skills. It also discusses implications for using mental practice to optimize the learning and performance of golf skills.

LEARNING OUTCOME

After completing this lesson, you will be able to:

- Explain the role of mental practice and imagery in the teaching, learning, and playing performance of golf skills

READING ASSIGNMENT

Read the following lesson, which describes the use of mental practice techniques in conjunction with physical practice.

WHAT ARE MENTAL PRACTICE AND MOTOR IMAGERY?

Jack Nicklaus (1974) claimed that his good shots were 50% mental picture, 40% setup and stance, and 10% swing. In an interview, he described his mental practice and imagery process immediately before playing each shot as follows:

“I never hit a shot, not even in practice, without having a sharp, in-focus picture of it in my head. It’s like a color movie. First I ‘see’ the ball where I want it to finish, nice and white and sitting up high on the bright green grass. Then the scene quickly changes and I ‘see’ the ball going there: its path, trajectory, and shape, even its behavior on landing. Then there is sort of a fade-out, and the next scene shows me making the kind of swing that will turn the previous images into reality. These home movies are a key to my concentration and to my positive approach to every shot.”

Former tennis great Chris Evert reported mentally rehearsing the details of each match before it was played (Weinberg & Gould, 1995):

“Before I play a match, I try to carefully rehearse what is likely to happen and how I will react in certain situations. I visualize myself playing typical points based on my opponent’s style of play. I see myself hitting crisp deep shots from the baseline and coming to the net if I get a weak return. This helps me mentally prepare for a match and I feel like I’ve already played the match before I even walk on the court.”

Evert's example is similar to golfers who mentally rehearse how they will play a golf course before they play it.

Mental practice is the cognitive rehearsal of a physical activity in the absence of any observable muscular movement. It can involve repeatedly thinking about the cognitive aspects involved in the execution of a golf skill, as in the Nicklaus example, or the procedural aspects of playing the game on a course, much like the Evert example. It also can involve engaging in visual or kinesthetic imagery of the performance of a skill (either in part or as a whole), or visual imagery of a shot outcome (e.g., ball flight). Through mental practice, students can recreate previous experiences from memory and shape them in meaningful ways, or picture new events to prepare themselves for an upcoming physical performance. Some specific examples include mentally rehearsing the following:

- How to move to perform a full golf swing (either with a driver or an iron), putting stroke, chip, pitch, or sand shot as taught by the teacher
- How to move to perform a swing that will produce a shot as visualized and kinesthetically felt
- How to move to produce a previous shot that was well played, and what it felt like
- How to move to make a swing correction as taught by the teacher
- The procedural steps involved in a pre- and post-shot routine
- The procedural steps involved in taking a proper drop for an unplayable lie or lateral water hazard according to USGA Rules
- The strategy for playing a golf course before actually playing it, including the clubs to be used to play various shots
- The visualization of a shot outcome (e.g., ball flight relative to the target) and the swing that produces that shot outcome, as well as how that swing would feel
- How to cope with stress or anxiety in competitive situations, manage emotions, and perform shots effectively—this is usually incorporated into a player's pre- and post-shot routines

Motor imagery is a term that is often used interchangeably with mental practice, but they are not the same. Motor imagery is a conscious experience in which a player uses all of his or her senses to create or recreate the execution of a motor skill in the player's mind (Vealey & Greenleaf, 1998). Frequently, students use motor imagery that relies heavily on visualization (i.e., seeing the golf swing being performed in one's mind), which is referred to as visual imagery. Motor imagery is an essential element of mental practice, but the cognitive act of creating or recreating the execution of a motor skill is not mental practice unless it is rehearsed.

TYPES OF MOTOR IMAGERY

Motor imagery can be external or internal (Mahoney & Avenier, 1977). When students use all of their senses to imagine themselves performing a golf skill from the perspective of an external observer, they are using **external imagery**. External imagery is akin to students watching themselves perform a golf swing on videotape. They would imagine seeing and feeling the swing they executed as though they were external observers, such as a teacher or coach. Conversely,

when a student imagines seeing and feeling himself or herself executing a golf swing from his or her own perspective as a performer, the player is using **internal imagery**. They would imagine seeing what they see and feeling what they feel when they execute the swing from a performer's perspective.

Research evidence (e.g., Hinshaw, 1991) reveals that both types of imagery can enhance motor performance if used properly, but greater effects have been found for internal imagery. Unfortunately, some people have misinterpreted this finding and recommended that performers only use an internal form of imagery, when evidence suggests that both types can improve performance. Indeed, whether a student uses external or internal motor imagery is less important than whether he or she uses the type or combination of types that produce the most vivid and controllable images. For instance, elite archers reported that they routinely used both types of imagery, but tended to use internal more than external imagery (Landers, Wang, Daniels, & Boutcher, 1984).

Based on the limited amount of research available, students should be encouraged to try both types of imagery at the outset—not only because they both can enhance performance, but also because changing from one imagery perspective to the other could be helpful in developing skill in imagery control. After some experience with both types of imagery, students can then choose either or some combination of both types, depending on what works best for them.

KEYS TO EFFECTIVE MENTAL PRACTICE AND MOTOR IMAGERY

There are two major keys to effective mental practice and motor imagery: vividness and controllability. The first step in getting a student involved in mental practice is to evaluate his or her current imagery skill level in terms of vividness and controllability of (or ability to manipulate) images generated. Based on the results, the next step is to engage the student in training exercises to enhance vividness and controllability of images where needed. These keys and steps are discussed next.

EVALUATING STUDENTS' IMAGERY LEVEL

Like physical or golf skills, mental practice and motor imagery are cognitive skills that can be learned and improved with practice. Some students will be good at it, whereas others may not even be able to create an image in their minds. Two popular instruments that have been used to evaluate a student's motor imagery level are the Sport Imagery Questionnaire (SIQ) (Martens, 1982) and the Movement Imagery Questionnaire (MIQ) (Hall & Pongrac, 1983; Hall & Martin, 1997).

These questionnaires could be easily adapted to golf by asking students to clear their minds, close their eyes, take a couple of slow deep breaths, think of a specific fairway on a hole, and use all of their senses to visualize a ball flight to a target in the fairway, the pre-shot routine, and the driver swing that would produce that ball flight. The students should keep their eyes closed for about one minute as they try to imagine these things as vividly as they can. This is one example of the things that could be imaged in a golf situation, but students could be asked to image many different things in a variety of golf situations. What they image could cover any number of aspects of the game, including those aspects in which they are experiencing difficulties (e.g., missing short putts under the pressure of competition).

After they have finished imaging these specific actions and results, students should be asked to rate the four dimensions of imagery by circling the number on the rating scale in the following figure that best describes the image they experienced.

FIGURE 1-1: EXAMPLE OF FOUR DIMENSIONS OF IMAGERY

a.	How vividly did you see yourself doing this activity?	1	2	3	4	5
b.	How clearly did you hear the sounds of doing the activity?	1	2	3	4	5
c.	How well did you feel yourself making the movements?	1	2	3	4	5
d.	How clearly were you aware of your mood?	1	2	3	4	5

1 = No image present; 2 = Not clear or vivid, but recognizable image; 3 = Moderately clear and vivid image; 4 = Clear and vivid image; 5 = Extremely clear and vivid image.

When students are asked to rate their image on four different things in various golf situations, a total score can be determined as displayed in the following example.

FIGURE 1-2: SCORECARD TO RATE DIMENSIONS OF IMAGERY

		Total Score								
a.	Visual	_____	+	_____	+	_____	+	_____	=	_____
b.	Auditory	_____	+	_____	+	_____	+	_____	=	_____
c.	Kinesthetic	_____	+	_____	+	_____	+	_____	=	_____
d.	Mood	_____	+	_____	+	_____	+	_____	=	_____

For each of the four areas, the top possible score is 20 and the lowest possible score is 4. The closer students come to 20 on each sense, the more skilled they are at imaging in that particular sense. Lower scores mean students need work on those aspects of their imagery. An appropriate mental training program can be developed to meet each student's needs in this regard. This type of program is described in the next section.

TRAINING VIVIDNESS OF STUDENTS' IMAGES

Students who are effective at using imagery use all their senses to make their images as clear and detailed as possible. It is essential that they strive to create or recreate the actual event or activity in their minds. The more similar the images are to the actual event or activity, the more likely it is that the training will transfer to the students' actual performance. Special attention should be paid to the environmental detail of the actual playing situation, such as the course, hole, playing partners, spectators, wind, rain, etc. It is important that students try to feel the anxiety, frustration, anger, doubts, negative thoughts, and positive thoughts, associated with the specific performance that is being imaged. All of this will make the imagery experience more realistic.

If students have difficulty getting vivid images, instructors should first have them try to visually imagine things that are very familiar to them, such as their furniture and the way in which it is

arranged in their homes. After that, the instructor can have them imagine a golf course that they regularly play—ideally, one where they are familiar with all aspects of the course. Instructors can have students practice getting vivid images in at least three ways:

1. Picturing the furniture in their home
2. Imagining a positive performance of a golf skill (e.g., drive, chip, or putt)
3. Imagining previous positive and outstanding playing performances

TRAINING STUDENTS TO CONTROL IMAGES

The other key to effective imagery is learning to manipulate images so they are controlled in the way that one wants to control them. For instance, many students can image, but often the images are of negative experiences or performances that they would like to avoid. Some students have difficulty manipulating their images, and repeat their mistakes as a result. Often these undesirable images arise because of negative thoughts and self-talk, such as “Do not hit it in the water,” “Do not short-side yourself,” “Do not hit it out of bounds,” “Do not hook or slice the ball,” “Do not three putt,” or “Do not miss this short putt.” These thoughts are focused on what not to do rather than what to do, and they will conjure up images of what not to do.

Controlling images begins with thinking of what to do to play effectively. Controlling images helps students mentally experience what they want to accomplish instead of what they do not want to accomplish. The key is to be in control of the images and be able to manipulate them. Students can improve their image control with practice using controllability exercises such as those described in the following sections.

CONTROLLING PERFORMANCE

In this exercise, the students select a specific skill that they have performed poorly in the past during competitive playing situations. Being aware of the correction of the skill error, the students imagine themselves performing the skill correctly while seeing and feeling their movements in a practice context. For instance, a student might see and feel himself or herself hitting a drive perfectly and watching the ball flight go as planned on the practice tee or in a non-competitive practice round. After this, the instructor has the student move his or her imaging practice from the practice context to a competitive playing context.

CONTROLLING PERFORMANCE ON A TOUGH COURSE, HOLE, OR TOURNAMENT

The instructor has students select a hole or course on which they have a track record of performing poorly in competitive situations. For this exercise, the students must try to imagine executing a planned playing strategy on the course or hole just as they would in competition. Students should imagine situations in which they are getting the best of the course or hole. For example, students might imagine playing a hole successfully shot by shot. Whatever students imagine doing, the instructor should be certain that they control all aspects of their movements as well as the decisions they make.

CONTROLLING EMOTIONS

For this exercise, the instructor has students select a playing situation where they tense up, become frustrated and angry, or lose concentration and patience (e.g., missing a short putt, three-

putting, or hitting one or more poor shots). It begins with the instructor having students try to recreate the unpleasant playing situation using their imaginations, especially the feelings that accompany it. After that, the students use slow, deep breathing and logical, positive self-talk to put things in perspective, manage emotions, and stay in the present instead of the past or future. Typically, these elements are essential parts of a player's post-shot routine. When practicing their slow, deep breathing and logical, positive self-talk, students should try to feel the tension drain out of their body and try to focus on what they need to do to execute their skills effectively. They should be encouraged to try to control what they see, hear, and feel in their imagery, as well as strive to learn how to manage their emotions effectively. Controlling emotions and performance will be discussed in more detail in "Lesson 1-4: The Mental Game."

EVIDENCE OF THE BENEFITS OF MENTAL PRACTICE

Anecdotal reports, such as the statements made by Nicklaus and Evert that were cited at the beginning of this chapter, are numerous. Over the years, many of the nation's best athletes and coaches have included mental practice and imagery in their daily practice sessions, and even more athletes report using mental practice and imagery when they were injured and could not physically practice. Research conducted at the U.S. Olympic Training Center (Murphy, Jowdy, & Durtschi, 1990) found that 90% of Olympic athletes used some form of imagery and 97% of these athletes reported that it facilitated their performance. Furthermore, 94% of the coaches of Olympic athletes used imagery during their practice sessions, with 20% using it at each session. In one case study (Suinn, 1976), members of the U.S. Olympic Ski Team were divided into two groups that were equally matched in ski-racing ability. The group that practiced imagery training improved much more rapidly than the control group, which practiced the same things as the imagery group, but without imagery training. The coach called off the study and insisted that all his skiers be given the opportunity to engage in imagery training.

Based on the research evidence available, mental practice and motor imagery are most effective when used as a *supplement* to physical practice. Used as a supplement, both mental practice and motor imagery have been found to enhance the performance of beginners and those who are more experienced. Evidence from early research on whether mental practice enhanced motor learning and performance (Richardson, 1967) was inconclusive. It was not until the 1980s, when meta-analyses (or quantitative reviews) were used, that mental practice was found to enhance motor performance (Feltz & Landers, 1983; Hinshaw, 1991). Other reviews (see Driskell, Copper, & Moran, 1994; Martin, Moritz, & Hall, 1999) also describe convincing evidence that, under appropriate conditions, mental practice can facilitate both motor skill learning and skill performance by facilitating performance preparation. The benefits of mental practice on motor learning and performance have been found in laboratory studies using novel motor tasks, as well as studies using sport skill performance among high school, college, and elite Olympic athletes (Kim, 1989) and rehabilitation settings involving relearning (e.g., Fairweather & Sidaway, 1993; Linden, Uhley, Smith, & Bush, 1989).

Several examples of research evidence demonstrating the benefits of mental practice in various contexts are presented in the next section.

MENTAL PRACTICE BENEFITS FOR BEGINNERS IN GOLF

One study (Brouziyne & Molinaro, 2005) investigated whether mental imagery combined with physical practice could improve chip shot performance for beginners. Twenty-three university students (eight females and 15 males; average age was 23.4 years), who were novices in the game of golf, were divided into three groups:

1. Physical Practice Group—physically practiced the chip shot
2. Physical and Mental Practice Group—combined physical and mental practice of the chip shot
3. Control Group—performed various sport activities other than the chip shot

The data revealed that beginners' chip shot performance improved more in the group that combined physical with mental practice than it did in the other two groups. This result provides evidence that mental practice can benefit beginners in learning golf skills when it is combined with physical practice.

MENTAL PRACTICE BENEFITS FOR ENHANCING MUSCULAR POWER

A 1990 study by Van Gyn, Wenger, and Gaul demonstrated the positive effects of mental practice on improving muscular power for people learning a 40-meter bicycle sprint. After being pre-tested on a stationary bicycle to determine peak power for a 40-meter sprint and sprint times, participants began a six-week training program in which they engaged in three training sessions per week. They were post-tested following the six-week training program. The training involved physical practice in which participants had to maintain maximum speed for 10 seconds. Four groups were formed:

1. Mental Practice Group—imagined performing the sprint eight times
2. Physical Practice Group—engaged in only power training
3. Mental and Physical Practice Group—imagined the sprint eight times and engaged in power training
4. Control Group—engaged in no mental or physical practice

The data revealed that only the group that received both mental and physical practice showed improvement in sprint times at the end of the six-week training program. Furthermore, both the Mental Practice Group and the Mental and Physical Practice Group improved their peak power scores between pre- and post-test scores. These results provide evidence supporting the benefits of mental practice.

MENTAL PRACTICE BENEFITS IN REHABILITATION SETTINGS INVOLVING RELEARNING

Evidence for the benefits of mental practice in the relearning of motor skills has been demonstrated in rehabilitation settings (e.g., Page, 2000; Page, Levine, Sisto, & Johnston, 2001). In 2001, Page and colleagues studied the effectiveness and feasibility of a treatment that combined therapy and imagery and compared its results to a traditional therapy program. In a group of 13 patients who had experienced a stroke sometime within the previous year, eight of the 13 received traditional therapy for three hours per week over six weeks and an additional 10-

minute guided imagery session following each therapy session. They were also instructed to practice imagery at home an additional two times per week. The remaining five patients participated in educational sessions in lieu of the imagery sessions.

The data revealed that the patients receiving the combined program improved their scores on two commonly used tests of motor function by as much as 12 to 16 points, while the group receiving traditional therapy showed little or no improvement. The hypothesis being advanced to explain the benefits of mental practice is that the motor system is being primed at a central command level that eventually leads to movements being executed more quickly and with greater control (Stevens & Stoykov, 2003).

MENTAL PRACTICE BENEFITS AS A GENERAL PREPARATION STRATEGY

Singer (1986, 1988) proposed a five-step general learning strategy that involves mental practice in three of the steps. This five-step strategy can be applied to a golf context as follows:

1. Get ready to perform the action (e.g., play a shot, hole, round, or competition) physically, mentally, and emotionally.
2. Mentally perform the action.
3. Concentrate intensely on only one relevant cue related to the action, such as a swing thought.
4. Execute the action.
5. Evaluate the performance (e.g., swing and ball flight).

Research has supported the effectiveness of this general strategy for learning a specific skill (Lidor, Tennant, & Singer, 1996). The results revealed that participants who engaged in the five-step strategy learned to perform a novel throwing skill more accurately than those who did not use the strategy. It is interesting to note the similarities of this general five-step strategy to the pre- and post-shot routines of golfers, which also make use of motor imagery and mental practice.

WHY IS MENTAL PRACTICE EFFECTIVE?

Currently, there are no comprehensive theories that satisfactorily explain why mental practice in the form of imagery is effective. There are, however, two hypotheses that have attempted to explain the benefits of mental practice: the cognitive hypothesis and the neuromuscular hypothesis.

The **cognitive hypothesis** holds that mental practice helps students specifically identify what to do and where to focus their attention before attempting to physically perform the motor skill. If, through mental practice, students are identifying the right things to do and know where to focus their attention before they attempt to perform the skill, they are better prepared to perform the skill than if they did not mentally practice at all, mentally practiced the wrong things, or had the wrong focus of attention. Students who practice mentally “can think about what kinds of things might be tried, the consequences of each action can be predicted to some extent based on previous experiences with similar skills, and the performer can perhaps rule out inappropriate courses of action” (Schmidt, 1982, p. 520). A teacher might ask beginners to picture themselves hitting a chip shot after seeing it demonstrated before having them physically try to perform it.

For experienced performers, imagery seems to help refine their skills and prepare them to make decisions and perceptual adjustments quickly. For instance, Olympic gold medalist Greg Louganis reported using imagery to help prepare to make refined changes in his dive based upon his body positioning during different points of the dive.

The **neuromuscular hypothesis** holds that mental practice results in electrical activity in the musculature involved in the movement. This suggests that the appropriate neuromuscular pathways involved in the action are activated during mental practice. For students learning to perform a motor skill, this activation is believed to facilitate learning by helping establish and reinforce the appropriate neuromuscular pathways that are essential to the physical execution of the skill. For students performing a well-learned skill, this activation prepares the neuromuscular pathways that need to be activated before they perform the skill. This preparation increases the likelihood that students will perform the skill as mentally practiced.

At the heart of the neuromuscular hypothesis is the belief that mental practice or imagery of the execution of a motor skill and the physical execution of the motor skill are in some way functionally equivalent. One consistent finding in much of the research investigating this belief is that imagery of the execution of a movement activates many of the same physiological responses (e.g., heart and respiratory rates), as well as sub-cortical and cortical areas of the brain, as the preparation to execute the movement and the actual physical execution of the movement do. However, the degree of this activation, as well as the observed physiological responses associated with mental practice and imagery of a movement, are considerably less than those associated with the physical execution of the movement. Moreover, the pattern of physiological activity for cortical measures found with imagined movements has not been found to exactly mirror the pattern found for physically executed movements, but it is much closer than it is for skeletal muscle measures of electrical activity. Electrical activity during imagery appears to “prime” the muscles (that is, get the muscles ready) rather than mirror what happens during movement execution.

Questions remain about the degree to which the imagined and actual movements are functionally equivalent. The known physiological changes associated with mental practice and imagery are promising, in that they indicate the presence of related physiological changes during mental practice and imagery. However, more research is needed to determine the extent to which these physiological changes associated with mental practice and imagery are directly related to improvements in physical movement performance.

CONDITIONS THAT ENHANCE THE BENEFITS OF MENTAL PRACTICE

Just as for physical practice, the extent to which mental practice is effective for enhancing motor skill learning and performance largely depends on the conditions used. Based on the available research, there is good reason to believe that the conditions that enhance the effectiveness of physical practice will also enhance the effectiveness of mental practice. As with physical practice, in order to enhance the benefits of mental practice, students should:

- Practice when motivated
- Practice with a purpose
- Practice the right things

- Practice the right way
- Practice the right amount
- Practice with relevant feedback

Unfortunately, systematic research investigating each of these conditions is not as extensive for mental practice as it is for physical practice. As a result, there is not yet enough research evidence to conclude that mental practice is affected in the same way as physical practice by each of these six conditions. However, it is reasonable to assume that mental practice is affected by these conditions in the same way until evidence proves otherwise. Furthermore, there has been some research that has investigated several of these six conditions in relation to mental practice, and this research does provide additional information that is important for understanding how to use mental practice to optimize motor skill learning and performance.

HOW SHOULD MENTAL PRACTICE BE USED IN RELATION TO PHYSICAL PRACTICE?

Recent research has begun to investigate the six conditions that could enhance mental practice to optimize motor skill learning and performance. The research literature indicates that, for a given amount of practice, decreased amounts of physical practice relative to the amount of mental practice decreases motor and sport performance (Feltz, Landers, & Becker, 1988; Hird, Landers, Thomas, & Horan, 1991). For example, Hird and colleagues compared six different practice conditions of mental and physical practice and found three major results:

1. Mental practice alone was better than no practice at all.
2. Physical practice was better than combinations of mental and physical practice or mental practice alone.
3. As the proportion of physical practice increased, the level of motor performance improved.

These results clearly establish the superiority of physical practice relative to the motor tasks that were used in this research. They also reveal that mental practice can have a positive effect on motor learning and performance, but not to the same extent as physical practice.

These results also suggest that, as long as students are able to physically practice, mental practice should not be substituted for physical practice unless there is some good reason. For instance, mental practice might be substituted for physical practice when students cannot engage in physical practice due to the unavailability of the practice range or golf course, being in the midst of traveling to or from a competition, not having enough time to engage in physical practice, or dealing with a minor injury or mild illness. Based on the available research evidence, it is recommended that the time allotted for mental practice should be supplemental to the time allotted for physical practice, rather than detracting from it.

HOW LONG SHOULD STUDENTS ENGAGE IN MENTAL PRACTICE?

How long should students engage in mental practice of anything (e.g., a golf skill, strategy for playing a golf course, pre- and post-shot routines, procedural steps for USGA Rules)? As with physical practice, it largely depends on how motivated they are to learn and how long they can

sustain concentration on the task at hand. It seems that students can fully concentrate on mental rehearsal for only a few minutes at a time. The few studies that have attempted to examine this variable suggest that *three to five minutes* of mental practice at one time produce the best results (Shick, 1970). Of course, mental practice of any one thing should be changed or stopped when students begin to lose their motivation or concentration.

The length of time that students need to optimize the benefits of mentally practicing a motor skill is partly a function of the extent to which the skill contains cognitive components (Driskell et al., 1994; Feltz & Landers, 1983; Hird et al., 1991). For example, playing golf, tennis, or the position of quarterback in football seems to require skills higher in cognitive components (e.g., plays and strategies) than running in track, swimming, or power lifting. Research has revealed that performance of motor skills that are inherently high in cognitive components can benefit with as little as three to five minutes, or five or six rehearsals, of mental practice. On the other hand, performance of motor skills that are lower in cognitive components may require at least 15 minutes or 30 rehearsals of mental practice.

Driskell et al. (1994) also found that the novice participants who were inexperienced in motor skills derived more benefit from mental practice of motor tasks that were high in cognitive components. They also found that the performance of participants experienced in motor skills received approximately the same benefit from mental practice regardless of the extent to which cognitive components were involved in the skills.

AT WHAT SPEED SHOULD GOLF SKILLS BE MENTALLY PRACTICED?

At what speed should students mentally practice a golf skill (e.g., full swing, chip or pitch shot, or putting stroke) before they attempt to physically perform it? Should the skill be mentally practiced slower or faster than the speed at which it is physically performed? Or should it be mentally practiced at about the same speed and take about the same time that it takes to actually physically perform the skill? Based on the research evidence available, it is recommended that students mentally practice a motor skill at about the same speed and time that it takes to actually physically perform it (Etnier & Landers, 1996). For instance, immediately before physically hitting a drive, students should mentally rehearse the driver swing needed to produce the desired ball flight relative to the target in real time. Alternately, immediately before physically executing a putt, students should mentally rehearse the putting stroke they plan to make at the same speed and time it takes to actually perform the stroke.

Some gymnasts and golfers mentally practice their procedural skills (such as the sequence of steps required to perform a floor exercise routine or play a golf course) at a speed faster than the actual time it would take to physically perform these skills. They claim that practicing at this faster speed helps them remember the steps they have to perform. Based on anecdotal evidence, these claims appear to be true—cognitively rehearsing procedural skills at a faster pace before physically performing them does not interfere with the benefits of mental practice.

SHOULD ATTENTION BE FOCUSED ON FORM OR OUTCOMES WHEN MENTALLY PRACTICING?

Should students focus their attention on their form when executing a motor skill, or on the outcome of the performance when mentally practicing the skill? For instance, in golf, should

students focus more on the form of their swing (e.g., spine angle, swing path, swing plane, movement, or club positions) or on where they want the ball to go (i.e. shot outcome) when mentally practicing? One study examined this question in the context of mentally practicing a putting stroke (Lutz, Landers, & Linder, 2002).

With the **Form Focus of Attention**, performers concentrated on the biomechanical elements required for successful putting performance (e.g., stance, ball position, keeping body and head still during a putt, and how the arms should move during the execution of the putt) prior to and during the putting stroke. With the **Outcome Focus of Attention**, performers concentrated on the path of the ball as it rolled into the hole prior to and during the putting stroke.

The data revealed that participants who focused their attention on the outcome while mentally practicing performed better than those who focused their attention on their putting form. Based on this finding, they concluded that focusing on the outcome was more effective during mental practice than focusing on form—at least for self-paced motor tasks that demand a great deal of accuracy for success, such as putting. Unfortunately, these researchers did not report whether the putting form improved more for the participants who used the Form Focus of Attention than for those who used the Outcome Focus of Attention. It could be that improvement in form occurs best when focusing on the form and improvement in outcome occurs when focusing on outcome.

These findings are similar to what was found in the research targeting the use of internal versus external cues during physical practice, as was discussed in the Level 2 PGA PGM *Intermediate Teaching and Golf Club Alteration* course. Think of focusing on form as an internal cue and focusing on outcome as an external cue. This suggests that focusing on internal and external cues provide the same results as mental and physical practice. However, further research is needed in order to prove this hypothesis.

WHEN SHOULD MENTAL PRACTICE BE USED IN RELATION TO PHYSICAL PRACTICE TO OPTIMIZE PERFORMANCE?

Should students first physically practice a motor skill and then mentally practice it before actually performing it? Or should they first mentally practice a motor skill and then physically practice it before actually performing it? Ettnier and Landers conducted research concerning these questions for a 1996 study. They used college-age participants with previous basketball playing experience and formed three groups:

- Group 1: Mental practice before physical practice
- Group 2: Physical practice before mental practice
- Group 3: Control group—no mental or physical practice

The basketball shooting task involved shooting baskets for three minutes outside an arc that was 15 feet from the basket. On trial 1, all participants physically performed the shooting task. Prior to physically performing the basketball task on trials 2 and 3, Group 1 practiced mentally before physically, Group 2 practiced physically before mentally, and Group 3 had no mental or physical practice. Groups 1 and 2 performed better than Group 3. Additionally, the group that mentally practiced before physically practicing (Group 1) performed better than the group that physically practiced before mentally practicing (Group 2). These findings suggest that it is better for

participants who are experienced in the motor task to engage in mental practice before engaging in physical practice.

COULD THE EFFECTS ATTRIBUTED TO MENTAL PRACTICE BE DUE TO MODELING?

Research evidence reporting the effects of mental practice or imagery on motor performance has often involved modeling (i.e. observational learning) in the procedures. Modeling is the use of a demonstration as a means of conveying information about how to perform a motor skill. In this research, it is difficult to determine the extent to which the effects on motor performance were due to mental practice, modeling, or some combination of both. Both mental practice and modeling were in use, and both have been shown to enhance motor performance in acquisition (motor learning) and in post-acquisition (Driskell et al., 1994; Feltz & Landers, 1983; McCullagh & Weiss, 2001).

Generally, research about the effects of mental practice and modeling has found that imagery alone is insufficient to learn a new motor skill. If the student has no experience with a skill, he or she is unable to use imagery to create an accurate model of how to execute the skill.

However, improvements in motor performance for both form and outcome during learning can be achieved with imagery when it is combined with modeling. Modeling does provide an external stimulus to facilitate imagery via a live demonstration or video of the motor skill performance to be learned. Because of this, it is not surprising to discover that modeling combined with imagery, or modeling used alone, may be the most effective way to enhance performance during motor learning or for motor skills in which form is important.

The available findings from research that combined imagery with modeling suggest that the degree of imagery's effects on motor performance during learning may have been due more to modeling than to imagery. However, further research is needed to determine the validity of this explanation and to separate the effects of imagery from the effects of modeling (Martin, Moritz, & Hall, 1999).

LESSON 1-2: OPTIMIZING THE TRANSFER OF GOLF SKILL LEARNING TO PLAY

Transfer of learning is pervasive in everyday life. The learning students achieve at one grade level in school is expected to transfer to the new learning that takes place at the next grade level, and the learning that takes place in school and college is expected to transfer to work and everyday living tasks in the non-academic world. Transfer is also pervasive in developing proficiency in the game of golf. For instance, how well a golfer performs a golf swing or putting stroke without the guidance of a drill or training aid greatly depends on how well the student is able to transfer what was learned when he or she practiced with the guidance of the drill or training aid. Similarly, how well a golfer performs when playing competitively on a golf course largely depends on how well he or she is able to transfer what was taught and practiced on the lesson tee and range in non-competitive contexts. Indeed, our educational system and virtually all instructional, training, and practice programs used in sport (including golf), military, rehabilitation, and occupational settings are based on the assumption that much of what is learned in one situation can be effectively transferred to other situations.

Many things learned in one situation (such as lesson tee and practice range) can be transferred positively or negatively to other situations (such as play on various golf courses), including golf knowledge, mental and golf skills, cognitive processing, playing strategies, and the attitudes, emotions, concepts, and perceptions involved in acquiring golf skills and playing the game. The learning in one lesson is expected to be retained and positively transfer to the new learning that takes place in the next lesson, and the learning that takes place in practice is expected, to some extent, to be retained and positively transfer to play on a golf course. However, positive transfer of learning does not automatically occur as a result of any and all teaching methods, practice programs, drills, and training aids used. Instructors and coaches must teach the right skills in the right sequence at the right time, and must structure their teaching methods, practice conditions, and use of drills and training aids to facilitate positive transfer.

Effective teachers and coaches do not leave positive transfer to chance. They know they must teach, coach, and have their students practice appropriately in order to optimize positive transfer. To do this effectively, they must have at least some basic knowledge about the nature of transfer and the factors that affect it. They need to know the answers to questions such as:

- What are the principles of effective transfer?
- What factors facilitate and interfere with transfer?
- How should teaching and practice conditions be structured to facilitate transfer?

Instructors and coaches must know the answers to these and related questions if they expect to teach and design practice programs that promote effective transfer of golf skill learning and play. This lesson focuses on that basic transfer knowledge and its applications.

LEARNING OUTCOME

After completing this lesson, you will be able to:

- Explain the theories and factors that influence the transfer of learning and playing performance of golf skills

READING ASSIGNMENT

Read the following lesson, which describes the practice and lesson techniques that bring about effective transfer.

INTRODUCTION TO BASIC TRANSFER OF LEARNING CONCEPTS

There are several concepts that are essential to know about before examining the nature of transfer and the factors that affect it. These concepts include:

- Proactive transfer
- Retroactive transfer
- Direction of transfer
- Amount of transfer

The concepts and their related terminology are introduced in the following sections.

PROACTIVE TRANSFER

Transfer of golf skill learning that affects future learning is called **proactive transfer**. More specifically, proactive transfer is the process by which learning to perform a golf skill under one set of conditions influences learning to perform the same skill, or a similar or dissimilar skill, under the same, similar, or dissimilar conditions, as illustrated below.

FIGURE 1-3: PROACTIVE TRANSFER



Three examples of proactive transfer are:

- **Learning a Swing Under Different Practice Conditions:** Students can learn to perform a golf swing in which they hit drives on the practice tee under either practice conditions or simulated playing conditions. Learning under practice conditions can certainly positively influence the performance of that golf swing when hitting drives when playing, but not as much as if they learned under simulated playing conditions.

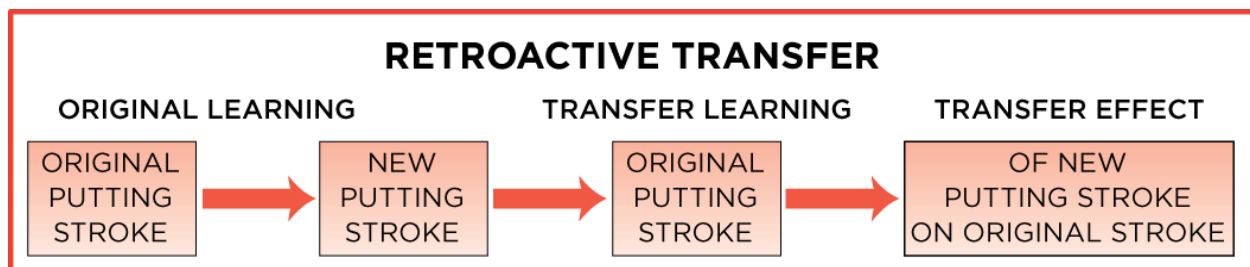
- **Learning to Correct a Flawed Swing:** Students could have initially learned a golf swing that was somewhat flawed, which inevitably has an influence on the process of learning to perform a subsequent swing that is fundamentally correct. Some previously learned parts of the flawed swing will facilitate the learning of the correct swing, whereas other parts will interfere with it.
- **Learning to Perform a Swing When the Drill or Training Aid is Removed:** Students can learn to perform a golf swing on the practice tee under the guidance of a training aid or drill, which can influence the process of learning to perform that golf swing when the guidance is removed. The less dependent they are on the guidance, the easier it will be to learn to perform the swing, whereas the more dependent they are on the guidance, the harder it will be to learn to perform it.

As can be seen in these examples, with proactive transfer, the golf skill and/or conditions in transfer learning are new to the students and the transfer of learning effect moves *forward* from original (previous) learning to transfer (new) learning. The transfer effect also can be retroactive and move *backward*, as can be seen when new learning has an effect on previous (old) learning. This will be discussed in the next section.

RETROACTIVE TRANSFER

Transfer of new golf skill learning also may affect previous learning—i.e. retroactive transfer. **Retroactive transfer** is a process by which subsequent learning of a golf skill affects the student's ability to perform a previously acquired golf skill, as shown in the following figure.

FIGURE 1-4: RETROACTIVE TRANSFER



Two examples of retroactive transfer are:

- **Returning to Old Swing After Learning a New Swing:** A group of students learned to make major changes in their original golf swing. These changes were not effective, so they decided to return to playing with their original swing. However, they soon discovered that they could not perform their original swing as well as in the past because the subsequent major changes they learned interfered with their ability to recover their original swing technique.
- **Returning to Old Putting Stroke After Learning a New One:** Another group of students learned a new way to putt because their original method of putting had lost its effectiveness. After using the new method successfully for a while, it too began to lose its effectiveness. They decided to return to their original putting method, surprisingly finding that it was more

effective than ever. For some reason, learning the new putting method after learning the original method improved the effectiveness of the original.

As can be seen in these examples, with retroactive transfer, the golf skill is familiar to the students because it was acquired in original learning (old skill) and the transfer of learning effect moves backward from the new skill to the old skill.

DIRECTION AND AMOUNT OF TRANSFER

Regardless of whether transfer is proactive or retroactive, the **direction of transfer** from one skill and/or set of conditions to another can be one of the following:

- **Positive** when the skill and/or conditions in original learning facilitate learning to perform the skill under the conditions in the transfer setting (positive proactive transfer); or when the subsequent skill and/or conditions in transfer learning facilitate the performance of the skill acquired under the conditions of original learning (positive retroactive transfer).
- **Negative** when the skill and/or conditions in original learning interfere with learning to perform the skill under the conditions in the transfer setting (negative proactive transfer); or when the subsequent skill and/or conditions in transfer learning interfere with the performance of the skill acquired under the conditions of original learning (negative retroactive transfer).
- **Zero** when the skill and/or conditions in original learning have no effect on learning to perform the skill under the conditions in the transfer setting (no proactive transfer); or when the subsequent skill and/or conditions in transfer learning have no effect on the performance of the skill acquired under the conditions of original learning (no retroactive transfer).

The **amount of transfer** refers to the quantity or magnitude of what was transferred. Although an abundance of research related to predicting the direction and amount of transfer has accumulated over the years, the theoretical picture is still not completely clear. One major reason is that research has not been able to specifically determine what is actually acquired in original learning and how the transfer skill and/or conditions are represented. Thus, it is still not possible to predict with 100% accuracy the direction and amount of transfer in all situations. However, there is enough research evidence to predict transfer with a reasonable degree of success in many situations, which provides a basis for deciding critical instructional elements, such as how to take advantage of previous learning, what skills to teach, when and in what order to teach them, how to teach them, under what conditions they should be taught, and how to structure practice conditions in order to optimize learning.

Research has clearly shown that the amount and direction of transfer is largely a function of the similarity of the relationship between the structure of the skills and stimulus conditions in original and in transfer learning. The greater the similarity of the skills and stimulus conditions in original learning and the transfer setting, the greater the positive transfer. However, a number of other factors also influence transfer, and several of these factors will be addressed in the following section.

FACTORS AFFECTING TRANSFER OF GOLF LEARNING

Transfer of golf learning depends on many factors and how they interact with each other in both original learning and transfer. These factors include:

- Time between original learning and transfer
- Structural similarity of golf skills and conditions
- Similarity of skill goals and cognitive processing
- Perceived similarity of golf skills, goals, and conditions
- Skill level reached in original learning
- Ability to learn and transfer general factors
- Emphasis placed on speed and accuracy during original learning

The next section provides a closer look at how these factors function to influence the transfer of golf skill learning.

TIME BETWEEN ORIGINAL LEARNING AND TRANSFER

The golf skill and the conditions under which it is being practiced in original learning can be near or far from the golf skill and conditions used in transfer in terms of **time** and **similarity**. These two dimensions are closely connected, in that the passage of time will tend to decrease the similarity between original learning and transfer. For instance, perception of the similarity of original learning and transfer can change with the passage of time, such that the student fails to recognize many of the essential similarities of the two contexts. In addition to changes in perception with the passage of time, other variables can factor in, such as changes in the student's memory state (potentially resulting in forgetting); motivation level; and physical, emotional, and cognitive (new learning and knowledge) states.

Any one or more of these factors can vary with the passage of time in a way that decreases the similarity between original learning and the transfer setting. Because of this, when there is a long period of time between original learning and transfer, the similarity is more likely to be affected than when it is a shorter interval. A longer time period in between original learning and the transfer setting also means there is less chance for transfer to occur. Conversely, when the time between original learning and transfer is short, there is less chance for these variables to affect the similarity between the two settings, meaning there is a greater chance for transfer to occur. For instance, if a student learns to perform a golf swing in non-simulated playing conditions on the practice range during original learning, and immediately transfers what they learned to simulated playing conditions on the practice range, this will likely result in more transfer of learning than if the transfer was attempted one week after original learning.

STRUCTURAL SIMILARITY OF GOLF SKILLS AND CONDITIONS

Transfer of golf skill learning depends on the structural similarity of the golf skills acquired in original and transfer learning. The more similar the two golf skills are, the greater the transfer of learning. For example, the movement technique involved in hitting a tee shot with a driver is

structurally similar to the technique involved in hitting a tee shot with a three- or five-wood; therefore, a considerable amount of positive transfer would be expected.

Transfer also depends on the similarity of the stimulus conditions under which the two golf skills are learned in original and transfer learning. The more similar the stimulus conditions are, the greater the transfer of learning. For instance, learning to perform a golf shot under simulated course conditions should transfer positively to learning to perform the same or similar shot under similar actual course conditions.

The extent to which transfer extends along the similarity continuum depends on each student's ability to take advantage of stimulus and response generalization. **Stimulus generalization** occurs when a particular golf skill is learned under one set of stimulus conditions (e.g., a specific practice range) and can be performed under similar sets of stimulus conditions (e.g., other practice ranges). Similarly, **response generalization** occurs when a golf skill is learned under a certain set of stimulus conditions (e.g., short game practice area) in which similar golf skills or variations of that skill (e.g., chipping, pitching or sand shots from different distances) can be performed. If both stimulus generalization and response generalization can be taken advantage of, students can learn to associate the same skill to a range of similar stimulus conditions and a range of similar skills or variations of one skill to a particular stimulus condition. The following figure and its accompanying examples provide some general principles for estimating the direction and amount of transfer. These principles can be very helpful in teaching, coaching, and designing conditions to facilitate transfer.

FIGURE 1-5: STIMULUS AND RESPONSE GENERALIZATION

Example	Stimulus Conditions	Skills	Transfer Effect
1	Same or Similar	Same or Similar	High Positive
2	Same or Similar	Similar, but Differ in Critical Ways	Negative
3	Dissimilar	Same	Slightly Positive
4	Dissimilar	Dissimilar	None (zero)

EXAMPLE 1: HIGH POSITIVE TRANSFER

When the stimulus conditions and skills in original learning are the same as those in the transfer context, the amount of transfer is likely to be high and the direction positive. For instance, if students have learned to play a particular golf shot under certain course conditions, using it the next time that the same or similar conditions appear is simply a continuation of the same learning process.

EXAMPLE 2: NEGATIVE TRANSFER

Negative transfer is likely to occur when both of the following are true:

- The stimulus conditions are the same or highly similar in original learning and the transfer setting.
- The skills are similar, but differ in critical ways.

For instance, if students have learned to perform a golf shot in a certain way under one set of stimulus conditions, they are likely to have some difficulty (especially at the outset of transfer) in learning to perform it using similar movements in a different way under the same stimulus conditions. If students have mistakenly learned to come “over the top” instead of “dropping the club” to their side at the start of the downswing, they are likely to experience negative transfer on their way to learning to drop the club to their side. This type of negative transfer is often seen in golf when the student is trying to learn to make major changes in swing technique to improve performance. If achieving the new swing change requires learning, then the stage is set for negative transfer in which the previously learned swing movement (coming “over the top”) interferes with learning the new movement (“dropping the club” to their side).

EXAMPLE 3: SLIGHTLY POSITIVE TRANSFER

Slightly positive transfer is expected when the stimulus conditions are dissimilar and the skills are the same in original learning and the transfer setting. One example of this type of transfer occurs each time students learn golf skills by taking lessons or by practicing on the range before trying to transfer those skills to play on the course. The stimulus conditions provided by lessons and the practice range are somewhat different than those found on a golf course, unless golf course conditions were simulated on the lesson tee and range. The students should be able to perform their new golf skills on the course and the range, but their performance on the course is not likely to be as good as it was during the lesson and on the range. To enhance the transfer of those skills to on-course play, they will need to use them more often on a course.

EXAMPLE 4: NO TRANSFER

No transfer would be expected when the stimulus conditions and skills are dissimilar in original and transfer learning. For instance, if students learn a particular golf shot under certain stimulus conditions in original learning, one would expect to find that such learning has no effect on learning to perform a swimming crawl stroke in transfer.

SIMILARITY OF SKILL GOAL AND COGNITIVE PROCESSING

Transfer also depends on the similarity of the goal of the skill and the cognitive processing needed to effectively perform the skill in original and transfer learning. Both the goal of the skill and the way in which it is cognitively processed by the student need to be the same or similar in both original and transfer learning to facilitate transfer. For instance, if the ultimate goal of the skill is to be able to hit a draw on a tee shot under playing conditions, then the skill should be practiced and learned under similar or simulated conditions as much as possible in order to effectively facilitate transfer to actual competitive play. Thus, skills must not only be the same or similar in original and transfer learning, but the goals of the skills and the way in which they are cognitively processed must be the same or quite similar in order to facilitate transfer.

Teachers and coaches who want to structure a learning environment to facilitate transfer must match the skill goal and the type of cognitive processing used during original learning to the goal and cognitive processing required in the transfer setting. Positive transfer is likely to be enhanced by making the goal and cognitive processing the same or similar in both original and transfer learning. For example, consider how a teacher chooses to structure practice conditions for a student who is learning a golf swing using a drill with a training aid. The teacher has the student

cognitively process and practice the skill on the range exactly the way it would be performed during play. Thus, the student is not only learning to perform the same skill in original and transfer learning, but also is learning to perform the skill in the same way in original and transfer learning. This ensures not only that the movement task is the same, but also that the cognitive processing that is necessary to successfully perform the skill during play is the same. The next step is to have the student practice this swing on the course under playing conditions.

PERCEIVED SIMILARITY OF GOAL SKILL, GOAL, AND CONDITIONS

Not only does transfer depend on the extent to which the skill and stimulus conditions in original and transfer learning are structurally similar, and the degree to which the goal of the skill and the cognitive processing are similar, but also on the extent to which the student perceives them to be similar. The greater the student's perceived similarity, the greater the amount of transfer. However, if the student does not recognize the goal of the skill and the playing conditions under which the skill or strategy is appropriate to use, little or no transfer will occur. For instance, a student may have recently learned about which short game situations are the most appropriate for using his or her pitching, gap, sand, and lob wedges. If he or she does not perceive these situations during play on a course, the student may not use the right wedge in the right situation.

The perceived similarity of skills, stimulus conditions, and skill goals in original learning and transfer depends largely on each student's background knowledge or expertise. To a great extent, a student's knowledge or expertise regarding the skill enables him or her to recognize the goal of the skill and whether the structural similarities are real (actual) and important or superficial and unimportant. The perceived similarity of the skills, goals, and stimulus conditions also depends on the context of the transfer setting. For instance, the transfer setting could be a student learning to perform a swing without the guidance of a drill or training aid, or learning to play shots on the golf course after practicing them on the range, or learning to play shots in competition after practicing them under non-competitive conditions. The context is specified by the events that take place near it in time, or the events that are retrieved from the student's memory during performance of the skill in the transfer setting.

Whether the direction of the transfer is positive or negative largely depends on the structural similarity of the skills and stimulus conditions in original learning and transfer learning, as discussed in the previous section and shown in "Figure 1-5: Stimulus and Response Generalization." The amount of transfer, however, is largely a function of the student's perceived similarity of the skills, stimulus conditions, and skill goals in original learning and transfer. The more the student believes that the skills, conditions, and goals in the two learning situations are similar, the greater the amount of transfer. Of course, no transfer occurs when the two settings are perceived as unrelated, regardless of the degree of structural similarity of the skills, conditions, and skill goals.

SKILL LEVEL REACHED IN ORIGINAL LEARNING

Increasing the amount of quality practice on the range and course during original learning can enhance the retention and transfer of skill performance to play on the course. Indeed, positive transfer increases with the level of skill performance achieved, provided that structurally similar skills and goals are involved in practice and play, and the student perceives these skills and goals as similar.

Actually, any variable that increases the amount of practice and results in an increased level of skill performance can increase transfer. For instance, a teacher could create more challenging learning conditions by delaying or giving less frequent augmented feedback during practice; alternately, the teacher could have the student use variable practice within and among skills, or simulate actual playing conditions. Any of these manipulations will result in the student needing more practice to learn to perform effectively than if the learning conditions were easier. Manipulating any variable—such as having students try to learn golf skills under simulated playing conditions—may be conceptualized as being functionally equivalent to increasing the amount of quality practice. Simulating playing conditions actually creates transfer-practice conditions that make golf skill performance, the goal of the skills, and the way they are cognitively processed more specific to the way students actually play the game on a course (Christina & Alpenfels, 2002).

One resulting effect of practicing to learn how to perform golf skills under simulated playing conditions (that is, transfer practice conditions) is that these skills would be more difficult to learn to perform than under traditional practice conditions. However, practicing like one plays encourages each student to be more cognitively engaged in the learning and performing process than traditional practice conditions, and is likely to produce a higher or more complete level of learning that facilitates positive transfer to actual playing conditions (Christina, Alpenfels, & Santiago, 2008). Compared to traditional practice conditions, students may find it more difficult to learn to perform golf skills under transfer practice conditions at the outset, but after these necessary skills are acquired, they are likely to transfer to play on the golf course more effectively.

ABILITY TO LEARN TO TRANSFER GENERAL FACTORS

There is research evidence indicating that some transfer can be accounted for by general factors, such as knowledge of principles and learning to learn. These two factors are discussed in the following sections.

TRANSFER OF PRINCIPLES, CONCEPTS, STRATEGIES, AND RELATIONSHIPS

Studies involving motor skills have shown that knowledge of principles, concepts, strategies, and relationships can transfer from original learning to transfer learning (e.g., Broer, 1958; Mohr & Barrett, 1962; Papcsy, 1968). For example, one study (Werner, 1972) demonstrated that teaching science concepts involving levers and Newton's first and third laws of motion to fourth, fifth, and sixth grade students in original learning transferred to learning to perform a variety of gross movement tasks. Taken together, the findings from these studies involving motor skills show that biomechanical principles can be transferred from original learning to transfer learning.

Remember, however, that learning movement principles, strategies, or cause-and-effect relationships that apply to a specific golf skill does not guarantee the successful transfer of the skill to transfer learning. Teaching these general factors is one thing, but learning to transfer them is very much another. Indeed, students must clearly understand exactly how to apply these general factors.

One way to facilitate the transfer potential of a general factor and bridge the gap between knowledge and application is to provide a variety of examples when teaching a principle,

concept, strategy, or relationship, and specifically show how it is applied or works across different golf skills or swings with different clubs. Once students have the idea of how a principle is applied from the performance of one golf skill or swing to another, they have a better chance of transferring it. For example, once students understand and have learned to apply the principle of impact in chipping and pitching, that principle can be transferred to full swing with all the irons in the bag.

TRANSFER OF LEARNING-TO-LEARN

Another general factor that may transfer from one motor skill to another as a function of the similarity between skills, goals, and conditions is learning-to-learn. The transfer produced by this general factor largely depends on the relationships between the skills, goals, and conditions in original and transfer learning.

The learning-to-learn phenomenon, advanced by Harlow (1949, 1951, 1959), was first observed in cognitive problem-solving tasks that were similar. The phenomenon holds that people who have learned how to solve a certain class of problems (e.g., math, crossword, or sudoku puzzle problems) quickly have learned how to learn problems of this type; that is, they have previously acquired a **learning set** for this class or category of problems. However, each learning set must be well learned so that it is reliable enough to transfer to solving new or more complex problems. Harlow's work appears to provide a basis for explaining the often observed phenomenon referred to as **insight**, a term used to explain how someone rapidly solved a problem. For Harlow, insight was a phenomenon that occurs as a consequence of learning-to-learn or acquiring a learning set for that class of problems.

Harlow's work is related to golf skills in at least two ways. First, it could partly explain how some students are able to learn new golf skills or certain aspects of them much faster than other students. It is possible that these fast-learning students have learned how to learn a class of sport skills such as object-striking skills involved in ice or field hockey and baseball, which makes it easier to learn a new sport skill in this class, such as a golf skill. More specifically, having previously acquired a learning set for the hand-eye coordination involved in striking a puck or a ball could make it easier to learn the hand-eye coordination involved in striking a golf ball.

Second, the performance of golf skills under playing conditions has a perceptual-cognitive component that involves problem solving and decision-making. For instance, having a well-learned golf swing (i.e., knowing how to control and coordinate movements to properly strike a golf ball) is a prerequisite for successful ball striking, but so too is solving the problem of what to do. Solving this problem is perceptual and cognitive in nature because it involves deciding what club to use, and where and how to play the shot based on the conditions. It does little good to have learned the appropriate golf skills without the knowledge of how to solve problems perceptually and cognitively in order to appropriately use these skills.

PERFORMANCE DIFFICULTY IN ORIGINAL LEARNING AND TRANSFER

Should students practice their golf skills under easier or more difficult conditions than those required when they actually play on a course? Or should they practice under the same conditions that are required during play? For instance, does practicing putting to a hole whose diameter is smaller (difficult) or larger (easy) than the official standard of 4.25 inches result in better putting

to the standard diameter hole than practicing to the standard diameter hole? Should students try to learn golf skills under easier practice range conditions before trying to perform them under the more difficult course conditions, should they learn them under conditions that are more difficult than actual playing conditions, or should they learn them under simulated playing conditions?

Transfer can be unequal from original learning to transfer learning for skills and/or conditions that are of different levels of difficulty to perform. There is some evidence for greater transfer from difficult to easy skills and/or conditions, and some evidence for greater transfer from easy to difficult. However, there is even more convincing evidence that direct practice on the transfer skills and/or conditions rather than practicing first on easier or more difficult versions of them leads to the greatest transfer (Holding, 1962; Leonard, Karnes, Oxendine, & Hesson, 1970; Scannell, 1968; Singer, 1966). Thus, based on this evidence, if a teacher or coach wants to optimize transfer, it is recommended that the transfer skills and/or conditions be practiced in original learning at the same or similar level of difficulty that will be demanded in transfer learning. This is one reason why practicing golf skills under simulated playing conditions on the practice range at a level of difficulty that is similar to actual playing conditions has been found to enhance transfer to actual playing conditions (Christina et al., 2008).

Although the complete answer explaining why unequal transfer has been found between original and transfer learning of unequal difficulty is still a matter of some uncertainty, there is one explanation that has been proposed (Holding, 1962, 1965). It is possible that difficult versions of skills and/or conditions in original learning include all aspects of their easier versions (referred to as **inclusion**), which could explain why a high amount of positive transfer is usually found when going from difficult to easy versions. However, inclusion is not a viable explanation for transfer from easy to difficult versions, because easy versions do not include all aspects of their difficult versions.

To explain positive transfer from easy to difficult versions, Holding proposed the transfer of **performance standards**. If practice of an easier version of the skill and/or conditions results in learning to make performance errors that are small in size, and if they are transferred to the more difficult version in which an error of the same real size is proportionately smaller, there could be a positive transfer effect when changing from the easy version to the difficult version. Furthermore, if practicing on the easier version results in learning to prefer accuracy over speed, the transfer of that learning could elevate standards of performance when changing to the difficult version.

EMPHASIS PLACED ON SPEED AND ACCURACY DURING ORIGINAL LEARNING

Should students emphasize movement speed and sacrifice movement accuracy (fundamentally correct positions) when practicing to learn how to perform a golf swing during original learning? Should they emphasize movement accuracy when practicing and sacrifice speed? Or, should they place the same emphasis on both movement accuracy and speed as will be required to perform the swing during actual play (in transfer)?

Unfortunately, no research was found specifically addressing these questions for learning the golf swing. However, there is some motor skill research from which implications can be drawn (see Rose & Christina, 2006, p. 376). This research suggests that transfer of learning how to

perform a golf swing is likely to be best facilitated by emphasizing the same speed and accuracy during original learning that is normally required when the swing is performed during play (transfer), provided it can be performed safely and with an acceptable degree of accuracy.

Of course, early in learning, performance of the swing may have to be slowed down somewhat for some students until a reasonable degree of movement accuracy can be achieved. It does little good for students to repeatedly swing a golf club quickly using totally inappropriate technique. If they continue to practice a fast, inaccurate swing, they are likely to learn a flawed swing, which they will find themselves correcting later.

If the swing has to be slowed down for some students, a progressive practice schedule of gradual increases in swing speed may have to be used. Research (Baker, Wylie, & Gagne, 1950; Sage and Hornak, 1978) has shown this schedule to have about the same transfer benefits as practicing a motor skill at the speed it is ordinarily performed. Based on this research, it seems reasonable to say that the same transfer benefits would be found for learning a golf swing under a progressive practice schedule.

However, if there is no reason to slow down the swing, it is recommended that the swing be practiced at normal speed as soon as possible in order to facilitate optimum transfer of learning. Finally, if the performance of different golf shots will demand swings at different speeds, practice under variable speed conditions is likely to provide more beneficial transfer effects than practice under a single speed (Siegel & Davis, 1980).

PART-TO-WHOLE TRANSFER

Part-to-whole transfer involves a student first learning to perform one or more component parts of a golf skill, and then transferring that part learning towards learning to perform the whole golf skill. Part learning is especially effective when the golf skill or swing is too complex for the student to perform as a whole at his or her stage of learning. For example, some beginners are not able to perform the golf swing effectively at the outset of learning, meaning they must practice and learn to perform the parts before practicing the whole swing. Another example is when an experienced player is trying to learn to make a major change in his or her swing. Typically, the player practices the correction as a part before trying to incorporate it into his or her full swing. One reason for this is that the flawed part (old habit) interferes with learning to perform the correction (new movement), making it necessary to practice the correction a lot so it can begin to override the old habit. A final example is one in which the skill contains component parts that are prerequisites for learning to perform the whole skill. For instance, before a student learns the proper way to perform a golf swing, he or she should first learn the proper way to grip the golf club, then the proper stance and posture next, and finally the ball position in relation to that stance. The grip, stance, posture, and ball position are foundational elements on which the swing depends; therefore, they are often taught as prerequisites to learning the motion of the golf swing.

When using a part method of practice for the purpose of transfer of learning the whole skill, the greatest transfer is likely to occur for the movements that are identical or highly similar between the component part(s) and whole skill. Practice on isolated parts of a golf skill always should be done in relation to the whole golf skill.

There are at least three ways in which part learning can transfer to the whole skill:

- Part-to-whole learning
- Progressive-part learning
- Repetitive-part learning

These three methods of practice and learning were previously discussed in the Level 2 PGA PGM *Intermediate Teaching and Golf Club Alteration* course, in Lesson 1-4, “Variables That Influence the Effectiveness of Practice,” under the heading of “Whole and Part Methods of Practice”. Review the contents of this particular section for a summary of these three types of learning.

LESSON 1-3: LEARNING TO MAKE SWING CHANGES

Teachers and coaches are often faced with the challenge of helping experienced players learn to make swing changes to correct flaws in their old, well-learned swings. There are a sufficient number of stories about top amateur and professional players who have tried and failed, which indicates that learning to make such corrections can be very challenging. In fact, some of these players not only failed to learn the swing changes, but also found it very difficult to return to their old swing. Conversely, there are a number of players over the years (such as PGA Tour greats Ben Hogan, Hubert Green, Nick Faldo, Tiger Woods, and many more) who succeeded in learning to make swing changes during their careers, which shows that it can be done. However, regardless of whether it can or cannot be done, players can expect their playing performance to suffer while they are engaged in learning to make swing changes. Indeed, teachers and students are undertaking a very special learning challenge and quite often entering uncharted territory when they engage in learning to make swing changes. Swing changes can have serious consequences on playing performance, and they pose many unanswered questions.

Is the student capable of learning to make swing changes in his or her old swing? Is the student motivated to learn to make the changes? How difficult are the changes actually going to be to learn? If they are difficult, why are they difficult and what can be done to facilitate that learning? Are all swing changes difficult to make, or are some easier than others? How long will it take to learn the swing changes, and how much will playing performance be affected? Are some teaching methods more effective than others for helping students learn to make major corrections in old swings? What happens if the student cannot effectively learn the swing changes, and then has difficulty returning to his or her old swing? Instead of teaching new swing movements, should teachers and coaches simply leave the old swing movements alone and teach them how to play their best with their old swing? This lesson closely examines this very special teaching and learning challenge in an effort to provide answers to these and other questions that hopefully can serve as a guide in helping students learn to make swing changes.

LEARNING OUTCOME

After completing this lesson, you will be able to:

- Explain how learning occurs when students try to make swing changes in a well-learned swing with implications for teaching and playing performance

READING ASSIGNMENT

Read the following lesson, which examines the specific challenges involved in helping an experienced player make changes to a well-learned golf swing.

PRE-SWING CHANGES

As it turns out, some well-learned, flawed skill habits are easier to change than others, especially pre-swing habits such as fundamental errors in grip, posture, and ball position. This is particularly true if the corrections are easily combined with the actual execution of the swing.

Ordinarily, pre-swing corrections are simply physical adjustments of any part of the body that are relatively easy to learn and, with some practice, can be used fairly promptly during actual play, often resulting in improved performance. For example, having a player widen his or her stance to correct for the stance being too narrow can be accomplished quickly with relatively little practice, and the benefits can be seen rather quickly. Other examples of pre-swing corrections that are physical adjustments include changing the following:

- Grip or grip pressure on a golf club
- Posture (e.g., spine, shoulder, or hip angles) at address
- Weight distribution over each foot at address
- Head or arm position at address
- Ball position at address

The following section briefly examines the nature of pre-swing changes, as well as when some changes are easier to make than others.

NATURE OF A PRE-SWING CHANGE

A position is maintained or held by the appropriate muscles exerting the appropriate amount of effort. When teachers ask students to make a pre-swing change, they are really asking them to move to make a change from one position to another. To make this change from the old position, students simply activate the appropriate muscles to exert the appropriate amount of force to move to the new position and then maintain it, which is relatively easy to do with the guidance of instruction and relevant feedback. Of course, the new position will have to be practiced with relevant feedback until a motor program is developed that can automatically (that is, without having to consciously think about how to do it) activate the appropriate muscles to exert the appropriate amount of force to generate the new position. At first, the new position will feel different, but with practice and continued use, it will begin to feel “right” or “normal.”

SOME CHANGES ARE EASY AND SOME ARE MORE COMPLICATED

Many pre-swing corrections are easy to learn to make, especially if they do not influence the performance of the swing. However, some of them can affect the execution of the swing, which makes the error-correction learning process somewhat more complicated than for those pre-swing corrections that have little or no effect on the swing.

For instance, changing a student’s grip on a golf club can cause him or her to swing differently. If the new swing caused by the grip change is fundamentally more correct than the old swing, then the grip change had a positive effect on the student’s swing. Nonetheless, the new grip and the swing change it caused will have to be practiced together until it is learned reasonably well. The new grip and altered swing will feel different to the student at first, and this will be accompanied by a lack of confidence until he or she has played enough shots with them to learn to trust them being together. However, with practice and play, the new grip and altered swing will begin to feel correct, and the student’s confidence will increase.

Conversely, if the altered swing is less fundamentally correct than the student’s old swing, then the grip change had a negative effect on the execution of the old swing. The teacher or coach has

two options at this point. One option is to let the student play with his or her old grip without changing it, because the new grip results in a less fundamentally correct swing than the old swing. The other option is to attempt to change the old grip. In this case, the student would have to be taught how to use the new grip in such a way that it does not negatively alter the old swing so as to make it less fundamentally correct. This approach can be somewhat challenging—it requires some practice to learn to pair the new grip with the old swing, rather than the old grip with the old swing. The pairing of the new grip with the old swing will feel different at first, and will be accompanied by a lack of confidence until the student has practiced and played enough shots with the new grip and old swing to learn to trust this pairing. With enough practice and play, the pairing of the new grip with the old swing will begin to feel right, and the student's confidence will increase. Before pursuing the second option, the teacher should be reasonably sure that the student is motivated and capable of learning this new pairing, and that the pairing will result in better swing and shot performance, especially under playing conditions.

In summary, pre-swing changes that have no effect on the execution of the swing are easier to make than those that do. Once these pre-execution changes are made, the student does not have to attend to or think about them during the execution of the swing. Moreover, they do not require a great deal of practice to learn. However, pre-swing changes that do have an effect on the swing are usually more challenging to learn and implement.

SWING CHANGES

Learning swing changes that result in a new swing requires that students develop either a modified or completely new motor program that is capable of controlling some or all of their movements differently than the old motor program did. In this context, **movements** are defined as the transition from one position to another. In order to control these positions differently than the old motor program did, students must learn either a modified or new motor program that enables them to move through the sequence of positions that generates the corrected or new swing.

It is the learned, modified, or new motor program that enables students to use the right muscles at the right time and exert the right amount of force at the right time to move appropriately through the right sequence of positions. Learning a modified or new motor program that is capable of effectively coordinating the activation and inhibition of the right muscles at the right time (that is, exerting the right amount of force at the right time to produce the right swing movements) requires students to go through the learning process. There are no short cuts; in fact, there is no other way to acquire this modified or new motor program but to go through the learning process.

This process of learning a modified or new motor program is one in which neural networks that make up the program must appropriately change through practice and play so that the right swing movements are generated. Some of the key neural changes that occur with physical practice and play include the following:

- Nerve cells gradually become connected in new networks that, when activated by the motor program, mediate the movements that produce the modified or new swing movements.

- Synaptic connections among nerve cells in neural networks change and become more efficient at transmitting messages via nerve impulses.
- Synthesis of ribonucleic acid (RNA) and protein increases:
 - RNA is believed to be the primary agent for the transfer of information to protein, and protein is crucial for establishing information in long-term memory.
 - Increases in RNA and protein mean that the brain will be able to transfer more information to long-term memory faster.
- Myelin surrounding the nerve fibers of the neural networks is increased.

The amount and permanency of these neural changes increase as physical practice and play increase. Therefore, when little practice or play occurs, fewer of these neural changes occur, and the changes are more temporary, which is one reason why swing change improvements seen at the last lesson or practice session are not retained at the beginning of the next lesson or practice session. Conversely, the amount of neural change is greater and more permanent with extensive practice and play, which is one reason why it is not easy for students to learn to make major corrections in a flawed swing that has been highly practiced and well learned. The next section takes a closer look at some of the challenges students face as they go through the process of learning to make swing changes in well-learned movements.

THE NEED TO PROGRESS THROUGH THE PHASES OF LEARNING

To acquire a modified or new motor program that is capable of controlling modified or new swing movements requires that the student return to the early phase of learning and then progress through the intermediate and advanced phases. The old, well-learned motor program and the swing it controls have been practiced and used in play extensively, which facilitated their storage in long-term memory. The old program and swing were developed by progressing through the three phases of the golf skill learning process, as shown in the following figure.

FIGURE 1-6: PHASES OF GOLF SKILL LEARNING



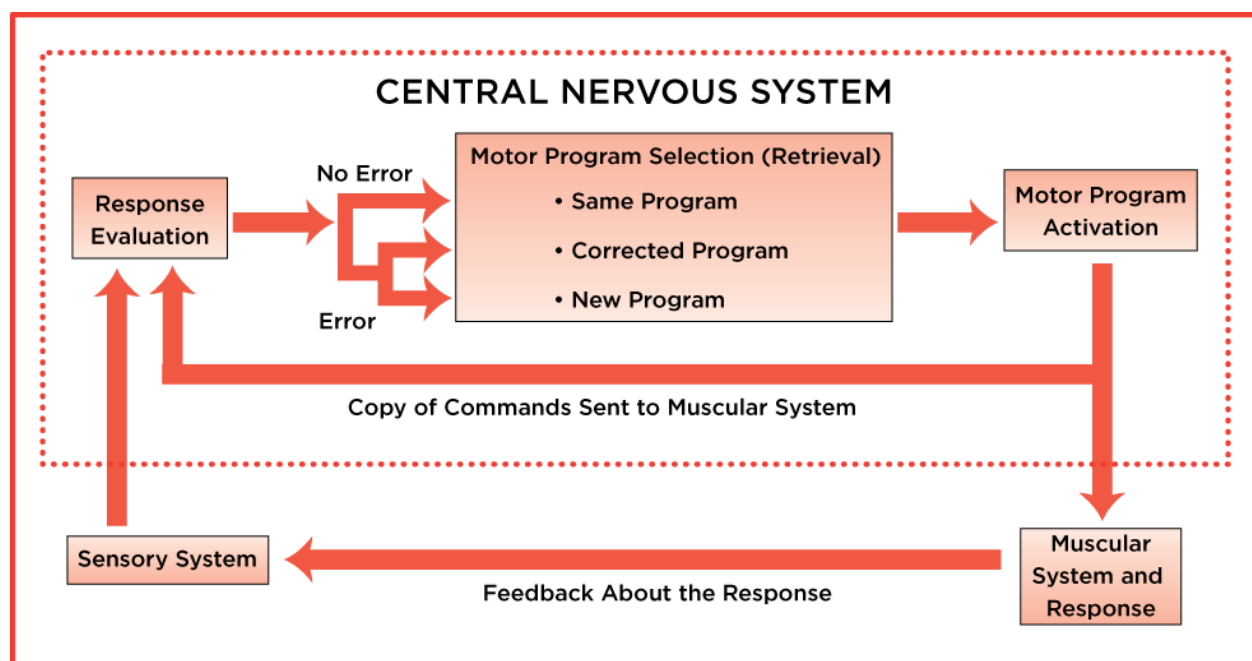
A student who has an old program and swing is in the advanced (autonomous) phase of learning. He or she activates the old program and the swing it controls autonomously—that is, without having to think about how to perform the movements that generate the swing. However, when that student tries to learn to make changes to the old program and swing, he or she must return to the early phase of learning from the advanced phase. The old motor program that once generated the swing movements autonomously, demanding little conscious attention, must be changed in order to perform the new movements. In the process of learning the new program, the new movements will be performed under cognitive control and consciously thought about, demanding a great deal of the student's attention.

The student attempting to make swing changes will have many of the same challenges and experiences as he or she progresses through the three phases of learning that were described in Lesson 1-1, “Introduction to How Students Learn,” in the Level 1 PGA PGM course, *Introduction to Teaching and Golf Club Performance*. Review this lesson for a detailed description of these challenges and experiences.

THE NEED TO LEARN A MODIFIED OR NEW MOTOR PROGRAM

Making swing changes requires that students learn either a modified (corrected) or new motor program. Just like a computer program, a modified or completely new motor program that controls a modified or completely new swing is not developed correctly on the first few attempts. A computer program must be run a number of times, errors must be corrected, and the program must be appropriately modified, until eventually the final version runs successfully. A student’s learning of a modified or new motor program may be thought of as following a similar procedure, as shown in the following figure (Christina & Corcos, 1988), which was first introduced in Lesson 1-1 of Level 1.

FIGURE 1-7: MODIFYING AN EXISTING MOTOR PROGRAM



As the student listens to the introduction and explanation of the swing changes and watches several demonstrations, he or she begins to develop a motor program of instructions, which is a sequence of general instructions that the student’s nervous and muscular systems must carry out for the successful production of the movements that make up the swing. These general instructions are written in the language of the nervous system (that is, electro-chemical nerve impulses) and transmitted by the nervous system to the muscular system to generate and control the movements that make up the swing. Next, the student attempts to perform the movements that make up the modified or new swing. This step is a test run of the modified or new motor program for executing the swing, at which point it can be determined how well the new program

worked. The motor program is activated, and the commands are sent via the nervous system to the appropriate muscles. A copy of the motor program commands remain somewhere in the nervous system for later response evaluation.

The modified or new swing is executed, and feedback about it (e.g., shot outcome, teacher's comments, or student's feel of the swing) is received through the sensory system. At this point, response evaluation is performed by comparing the feedback received with the retained copy of the motor program commands that were sent. Specifically, response evaluation involves matching the intended movements and the expected shot outcome with the actual movements performed and the actual shot outcome to determine if the swing was executed as planned. If the expected swing and outcome match with the actual swing and outcome, then the swing felt good and the response evaluation is "No Error." If they do not match, then the swing felt bad, there is a problem with the motor program, and the response evaluation result is "Error."

If the swing evaluation result was "No Error," the same motor program will be retrieved from memory the next time the swing needs to be performed. However, if the swing evaluation result was "Error," an attempt will be made to correct the motor program, and a modified or entirely new program will be used the next time the swing is performed.

THE NEED FOR PHYSICAL PRACTICE TO LEARN A MODIFIED OR NEW MOTOR PROGRAM

Learning a modified or new motor program that effectively controls a modified or new swing takes physical practice. As mentioned earlier, there are no short cuts—there is no other way to learn a motor program but through physical practice. Obviously, the more practice that is needed to learn the modified or new program, the more time it will take. How much practice and time will be needed cannot, at this time, be predicted based on scientific evidence. The best that teachers and coaches can do currently is estimate the amount of practice and time needed for each student to learn swing changes and transfer them to playing conditions based on their experience and that of colleagues. Undoubtedly, many factors must be taken into consideration when determining that estimate, such as:

- How complex the swing change movements are to learn
- The influence of the old swing movements on acquiring the new swing movements
- The capabilities of the student to learn the swing change movements
- The motivation of the student to learn the swing change movements
- How effectively the swing change movements are taught
- How effectively the swing change movements are practiced

The following sections give a closer look at each of these factors and how they determine the amount of practice needed to learn motor programs.

HOW COMPLEX THE SWING CHANGE MOVEMENTS ARE TO LEARN

Some swing change movements are easier to perform than others. Less practice is required to learn a relatively simple modified or new motor program than swing change movements that are

more complicated to execute. One way to view how complex swing change movements are to learn is from the perspective of the central nervous system and muscular system. During the learning of complex swing change movements, students often say things like, “I know what to do, but I just cannot do it yet” or “I know how I am supposed to move, but I am having difficulty doing it.” What they mean is they cognitively understand how to make the swing change movements, so they have the beginning of a simple modified or new general motor program, but they are unable to use it to perform the desired movements. The new program and the associated neuromuscular coordination can only be learned through physical practice. This section will delve into what exactly happens when this learning takes place.

Modified or new golf swing movements are controlled by the modified or new motor program, the central nervous system (CNS), and the muscular system. The CNS is hierarchically organized in different levels. At the higher levels are the brain and sub-cortical structures (e.g., basal ganglia and cerebellum), which provide the executive movement plan’s (that is, the motor program’s) sequence of instructions to the lower levels of the CNS (e.g., nerve cells and motor neurons located in the spinal cord). The higher levels through the modified or new motor program have overall responsibility for the functions of the lower levels of the CNS. In effect, the lower levels are subordinate to the higher levels, and their function is to carry out the details of the instructions specified by the modified or new motor program that are needed to perform the swing. It is only through physical practice of the modified or new swing movements that the lower levels learn how to carry out the instructional details of the motor program. For instance, as students practice to learn modified or new swing movements, they cognitively search for the best way or best strategy to engage the higher levels to control the lower levels in order to execute the movements needed to effectively perform the desired swing. As students practice and progress through the phases of learning, the lower levels gradually come under better control of the higher centers of the nervous system to more effectively carry out the instructions specified by the motor program.

It is clear that the higher levels of the CNS have a lot to learn to control at the lower levels to effectively generate the modified or new swing movements. The question of how the higher levels do this is still a matter of some uncertainty, but there is evidence proposing one theory (Basmajian, 1977). Through extensive practice with relevant instruction and augmented feedback, the higher levels learn to communicate better with the lower levels to progressively inhibit undesirable movements until the modified or new swing movements are achieved. Learned modified or new swing movements are ones that have acquired the best level of inhibition possible up to that time. Continued practice to perfect these movements consists largely of progressively more successful repression of unwanted movements. Learning modified or new swing movements is largely the process of progressively inhibiting the undesirable movements until only the desirable movements are activated.

Once learned under practice conditions, the modified or new swing will have to be practiced under simulated or practice round playing conditions (in other words, transfer practice) to facilitate transfer to play. Quite often, more complex swing change movements require more transfer practice than those that are less complex to perform. Moreover, they usually need to be performed more often under actual playing conditions than those that are less complex before the modified or new swing becomes somewhat reliable.

INFLUENCE OF OLD SWING ON LEARNING A NEW SWING

The amount of neural change is greater and more permanent with extensive practice and experience, which is one reason it is not easy to learn major corrections for a flawed swing that has been highly practiced and well learned. However, corrections can be made with further practice to develop a modified neural network to mediate the corrected swing. For a student to completely rebuild a swing, he or she must be committed to doing whatever needs to be done to learn the corrections, which undoubtedly will include an extensive amount of practice.

It is not easy to modify a neural network after the synaptic connections, myelin, and RNA and protein synthesis change as a result of extensive practice and play. Modification usually takes a considerable amount of practice and play, and does not destroy the “old” neural network. This means that sometimes the old network will compete and interfere with the “new” network when executing the modified or new swing movements. The new network must be practiced a greater amount than the old network was in order to minimize the competition and interference between them.

Old swing movements and their neural network(s) can facilitate, interfere with, or have little effect on learning new swing movements and their neural network. The rate of learning (that is, the amount of improvement divided by the amount of practice) is likely to be faster with less practice needed when old swing movements transfer positively or facilitate the performance of the new swing movements. In other words, the old neural network makes it easier to implement the new neural network. Conversely, the rate of learning can be expected to be slower with more practice needed when old swing movements and their neural network negatively transfer or interfere with the performance of the new swing movements and their neural network. Often this happens when the old swing movements (e.g., coming over the top on the downswing) are in an opposite or different direction than the new swing change movements (e.g., dropping the club to the inside on the downswing).

This negative effect or interference is evident not only in learning under practice conditions, but also when students try to take their new swing to the course or experience the stress of competitive pressure for the first time. Under increased levels of competitive pressure, it is not uncommon to have the old swing movements come out instead of the new swing movements. Usually, this negative transfer or interference can be overcome by increasing the amount of practice under both practice and playing conditions until the new swing movements become more strongly established in long-term memory than the old swing movements. Retrieving the proper movements can also be aided with a pre-shot routine that includes amended physical or mental preparation that focuses the student’s attention.

CAPABILITIES OF THE STUDENT TO LEARN THE SWING CHANGE MOVEMENTS

The student’s cognitive ability to understand how to perform the swing change movements and to translate that understanding into physically performing those movements is essential. Some students appear to be faster at learning how to do this than others. Another factor is the student’s cognitive ability to understand how the old swing movements can be used to facilitate the performance and learning of the new swing movements, or how they interfere with the execution of the new movements so that the interference can be overcome. Of course, the student also has to have the necessary physical ability to actually perform the new swing movements. This is

especially true when the old swing movements interfere with the performance of the new swing movements. This interference can be frustrating and try a student's patience, but learning will proceed more effectively if he or she is able keep this acquisition process in perspective and avoid becoming too discouraged. When this interference gets the best of students, they often act on the basis of their emotions instead of rational reasoning. Some students are better at controlling their emotions in this situation than others, and teachers will be challenged to help those frustrated students control their emotions in practice and beyond.

THE STUDENT'S MOTIVATION TO LEARN THE SWING CHANGE MOVEMENTS

The motivation to perform the swing change movements under practice conditions and, following that, continue to practice those movements under simulated and actual playing conditions is absolutely essential for learning. The student must be committed to learning to make the new swing movements and dedicated to practicing as much as it takes until the movements are learned and can be used effectively during play. Seeing little or slow progress with continued practice can be frustrating and somewhat discouraging for most students, which can negatively affect their level of motivation to persist. When this happens, teachers and coaches are faced with the challenge of finding ways to help their students regain their motivation.

Some students are more motivated than others to learn to make swing changes, and are more willing to pay the price to learn to improve, no matter the cost. Asking a student to dedicate months of practice to learning major swing changes may or may not be consistent with his or her long-term golf goals. Some students are continuously motivated to strive to improve so they can reach their full potential as a player at the college or professional level, whereas other students have less lofty goals. There is a bottom line question that should be asked when assessing how motivated a student is to learn: are the swing changes, and all that comes with learning to make them, consistent with the student's long-term goals? If they are not, the teacher or coach will have to reconsider his or her course of action. If they are, then it is time to propose this major learning challenge to the student.

HOW EFFECTIVELY THE SWING CHANGE MOVEMENTS ARE TAUGHT

Obviously, the learning of swing change movements will be more effective when they are taught properly. For example, this learning will proceed more effectively when the following conditions are met:

- The rationale for the swing change is explained.
- New swing movements are clearly explained and demonstrated in relation to the old swing movements.
- Questions are appropriately answered.
- Appropriate teaching aids, training aids, and drills are used.
- Relevant instruction and augmented feedback is provided.
- Appropriate skills and transfer practice routines are provided.
- Empathy, patience, and encouragement are provided.

Conversely, the learning of swing change movements will be less effective when they are not taught properly. How to teach golf skills effectively has been covered in the lessons devoted to teaching at all three levels of the PGA PGM curriculum.

HOW EFFECTIVELY THE SWING CHANGE MOVEMENTS ARE PRACTICED

Effectiveness of practice refers not only to how well each student “stays on task” and concentrates on learning to perform the new swing change movements, but also to how appropriately the practice was structured to serve that purpose. The two major ways to structure practice are **skills practice** and **transfer practice**. The purpose of the skills practice is to learn and maintain golf skills, which includes new swing change movements, and the purpose of transfer practice is to transfer what is learned in skills practice to play on the golf course. Skills practice and transfer practiced were introduced and described in the Level 1 PGA PGM *Introduction to Teaching and Golf Club Performance* course.

AN APPROACH TO MAKING SWING CHANGES

This section describes one way to approach students about learning to make major swing changes. This approach is intended to serve as a guide, and not as the only way to approach students about this challenging learning problem. This section is divided in two parts. The first part focuses on what teachers and coaches would be wise to do well before approaching students about the possibility of learning to make swing changes. The second part discusses how teachers and coaches could actually approach students about learning to make swing changes.

KEY QUESTIONS TO ASK BEFORE MAKING SWING CHANGES

Before actually approaching a student about learning to make major swing changes, teachers and coaches should thoroughly think through the advantages and disadvantages of having the student engage in this learning. Although it is possible that having a student engage in learning major swing changes could greatly improve his or her swing and playing performance, it also could make his or her swing and playing performance worse. If the swing changes are ineffective, the student may have considerable difficulty in returning to his or her old swing because the swing changes are interfering with the recall and execution of the old swing, which further complicates the issue. For these reasons, as well as the likelihood that the student’s swing and playing performance will suffer while engaged in this learning process, teachers and coaches must carefully consider this learning situation before asking the student to learn to make major swing changes. In the process of making this decision, teachers and coaches can consider the following questions:

- To what extent will the swing changes improve the student’s swing and playing performance?
- To what extent is the student capable of learning the swing changes under practice conditions and then transferring them to playing conditions?
- To what extent will the old swing movements interfere with and/or facilitate the learning of the new swing movements?
- How long will it take the student to learn the swing changes under practice conditions and then transfer them for use under playing conditions?

- To what extent will the student's shot and playing performance be adversely affected?
- To what extent is the student motivated to learn the swing changes?
- If the student is going to be asked to learn the swing changes, how and when will they be taught and practiced?

There is no magic formula that can be applied to find the answers to these questions. The answers will be largely determined by each teacher's or coach's judgment, which should be based on factors such as knowledge about learning and transfer of learning, practical experience involving the teaching and learning of major swing changes, advice from colleagues and players who have attempted to make similar major swing changes, and the student's learning capabilities and motivation to learn to make the swing changes. The information presented previously in Part 1 of this course will certainly be helpful in making that decision.

Sometimes the answers to these questions will indicate that a student should engage in an instructional and practice program that will enable him or her to learn the new swing movements, and at other times they will not. If the decision is to ask the student to consider learning to make major swing changes, it is time to approach the student.

APPROACHING THE STUDENT ABOUT LEARNING MAJOR SWING CHANGES

It is important to discuss and explain the swing changes with the student so that he or she not only understands what they are, how they should be performed, and why they should be learned, but also becomes motivated to learn them. Such a discussion and explanation is essential because of the commitment that must be made by the student, which will translate into the extensive amount of practice required to successfully learn the swing changes. Because it is the student who must learn to make the swing changes and who will suffer any adverse effects on his or her swing and playing performance during learning, it is essential that the teacher or coach get him or her to buy into what must be learned. The student is more likely to become convinced and take that responsibility if he or she believes that learning the swing changes will significantly improve his or her swing and playing performance.

If the student agrees to try to learn to make the swing changes, the teacher or coach should provide the student with an instructional or learning and practice plan for acquiring the swing changes. This working plan should include the swing changes that would be taught and practiced, when they would be taught and practiced, and how they would be taught and practiced. The plan would have to be developed by the teacher and discussed with the student before the first lesson and practice begins. Afterwards, it would be appropriately adjusted or changed in relation to the student's progress for learning the swing changes.

The teacher should also briefly explain what the student is likely to experience as he or she progresses through the three phases of golf skill learning. For example, the student should understand that he or she will have to return to the early phase of learning and then progress through the intermediate and advanced phases before the swing changes can be performed proficiently. In the early and (to some extent) intermediate phases, he or she will have to think about how to perform the swing change movements, which produces adverse effects on swing and playing performance. However, with continued practice of the swing change, movements will gradually become more autonomous, with less and less conscious thought required about

how to execute these movements. Therefore, the student must have a strong commitment to making the swing changes because of the likelihood of adverse effects on swing and shot performance during the learning process. In other words, performance often gets worse before it gets better, and it will not be as proficient as it was with the old swing. However, when the swing changes are learned, performance will be better than it was with the old swing. The student needs to have some understanding of this swing change learning process so that there are no surprises.

Once the instructional and practice program is underway, some students may become so frustrated that they want to quit the swing change program and return to their old swing. Some students may even blame the teacher or coach for any poor swing, shot, or playing performance during learning, or for not being able to learn as quickly as they think they should. These students blame the teacher or coach for talking them into trying to make the swing changes. If this occurs, teachers and coaches should be prepared to accept the blame where appropriate, but remind the students that they agreed to engage in the swing change plan and that everything was explained to them before they consented to try it. They also agreed to take responsibility for learning to make the swing changes before the program began. At the same time, it is also important to take the pressure off the student when appropriate, because the relearning phase can be very challenging, discouraging, and frustrating at times. Be prepared to keep the student grounded in the reality of the learning process, giving him or her complete support and plenty of encouragement.

LESSON 1-4: THE MENTAL GAME

Successful playing performance requires more than learning a good golf swing and short game skills. One cannot overlook the importance of a physically sound body, properly fitted equipment, and the ability to adapt to unusual and special conditions. Yet, considering all of these factors, one of the most critical variables in determining successful playing performance involves the mental or psychological skills needed for a player to effectively manage his or her emotions and think effectively. Indeed, golf is a physical and mental game, and the latter grows in importance with the mastery of the physical skills, to the point where top players will claim that 70% to 90% of their results depend on their mental performance. The best players know that effective management of emotions and perfect thinking usually produces positive results, and that ineffective management of emotions and flawed thinking leads to flawed results.

This lesson begins by identifying and discussing how players mentally get in their own way, preventing themselves from effectively using their golf skills and playing their best. Next, the lesson focuses on how players mentally get out of their own way so they can effectively play their best. The final part of the lesson focuses on the key elements of pre- and post-shot routines that are essential to learning to optimize playing performance. The content in this lesson attempts to build on and complement the excellent information on the psychology of playing provided in Chapter 19 and in Appendix 19 of the *PGA Teaching Manual: The Art and Science of Golf Instruction*. Students are strongly encouraged to read this information in addition to the content of this lesson. Armed with information from both sources, teachers and coaches will be better prepared to deal with the mental side of the game with their students.

LEARNING OUTCOME

After completing this lesson, you will be able to:

- Explain how to teach students to learn an effective mental game to optimize their playing performance

READING ASSIGNMENT

Read the following lesson, which examines the mental and psychological aspects of playing the game of golf.

HOW PLAYERS MENTALLY GET IN THEIR OWN WAY WHEN PLAYING

There are numerous ways in which players mentally get in their own way when playing. When one or more of them are operating, they can interfere with the player's learned ability to retrieve the appropriate motor program from long-term memory and/or effectively implement it to successfully execute a well-learned golf skill. These ways rarely operate when playing shots on the practice range or during a practice round on a course, which makes it easy for the player to retrieve and implement the appropriate motor program to effectively execute the desired golf skill. However, these ways frequently operate during competitive play, and can potentially interfere with the player's ability to retrieve and implement the appropriate motor program. This is one of the main reasons that players find it harder to execute their golf swing and short game

skills as planned during competitive play than practice rounds. The following sections identify some of the more common ways that can function to interfere with each player's ability to play their best.

TRYING TOO HARD TO ENSURE SHOT OUTCOMES

Players commonly either try too hard or try to do too much to ensure their shot outcomes, doing such things as:

- Thinking too much prior to and during the swing or putting stroke
- Cognitively trying to guide or steer the execution of the swing or putting stroke movements
- Thinking too much and taking too much time on certain shots
- Trying difficult and risky shots that are not needed and have a low probability of success

FOCUSING ON THE WRONG THINGS

Many players will end up focusing on the wrong things during their swing, making it more difficult to make swing changes. Some mistakes include:

- Placing too much focus of attention on what not to do immediately before and during the shot to be played (e.g., do not hit it in the water, do not miss this putt, do not pick the club up on the backswing, do not take the club back too quickly on the backswing)
- Placing too much focus of attention on a future or past shot outcome, score on a hole or holes, score for a round or rounds, or winning or losing the tournament immediately before and during the shot to be played
- Thinking too much about swing mechanics instead of playing the game—for instance, trying to correct a golf skill technique (e.g., swing, putting stroke) during warm-up and play instead of accepting it and playing with it

PLAYING WITH DOUBT OR LACK OF CONFIDENCE

Having doubt or a lack of confidence can negatively affect one's ability to learn in several ways, including:

- Lack of confidence in certain golf skills and parts of one's game when they are, in fact, fundamentally solid
- Doubt about whether one can make the stroke needed to hole the putt or the swing needed to perform the shot
- Lack of confidence in the line and/or speed of a putt
- Doubt regarding the club selection, the type of shot to play, the direction and amount of wind, etc.
- Lack of confidence regarding whether one can play at a particular level of tournament competition

When the player doubts his or her ability to succeed and expects to fail, he or she is creating a self-fulfilling prophecy, meaning that his or her doubt actually helps cause the failure to happen.

Unfortunately, this is common in the game of golf. Negative self-fulfilling prophecies are psychological barriers that lead to a vicious cycle: the expectation of failure leads to actual failure, which lowers self-image and increases expectations of future failure.

PLAYING WITH OVERCONFIDENCE

Overconfidence in one's golf skills and game is being falsely confident. In other words, the confidence in one's skills, game, and ability is greater than is warranted. It can lead to believing that one does not have to practice one's golf skills and game as much as one should to play well. Some use overconfidence to cover self-doubts about their golf skills and game. This false overconfidence is an attempt to hide actual feelings of self-doubt.

PLAYING WITH FEAR

Some common examples of playing with fear include:

- Fear of embarrassment
- Fear of not playing or executing a shot or putt well
- Fear of not achieving the desired outcome and living up to one's expectations
- Fear of not being respected by others if one plays poorly
- Fear that one's worth or value as a human being will be diminished in some way if one plays poorly
- Fear that one will not make the team, starting line-up, or tournament cut if he or she plays poorly

UNWILLING TO ACCEPT POOR SWINGS AND SHOT OUTCOMES

A player might be unwilling to accept their poor swings or shot outcomes for any number of reasons, including:

- Being unable to believe that one could even make a swing or stroke a putt that could produce such a poor shot outcome under pressure
- Being unable to believe that the ball could take such a bad bounce or miss the hole on such a good putting stroke
- Expecting perfection or near perfection on every swing or putting stroke, and being unable to understand why one did not achieve it
- Losing control of one's emotions because the shot did not turn out as expected, which encourages undesirable behaviors like throwing clubs, cussing, sulking, using negative self-talk, and perhaps even walking off the course
- Not understanding and respecting the full extent of the game's unpredictability

HAVING A NEGATIVE, NON-APPRECIATIVE ATTITUDE

There are several ways in which one might have a negative, non-appreciative attitude on the course, hindering one's ability to play one's best, including:

- Having little or no interaction with other players with whom one is paired because they are the opposition
- Resenting, rather than appreciating, good shots played by competitors with whom one is paired
- Ignoring, rather than taking a little time to appreciate, the beauty of the golf course, environmental surroundings, or day
- Ignoring, rather than appreciating and acknowledging, the people who organized and conducted the tournament

MANAGING EMOTIONS INEFFECTIVELY

A few ways in which players might ineffectively manage their emotions include:

- Becoming too excited prior to or during competitive play, which can negatively affect one's preferred playing rhythm
- Becoming too angry, disappointed, discouraged, or elated in response to certain shots or a score on a hole or round and, as a result, thinking and acting emotionally instead of rationally during the round
- Becoming intimidated by players with whom one is paired, and consequently acting emotionally rather than rationally

PLAYING WITH EXCUSES

Some player excuses that might interfere with playing and learning effectively include:

- Do not like the course
- Do not like the pin placements
- Do not like the greens
- Do not like the players with whom one is paired
- Do not like the weather
- Do not like the lie in the fairway because the ball is in a divot
- Do not like the lie in the bunker because the ball is in a footprint

HAVING UNREALISTIC GOALS OR EXPECTATIONS

If one's goals or expectations are unrealistic, this can seriously interfere with one's ability to play. A few ways in which this tends to happen include:

- Regularly expecting or setting a goal to play much better than one's current golf skill level will allow—for instance, expecting to shoot an 18-hole score under par on a given day when one's scoring average is 10 over par
- Expecting to defeat a scratch player on a regular basis when one's handicap is 15—one might defeat the scratch player if one plays very well and the scratch player plays poorly, but not on a regular basis

- Setting short- or long-term learning and performance goals that are highly unlikely to be achieved given one's current skill level, learning capabilities, and the amount of time available for practice

PLACING TOO MUCH IMPORTANCE ON PLAYING OUTCOMES

Placing too much importance on one's playing performance outcomes only creates added pressure that does not have to be there. For example, placing too much importance on an 18-hole score, a score on a hole, any one shot or putt, or where one places in a tournament will only direct attention away from the things one should be focusing on to prepare to play each shot to the best of one's ability. In other words, placing too much importance on the game's outcomes directs one's focus of attention away from the process of playing the game and creates added pressure to achieve these outcomes over which one does not have 100% control. Needless to say, the added pressure will negatively affect playing performance.

USING ILLOGICAL, NEGATIVE SELF-TALK

When someone says things to himself or herself following a poor shot or round, such as "I stink," "How can I be so bad?" or "I am terrible," he or she is using illogical, negative self-talk. In these situations, a player is wrongly evaluating his or her worth as a player, and perhaps sometimes as a person, based on a bad shot or poor round of golf. Just because the shot or round was bad does not mean that someone is a bad player or person. Negative self-talk is critical, self-demeaning, counter-productive, and induces anxiety, preventing people from playing their best. It negatively affects playing performance and creates anxiety and self-doubt. The more someone uses illogical, negative self-talk, the more his or her playing performance is likely to deteriorate. It is useful to keep in mind that one is never as bad as one thinks one is when one plays very poorly, and one is never as great as one thinks one is when one plays brilliantly. It is important to keep one's level of play in perspective and use logical, rather than negative, self-talk.

HOW PLAYERS MENTALLY GET OUT OF THEIR OWN WAY WHEN PLAYING

Now that it has been established how players can mentally get in their own way, the next section takes a look at what they can do mentally to get out of their own way. The first thing players must do to improve is become aware of the psychological playing problems that are interfering with their ability to play their best. For example, if they know they have a fear of missing short putts or the tendency to think too much about a poor score or shot on a past hole, they can begin to address the problem. Presented next are guidelines for helping players learn to have the discipline to deal with these psychological playing problems so that they are better able to get out of their own way when they play.

USE LOGICAL AND POSITIVE SELF-TALK

Logical self-talk involves talking to oneself in a rational way before, during, and after rounds, especially poor shots or rounds, missed putts, or bad, unfair bounces and breaks. Unfortunately, the tendency for many players is to use emotional, irrational, negative self-talk after disappointing outcomes, sometimes even using these negative outcomes as supposed evidence of one's worth as a player or person. It is much better to view poor performances as mere stepping

stones to achievement—one can learn from the mistakes that caused these poor performances and use logical self-talk that is positive. This will be discussed in more detail later in the lesson, when pre- and post-shot routines are presented.

Logical self-talk can also help one stay in the present and in the process of playing the game. This can be done by simply talking oneself through each shot from the beginning until the shot is played, and even after the shot is played. For example, it is common to have a conversation with oneself about which target to select, the yardage, and which club to use. When trying to decide on the right club to use, a player might say, “It is 150 yards to the pin and I have a good lie. The wind is against me, which will make the shot play about a half a club longer. I would normally hit a 7-iron, but with the wind, I am going to knock down a 6-iron.” Another example is when a swing thought is being used to keep from picking the club up and being too fast on the first part of the backswing, at which point one might say to oneself, “Low and slow,” immediately before beginning the backswing. Logical self-talk that keeps one’s mind on the process of playing the game—rather than shot, round, or tournament outcomes—is considered to be positive. Moreover, positive self-talk can enhance one’s confidence or motivation. Saying something immediately before one plays a shot, such as, “I can do this” or “I have got this shot,” can help provide the confidence to let the swing go naturally instead of trying to steer it to ensure the shot outcome. Alternately, saying something immediately after playing a good shot, such as, “That felt good and proves that I can do it,” verbally reinforces oneself and the shot just played. It is a way of rewarding oneself for a well-played shot and enhancing one’s confidence level.

SET REALISTIC, MODERATELY CHALLENGING GOALS

Setting realistic goals for oneself that are moderately challenging is a great way of mentally getting out of one’s own way. For instance, a player could set goals in the following two ways:

- Setting a goal to play a little better than one’s current golf skill level—for instance, one could expect to shoot an 18-hole score that is a little better than what one’s handicap would predict
- Setting realistic short- or long-term learning and performance goals that are moderately challenging to achieve given one’s current skill level, learning capabilities, and the amount of time available for practice

FOCUS ON THE PRESENT

What is the most important shot in golf? The answer is “The shot that one is about to play.” One cannot do anything about one’s past shots, and it is impossible to physically play future shots. So, why not focus completely on the shot happening right now? It is physically impossible to play more than one shot at a time, but it is possible to think about the past poor shots or future shots while preparing and playing the present shot. Thinking about anything else other than what must be done to play the present shot results in less than 100% attention being devoted to the present shot. Hence, the frequently given advice to “play one shot at a time” is more accurately stated as “mentally play one shot at a time.”

FOCUS ON WHAT TO DO

It is okay for a player to identify the trouble spots to avoid before playing a shot. In fact, knowing where the trouble spots are helps him or her select a target that will optimize the

chances of avoiding them. However, once the target or the line for a putt has been selected, the player must focus 100% on what to do to play each shot to the best of his or her ability. All too often after the target has been selected, players continue to have thoughts about what not to do instead of what to do. Quite often, this is a shot outcome such as “Do not hit it in the water” or “Do not hit this chip fat.” Sometimes it is a swing or stroke mechanic such as “Do not come over the top on the start of the downswing” or “Do not move the head on the putting stroke.” Regardless of whether players are thinking of what not to do as a shot outcome or swing mechanic, it can interfere with the execution of the planned swing or putting stroke. For instance, if a right-handed player plans to play a draw starting down the right-center of the fairway, but thinks about not hooking the ball to the left immediately before the swing and during the backswing, he or she is likely to block it to the right. Remember that after selecting the target or putting line, focus on preparing what to do. If thoughts about what not to do occur, it is best to step back, get refocused on what to do, and start again.

PLAY WITH CONFIDENCE

The most important person who must believe in a player is the player. More specifically, in order to play his or her best, the player must realistically believe in his or her ability to do the following:

- Perform the golf skills needed to play the shots
- Manage his or her game and the course

Having a higher level of confidence gives the player a better chance of playing a successful shot than a lower level. Confidence can increase the chances of playing a shot when a player has the skills and can manage his or her game and the course, but it will not overcome incompetence. If a player does not have the golf skills needed to play the shots or manage the game or the course, then there is good reason for him or her to lack confidence. Generally, one will always have the appropriate level of confidence if it is realistically based on one's ability to perform the skills needed and manage one's game and the course.

The level of confidence determines the amount that the player commits to the swing, putting stroke, line and speed of the putt, club selected, or type of shot to play. For example, if one is 100% confident in the line and speed of one's putt, one will commit 100% to it and increase the chances of a good stroke. If one is 70% confident in line and speed, one will commit 70% to it, which increases the chances of a less than desirable stroke.

When one is 100% confident in one's golf skills and game, and is well prepared to play the shot or putt, this confidence increases one's chances of performing as though one is on the practice range or green. For instance, it helps one not to care too much about the shot outcome as one typically does in a tournament. One common characteristic shared by Harry Vardon, Gene Sarazan, Bobby Jones, Walter Hagen, Byron Nelson, Ben Hogan, Sam Snead, Arnold Palmer, and Jack Nicklaus was the belief in themselves, in their game, and that they could defeat anybody in the world (Aultman & Bowden, 1975).

MAKE WISE DECISIONS

Playing smart means making wise decisions. Playing smart enables players to increase their chances of playing shots that are likely to result in the lowest scores. Wise decisions enable players to do what is needed to hit the greatest number of fairways and greens, and take the fewest number of putts per round. Examples of this include:

- Playing to targets that are away from trouble and will leave one's ball in the best position for playing the next shot
- Playing the types of shots that are clearly one's strengths
- Playing shots that have the highest chance of reward and the lowest risk
- Playing shots that one has played before rather than shots that one has not
- Playing shots with clubs that one hits well and in which one has the most confidence
- Playing shots to the green that end up in the best position from which to putt to the hole

As a general rule, when in trouble, one should do what is needed to do to get out in the least number of strokes. Conversely, unwise decisions are those that have a higher risk and increase the chances of getting higher scores. One might be successful in playing a shot based on an unwise decision, but not very often. In general, well-executed shots based on unwise decisions usually lead to higher scores, whereas well-executed shots based on wise decisions lead to lower scores.

ACCEPT THE POOR SHOT OUTCOMES WITH THE GOOD ONES

There are a number of reasons that players should accept the poor shot outcomes with the good ones, including the following:

- Each player should understand and have learned to respect that he or she is not perfect and that the game can be quite unpredictable. At times, the game can even appear to be unfair. For instance, a good swing will produce a good shot, but the ball could take a bad bounce and result in a poor shot outcome. Conversely, a bad swing will produce a bad shot, but the ball could take a good bounce and result in a good shot outcome.
- Nobody has 100% control over any shot outcome. All one can do is prepare to play each shot to the best of one's ability and let the swing go.
- The game's unpredictability should be respected. When a poor shot outcome occurs, there is nothing that can be done about it. After a player hits the shot, he or she owns it and cannot replay it.
- Dwelling on a poor shot outcome keeps one in the past rather than the present, when one should be preparing to play the present shot to the best of one's ability. The most important shot in golf is the one coming up next, not the past shot or one that has to be played in the future.

PLAY WITHOUT EXCUSES

One ought to play the game without blaming a poor performance on something or someone else. It is all too easy to attribute unsuccessful shots or poor putts to anything or anyone other than

oneself. This “blame game” is quite interesting because the player is the only one making the decisions, playing the shots, and stroking the putts. No one is playing defense against the player in question, or trying to prevent him or her from playing successful shots or putts. Moreover, everyone is playing the same course and each player knows the specific situations (e.g., the lie, wind, or target) one has encountered before the shots are played, so everyone can play these shots based on wise decisions. Conversely, these same players often attribute successful shots and good putts to themselves. If someone decides to play the game of golf, he or she is likely to experience more success and enjoyment if he or she adopts the attitude of accepting the bad shot outcomes as well as the good ones. After all, the person who planned and played the shot also owns it, and thus should take responsibility for the outcome regardless of whether it is good or bad.

FOCUS MORE ON THE PROCESS OF PLAYING THE GAME RATHER THAN ON MECHANICS

Sometimes players will not have their best full swing or short game skills at the beginning of play, or they have it but then lose it during the round. Some players will continue to focus their attention on playing with the full swing or short game skills they have, and focus on their mechanics between shots (not immediately before and during the shots) in search of the correction. Other players will shift much of their attention to their mechanics and away from the process of playing the game. The players who focus more on playing the game and doing what they have to do to get the ball in the hole in the fewest number of strokes are likely to score better than those who focus more on their mechanics. Even great players knew that they could not hit perfect shots on all 18 holes. For instance, Walter Hagen said that he expected to hit about seven bad shots per round, and Ben Hogan expected to hit about three perfect shots per round. Tommy Armour claimed, “The average expert player—if he is lucky—hits six, eight, or 10 good shots a round. The rest are real good misses.”

HAVE A POSITIVE, APPRECIATIVE ATTITUDE

A few ways in which one can have a positive, appreciative attitude include the following:

- Interact in a friendly way with one’s playing partners when appropriate
- Show one’s appreciation for good shots played by one’s partners or competitors
- Take the time between shots to appreciate the beauty of the golf course, environmental surroundings, and day
- Take the time before and after the tournament to appreciate and acknowledge the people who organized and conducted the tournament, and all those who were supportive (such as coaches, teammates, parents, and friends)
- Learn to appreciate and enjoy everything about the game

MANAGE EMOTIONS EFFECTIVELY

Every player should have a solid grasp on how to manage his or her emotions on the course, because emotional control can go a long way in bringing about better play. One good way to do this is by learning to manage one’s emotions with slow deep breathing, progressive muscle

relaxation, rational thinking, and logical and positive self-talk, all of which also should be incorporated into pre- and post-shot routines.

Additionally, one can learn to keep one's shot, score, and tournament outcomes in perspective. It is important to be mindful that the game is not a matter of life and death, but only a game with a stick and a ball. The worst that can happen is that one does not play as well as expected.

It is also valuable to learn to set realistic goals and expectations on each shot, hole, and round. There is good reason to believe and have confidence in oneself, one's game, and how well one can play. However, one should keep one's level of belief and confidence within the realm of reality, especially in relation to one's skill level and ability to manage oneself and play the course.

FOCUS ON ONLY ONE GOAL WHEN PLAYING

Although he or she may have a number of short- and long-term goals, the player needs only to focus his or her full attention on one goal when playing, and that is to focus 100% on the things necessary to prepare to play each shot to the best of one's ability. These things on which one should focus are the elements over which one has 100% control.

Examples include the decisions one makes about the distance of the shot, wind direction, type of shot to play, club selection, practice swing, target, alignment, ball position, managing one's emotions, seeing and feeling the shot, and committing to the shot. These are the things that are incorporated into the pre-shot routine to help prepare to play the shot to the best of one's ability.

Sometimes the swing and stroke are executed and the shot outcome occurs as planned, and other times the outcome is not as planned, even when one prepares to play it to the best of his or her ability. Nobody has 100% control over his or her swing or stroke execution and the shot outcome, so there is no sense in focusing attention on worrying about them. The player should just prepare to play the shot to the best of his or her ability, and then let the swing or stroke happen as though he or she was on the practice range. If this one goal is taken care of, one will succeed in achieving longer-term goals, such as shooting the score for the round or the tournament of which one is capable.

FOCUS ON THE ELEMENTS OF PRE- AND POST-SHOT ROUTINES

Although a few aspects of pre- and post-shot routines are physical, most are mental, and those that are physical are closely linked to the mental aspects. Effective pre- and post-shot routines enable each player to focus his or her attention on the process of playing the game so that one does not get too involved with distractions, such as shot or score outcomes and emotional reactions. They incorporate and sequence the things presented in this section on what players need to do to mentally get out of their own way. In a sense, pre- and post-shot routines organize these things in a meaningful way to help the player play his or her best. These routines will be discussed in more detail in the rest of this lesson.

PRE-SHOT ROUTINE

A pre-shot routine is often simply stated as “See It, Feel It, Trust It, Do It,” which means the following:

- Visualizing the shot one plans to play
- Feeling the swing that will produce that shot
- Committing 100% to the swing that will produce the shot
- Performing the swing in a natural, unguided way, just as one would on the practice range

Effective pre-shot routines are designed to help players mentally stay in the present, effectively prepare to play each shot, and manage their emotions before the shot is played. An effective pre-shot routine is the result of extensive practice, but when it becomes well-learned, it is instrumental in helping players focus 100% of their attention on the process of playing the game rather than on the shot outcome or any other related outcome (e.g., winning or losing the tournament or shooting a low or high score).

Although the elements that make up pre-shot routines and the order in which they are performed will vary somewhat from player to player, most routines contain many of the following elements:

- **Lie:** Assess the lie of the ball, because it will determine the club selection and type of shot one should play.
- **Shot Distance:** Determine the shot distance, which is a function of factors such as yardage, wind direction, the slope or extent to which the ball must travel uphill or downhill, and temperature, humidity, and elevation relative to sea level. Commit 100% to the distance determined.
- **Type of Shot:** Decide on the best type of shot (i.e., shot shape and trajectory), which depends on the lie, selecting the safest target, and one’s shot and club strengths. Commit 100% to the type of shot selected.
- **Club Selection:** Select the best club based on the lie, shot distance, and the type of shot one plans to play. Commit 100% to the club selected.
- **Stay Slow and Swing Within Oneself:** Typically, players speed up and get quick under the stress of competitive pressure, which can result in the backswing and transition from backswing to downswing being too fast. They also tend to over-swing. Most good players know their tendencies and use self-talk to remind themselves to do things such as “slow down” or “swing slowly and within oneself”.
- **Practice Swing:** Take a practice swing of the actual swing that will produce the type of shot selected, and try to feel the swing that will produce a successful shot. The practice swing can be taken either behind the ball or to the side of the ball, depending on one’s preference. In instances when the practice swing did not feel good, or if they are especially nervous, players often take another.
- **Slow Deep Breath:** Take a deep breath, slowly breathing in through the nose and slowly exhaling through the mouth. Some players like to take their slow deep breath standing behind

the ball, others like to take it when they are alongside the ball, and some like to take one in both places.

- **Visualize the Shot:** Picture the shot one is about to play. Imagine seeing the flight and landing of the ball to the target selected.
- **Select a Target:** Select a target to which the clubface will be aimed and the alignment of the body (feet, hips, and shoulders) will be taken relative to the target line on which the clubface is aimed and the type of shot to be played. Some players prefer to align themselves to a distant target, such as the flag stick or a specific tree or bush in the distance, whereas others like to use an intermediate target, such as a brown spot or different color blade of grass anywhere between three to 10 feet in front of the ball. The intermediate target was popularized by Jack Nicklaus, who began using it during the 1970 British Open at St. Andrews because he was having difficulty aligning himself to distant targets some 300 or more yards away.

An effective way to select an intermediate target is to stand behind the ball and align the shaft of the club with the distant target and the ball such that the shaft is intersecting both. After that, look for an intermediate target anywhere from about three to 10 feet in front of the ball that the shaft also intersects. Once the distant target is selected, the shaft should intersect the ball and the intermediate target. Commit 100% to the target selected.

- **Address the Ball:** Address the ball by placing the clubface on the target line and taking one's grip, stance, and alignment to the target, while making certain the ball position is appropriate.
- **Pre-Swing Move:** A pre-swing move could be a waggle of the club, forward press, or movement of the club in a way that works before one begins the actual swing. The waggle, forward press, or pre-swing club movement can keep one's hands and arms free from building up too much muscular tension, and can also serve as a reminder of how to cock and un-cock one's hands and wrists. If a pre-swing movement is used in place of a waggle, it can serve to remind the player how to move to perform the first part of the backswing. For example, Mike Weir and Chris DiMarco take the club back so that the shaft is parallel with the ground and the toe of the head is pointing skyward, which reminds them how to perform the first part of their backswing.
- **Swing Thought:** Focus on a key swing thought (e.g., low and slow), cue, or position (e.g., toe up on the first part of the back swing), and feel or visualize the shot that will help recall and freely or naturally execute the swing that will produce the type of shot one planned and prepared to make.
- **Trust It:** Trust everything (including club selection, shot distance, and type of shot) one did in planning for the shot by committing 100% to the swing that will produce the shot one planned to make. Use logical self-talk to convince oneself to swing as one would if one were on the practice range, where the shot outcome was less important. Say what one needs to say if one needs to ensure confidence, such as, "I can do this. I have hit this shot thousands of times. I have got this shot." Additionally, say what one needs to say if one needs to put the shot in perspective, such as "It is not a matter of life and death; what is the worst that can happen if the shot outcome is bad?" The worst that can happen is that the shot is played

poorly and one ends up with a higher score. So what? It is a game with a stick and a ball, and should be kept in perspective.

At this point the swing is executed, hopefully sending the ball to the target on the flight and the distance that was planned. Now it is time to use a post-shot routine to effectively deal with the swing that was made and the shot outcome that resulted.

POST-SHOT ROUTINE

A post-shot routine keeps the player focused on the process of playing the game after each shot is played. The post-shot routine helps players accept each shot and manage their emotional reaction to the outcome, evaluate the mental (pre-shot routine) and physical (swing execution) performance that produced the shot, identify possible causes of poorly executed shots, and take appropriate action or make corrections. Indeed, an effective post-shot routine takes an extensive amount of practice to develop, but when it becomes well-learned, it is instrumental in helping the player focus 100% of his or her attention on the process of playing the game rather than on the shot outcome or any other related outcome (e.g., winning or losing the tournament, shooting a low or high score, or making or not making the tournament cut). The elements of a post-shot routine may vary from player to player, but most routines contain the elements described in the following sections.

ACCEPTING THE SHOT AND MANAGING ONE'S EMOTIONS

Accepting the shot, especially a poor one, and managing one's emotions appear to be simple actions to take, but in reality, they are not, and usually these actions must be practiced extensively and learned. The first thing players experience and have to manage immediately after playing a shot is their emotional reaction to the outcome. The extent of the emotional reaction is largely a function of each player's personality and how much importance he or she places on the shot outcome. Some players become more emotionally aroused or excited either by good or poor shot outcomes and/or place more importance on outcomes than others. Regardless of the differences in players' personalities and the importance they place on shot outcomes, their emotional reaction to each shot outcome must be effectively managed to stay rational and in control of the situation in order to prevent their emotions from carrying over to the next shot and beyond.

One way to approach players about this is helping them understand that if they did all that they could have done in performing the pre-shot routine, then it is easier to accept the shot outcome. If they readily accept the shot regardless of how poor it is, they will be in a better frame of mind to effectively manage their emotional reaction to the shot. Of course, good shots are easier to accept than poor ones, but even good shots can cause a player to become too excited, overconfident, and careless in preparing the next shot. Poor shots are much more of a challenge to learn to accept. Typically, the immediate emotional reaction to a poor shot is disappointment and anger that is often accompanied by a heightened level of excitement or arousal that is above the level at which players play most effectively. The increased level of arousal is going to be experienced immediately after a good or poor shot, but the key is to learn to manage it so that it does not persist for more than a few seconds, which is easier to do if players are prepared to accept the shot before they play it.

Accepting a shot does not automatically and completely eliminate emotional arousal levels that are too high, but it greatly helps. After accepting the shot, many players manage their increased arousal levels in order to think rationally instead of emotionally by closing their eyes, taking one or two slow, deep breaths, and engaging in logical self-talk. When taking each deep breath, they slowly inhale through their nose and slowly exhale through their mouth. The purpose of closing their eyes and taking one or two slow, deep breaths is an effort to calm down and get control of their emotions. Next, the player should engage in logical self-talk to put the poor shot in perspective. The most effective statements are those to which players can best relate in helping them to regain control of their emotions. The exact words will be different from one player to another, but there is a question that teachers and coaches can ask that will help each player find the right things to say to him or herself. They can simply ask the player the question, “If you were your own caddy or coach, what would you say to yourself?” The answer to this question will generate some beginning statements or words that can be tried each time an emotional reaction to a poor shot occurs. With continued use, the statements or words may be changed, and new ones that are more effective may emerge. The end result of this process will be logical self-talk that is effective in helping each player accept the shot and manage his or her emotions to maintain the appropriate level of arousal.

PROGRESSIVE MUSCLE RELAXATION TECHNIQUES

Often players will experience undesirable tension in various muscles in their body during a competitive round of golf. The progressive muscle relaxation technique can be helpful in relieving that tension. Relaxation of the body through decreased undesirable muscular tension will, in turn, decrease mental tension. Essentially, learning this technique involves tensing and relaxing each major muscle group in the body at different times. These tension-relaxation cycles develop a player’s awareness of the difference between muscular tension and lack of it. Each cycle involves maximally contracting a specific muscle group, and then trying to completely relax it while focusing on the different sensations of tension and relaxation. With practice, players can learn to detect undesirable tension in a specific muscle group or area of the body, such as the neck or shoulders or left arm or hands, and then relax that muscle group or areas.

The first few practice sessions of progressive relaxation, with the person lying on his or her back, will probably take about 30 minutes to tense and relax all the muscle groups in the body. The first step is to maximally tense a muscle group and then relax it while paying close attention to how it feels for the muscle group to be relaxed as opposed to tense. This should be performed twice before moving on to another muscle group. Each tension and relaxation cycle should take about five to seven seconds. After three or four practice sessions, many people are able to relax within five to 10 minutes. When a person can achieve relaxation within 10 minutes, he or she can omit the muscle tension component and focus just on the relaxation component. An example of specific instructions that a person would follow for one muscle group is the following (taken from Weinberg & Gould, 1995, page 267):

“Raise your arms, extend them in front of you, and make a tight fist with each hand. Notice the uncomfortable tension in your hands and fingers. Hold that tension for 5 seconds, then let go halfway and hold for an additional 5 seconds. Let your hands relax completely. Notice how the tension and discomfort drain from your hands, replaced by comfort and relaxation. Focus on the contrast between the tension you felt and the relaxation you now feel. Concentrate on relaxing your hands completely for 10 to 15 seconds.”

If one says something like “relax” or “take a slow, deep breath” each time one practices the relaxation component of the cycle, either phrase can be used as a cue to trigger relaxation within a few seconds. Once learned, this technique can be effectively used anytime between shots when playing.

EVALUATING THE SWING THAT PRODUCED THE SHOT

Once the player has accepted the shot outcome and effectively managed his or her emotions, it is time to learn from the shot. Regardless of whether the shot was good or poor, the player should begin by first reflecting on how well each of the elements of the pre-shot routine was carried out. This reflection includes the extent to which the player felt good about, committed to, or trusted elements such as the club selected, target selected, alignment, ball position, type of shot played, and execution of the swing. For example, a poor shot could be the result of a poor swing that was caused by poor alignment to the target or not committing 100% to the target or club used. However, a good shot is the result of the execution of a good swing that was supported by a sound pre-shot routine that was effectively performed.

GOOD SHOTS

Every player should be sure to take a moment to reward him- or herself immediately after each good shot. Positive self-talk can be used to “pat oneself on the back” when a good shot is executed. It may seem trivial, but it is not. Positive self-talk when it is deserved can enhance one’s playing confidence. One benefit of evaluating good shots is to be aware of and remember what was done in the pre-shot routine that resulted in the execution of such good swings or putting strokes. Players can learn from their good shots if they are aware of and remember the things they did, felt, and thought about before executing the swing or putting stroke. For instance, the execution of a good swing or putting stroke could be due to pre-shot routine elements such as a particular swing thought or self-talk that was used to convince the player to commit 100% to the shot. When reflecting on a good shot, a player might ask, “What did I do so well when I prepared for the shot? What did I do on the swing or putting stroke and how did it feel? What swing thought did I use? On what was I focusing my attention and thinking about?” The key is to identify and remember what was done before the execution that contributed to the success of the shot so it can be repeated in the future.

POOR SHOTS

Poor shots need to be evaluated to find the cause(s) and correction(s) so that they are not repeated. Sometimes poor shots are caused by a flawed pre-shot routine, a flawed swing execution, or a combination of both. Flaws in the pre-shot routine that could lead to poor swing execution include the following:

- Miscalculating the wind and distance of the shot
- Faulty alignment or ball position
- Wrong club selection
- Ineffective swing thought
- Less than 100% commitment to the shot

- Focusing too much on the outcome
- Trying too hard and over-swinging
- Focusing too much on swing mechanics instead of letting the swing happen naturally
- Getting too excited
- Getting too quick with one's swing

After the causes are identified, they can be corrected before the next shot is played. Sometimes a poor shot is caused by a badly executed swing and not a flawed pre-shot routine. When this happens, the player would be wise to analyze the trajectory and shape of the ball flight, and also the divot pattern if the shot was played with an iron. This information should be combined with how the swing felt on the poorly executed swing and the player's typical swing execution error tendencies to identify possible causes and determine corrections.

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PART 2: KNOWLEDGE OF TEACHING

Building on the teaching and assessment skills discussed in Levels 1 and 2 of the PGA PGM program, Part 2 of this course delves into the particulars of assessing a student's level of learning, as well as how to conduct instruction in a way that brings about positive behavior changes and optimum skill development in the player.

The first lesson defines assessment as it relates to teaching, as well as several advanced methods for assessing student learning. These methods include strategic questioning, critically listening, videotape analysis, and direct observation. If an instructor knows how a student thinks and feels, then both the instructor and student are better equipped to realize the student's goals and employ the most useful and appropriate teaching program.

Maintaining the quality and flow of instruction is crucial to keeping students interested and motivating them to produce their best performance, bringing them closer to their goals as golfers and athletes. Lesson 2-2 reviews the importance of lesson flow, along with ways in which to bring about instruction that flows effectively. If teaching is dynamic and engaging, and every lesson closes in a meaningful way that connects to future learning experiences, students will have better learning experiences in both the short and long term.

Even teachers who discover how to bring about successful flow and student engagement in their lessons should not rest on their laurels—what works for one student or group of students might not work for another. In order to keep their teaching style from growing stale or outdated, teachers should constantly assess and re-assess their own teaching methods, and also constantly seek to expand their palette of teaching skills. The third lesson discusses the principle of reflective teaching and several important means for analyzing teaching practices objectively and systematically.

LESSON 2-1: ASSESSING STUDENT LEARNING

A significant difference between highly skilled teachers and less skilled teachers lies in their understanding of what the students are learning in each lesson. Good teachers are constantly analyzing and assessing their students' learning. The knowledge gained through continual assessment is invaluable for deciding which activities, skills, and concepts are best suited for the student at a particular point in the lesson or learning progression. Therefore, being able to assess student learning is a critical skill for anyone wishing to become an effective golf instructor. In this lesson, several techniques for checking student learning and assessing player progress will be presented. These techniques are often used in combination, and no one technique is superior to another. The best golf instructors effectively use any or all of them depending on the student or instructional goal.

LEARNING OUTCOME

After completing this lesson, you will be able to:

- Use a variety of techniques to measure the current performance level of beginning to expert golfers

READING ASSIGNMENT

Read the following lesson, which explains how to measure and evaluate student learning, and how to use this information to become a better teacher and help the student reach his or her goals.

ASSESSMENT DEFINED

Two steps are required in making an assessment:

1. A measurement
2. An evaluation

A measurement occurs when a characteristic or property is quantified, or a number is assigned to the characteristic for the purposes of comparison. The number of putts in a round, the length of a golf shaft in inches, and the strokes taken to complete 18 holes are all common measures in golf.

However, a single number is seldom enough to take the next step, which is evaluation. Evaluation refers to the process of making judgments about a property or characteristic. While a number represents a quantity, evaluation is the process of determining quality. Multiple numbers provide comparisons, and comparisons allow for judgments. If, for instance, a golfer shot a round of 85 one day, but shot 82 the day before on the same course under similar conditions, a meaningful comparison can be made.

Judgments are decisions about success or failure, better or worse, improved or deteriorated, adequate or inadequate, sound or unsound, and the degree to which something is good or bad. Golfers constantly evaluate the things they see and do, and their judgments help determine the

success, or lack of success, in previous actions and help plan the next course of action. If instructors and players work toward specific learning goals such as increasing knowledge of rules, improving a putting stroke, or altering a swing plane, then an evaluation of the progress toward those goals helps determine the quality of both the teacher's instruction and the student's golf performance.

A measurement or an evaluation can each be made independent of one another. That is, something can be given a numerical value with no judgment made, and judgment can be passed on something that has not been quantified in any way. Evaluations can be based on beliefs, impressions, or indirect evidence, but the best judgments are based on direct evidence. Put another way, a golf instructor might judge a student's playing ability based on a belief about the person's appearance, an impression gained from watching a warm-up, or evidence from a previous experience with that student. However, higher quality evaluations come from direct evidence. Seeing a student perform or hearing the student discussing his or her understanding of golf or a golf performance yields more convincing evidence and provides the basis for a more credible evaluation.

Assessment requires both evidence and evaluation—that is, one must take a measure or sample of some kind and judge the quality or standard of that measure. In the strictest sense, assessments are the most formal process of checking learning, but they also tend to reveal the most valid and reliable judgments. Evaluations based on evidence are often critical for making reasoned and informed decisions about the effectiveness of the teaching and quality of learning. Assessments provide further useful information for planning future instructional activities.

In general, when students practice and see their scores decrease or their distance or accuracy increase, their instruction and practice activities were effective and learning is taking place. Likewise, learning has occurred when students' descriptions of their golf experiences reflect deeper levels of understanding, motivation, or enjoyment. When no changes are noted or the measured change is judged to be too little, the practice or instruction is ineffective and needs adjustment. Skilled teachers use the information generated through assessments to guide and monitor the instructional process.

PURPOSES OF ASSESSMENT

Assessment can serve a variety of instructional purposes. Precisely how and how often the instructor checks for learning depends on what is being checked for. The following sections identify and explain some common reasons why golf instructors assess learning.

IDENTIFYING CURRENT KNOWLEDGE

Determining what students already know is useful for setting instructional goals that are well matched to the student's current level of skill, knowledge, aspirations, and abilities. The most skilled teachers often begin a lesson by first determining the present capabilities and knowledge of students so instruction is neither redundant nor too challenging. Understanding what the students would like to learn and why they want to learn it also provides invaluable information for motivating students throughout the learning process.

DIAGNOSING CHALLENGES

Assessment is a necessary part of identifying a student's limitations or challenges. Accurately identifying the student's performance problems is critical for determining what needs to be learned. Until the doctor knows what the patient's problem is, he or she cannot adequately prescribe the proper medicine. The same is true in golf instruction. Until the problem is pinned down, an effective solution cannot be determined.

GROUPING STUDENTS

There are times when a golf instructor needs to group students according to characteristics pertaining to their learning. For example, the instructor may wish to divide a golf school or youth program participants into skill groups to better meet the instructional needs of the group. High school and college coaches are often faced with the difficult task of selecting a small group of golfers from the multitude who try out for a team. To ensure fairness and accuracy, assessment should be a critical element in the selection process.

MEASURING PROGRESS

The measure of any good teaching is the progress a student makes in learning. It is therefore important for a teacher to accurately assess the progress of the students to determine how much has been learned. Measuring progress also helps to identify goals for future learning activities. Counting the number of successful attempts during a drill, having an accuracy or distance measure on the driving range, or reviewing a scorecard with a student are examples of measurements that will help in assessing a player's progress.

PROVIDING FEEDBACK

Feedback is an important element in student learning. To provide accurate feedback about a golf swing or any other golf skill, an accurate assessment of the strengths and weaknesses of the skill is useful. Generally, the results of any assessment provide a student with constructive feedback regarding his or her skill performances and learning progress. An advantage of feedback generated through assessment is that it can be offered in a variety of forms, including written, verbal, or nonverbal (e.g., videotape or demonstration).

Performance differences between players can potentially offer useful feedback for both players and instructors. For example, knowing average putting statistics, driving distances, or ups and downs compared with peers and more elite players can be used to check present performance standards and establish future target goals.

TYPES OF ASSESSMENTS

There are two periods in the instructional/learning process when golf instructors may want to assess their students. **Formative assessments** are made during the learning process, while **summative assessments** are made at the conclusion of the learning experience. To be most effective, formative assessments should begin early in the instructional process and continue throughout the player's learning experiences. This allows for both a continuous monitoring of learning progress and either setting new goals or adjusting current goals as the student makes progress. Most good teachers constantly take measures and make judgments about the quality

and quantity of the learning. Formative evaluations are also important for determining the types and amount of feedback players require during the practice portion of the lesson.

Summative assessments are taken after the student completes the learning activities. Summative assessments are useful for determining the degree to which learning program objectives have been met. Exactly what determines the conclusion of the learning experience is up to the golf instructor. In a golf school, it is at the end of the program. If the instructor is working with a student on an ongoing basis, it is imperative that these assessments take place on a regular and meaningful schedule.

Evaluations come in two forms: subjective and objective. A subjective evaluation requires the golf instructor to make a value judgment without the benefit of a number score or standard. Instead, these evaluations are based on the instructor's knowledge of particular criteria for a good performance. If those criteria are present and observed by the teacher during the student's skill performance, then a favorable judgment is rendered. Golf instructors often use subjective evaluations when viewing student performances, and then relay their judgments to the performer through feedback and evaluative comments.

Objective evaluations yield a score for a particular performance. In this evaluation process, a test of some kind is used to measure a student's performance. It is common in golf to use a short game test to measure the quality of a variety of short game skills (i.e., chipping, pitching, or putting). The score one receives on these tests is indicative of the quality of one's play in the short game area. A player's handicap is another example of an objective evaluation—for instance, a player with a handicap of 8 is clearly better than one who plays on an 18 handicap. Objective evaluations are always based on clearly defined scoring systems.

METHODS FOR ASSESSING LEARNING

There are many ways to assess students' knowledge, skills, and learning. It is often merely a lack of knowledge and ingenuity that prevents a teacher from making adequate assessments. In this section, several techniques are described that have proven valuable to teachers.

INSTRUMENTS AND TECHNIQUES

Just as there are many ways to teach golf skills or add to a player's knowledge of the game, there are many ways to assess a player's golf skills and knowledge. Some of the more typical methods include paper and pencil tests, direct observation, and videotape analysis.

PAPER AND PENCIL TESTS

One of the most traditional and effective techniques for assessing a player's knowledge and understanding of the game of golf is the paper and pencil test. These tests are particularly useful for assessing a player's understanding of game rules, course management, or even the history of the game. Written documents of almost any type can be useful for assessing student progress and development. One advantage of written documents is that a teacher can analyze the information after the lesson or practice so time does not need to be sacrificed during instructional time to assess student learning.

When constructing tests, instructors should consider making them brief while still obtaining the necessary information. In a sports instruction environment, it is preferable to have the students moving more than just their pencils.

DIRECT OBSERVATION

Golf instructors continually observe the skill performances and practices of their students in an effort to monitor and evaluate the students' progress toward their learning goals. To maximize the effectiveness of these observations, instructors should look for the same skills and skill cues covered in their lessons as students go through their practice. If a grip, stance, or follow-through was explained or demonstrated, attention should be focused on these skills and cues. Expert instructors will monitor student practice, identify performance errors, and then devise ways to reteach the skill to eliminate the deficiency. Expert teachers will also focus on the positive aspects of the performance and let students know what they are doing correctly. When someone's correct performance is praised and reinforced, he or she will generally repeat it. People are not always able to correct things that they are told they are not doing well. The best teachers are aware of this, and they use this learning principle to their students' advantage.

VIDEOTAPE ANALYSIS

In the world of golf instruction, videotape assessments of a player's swing and short game skills are commonplace. The ability to use one or more of the current software programs to perform a correct biomechanical assessment is a boon to golf instruction, as the instructor can easily zero in on the precise portion of the stroke needing instructional attention. Additionally, the ability to replay the skill in slow motion for the student allows the student to see what the trained eye of the golf instructor sees. Keep in mind, however, that beginners often require more assistance from the teacher to effectively use videotape for analyzing their performances and devising instructional cues and goals. Video analysis is also more effective when used over time, rather than once or twice in the learning progression. The more accustomed a player becomes to viewing a recording, the more cues they can derive from the tape. With practice, students become more astute at analyzing their performances, judging developments in their swing, and detecting nuances or changes that might signal the necessity of a correction.

ASKING QUESTIONS

There are three functions served when a teacher asks questions (Cazden, 1986):

- Enabling the lesson to proceed as planned
- Helping the student learn how to accomplish a learning task
- Assisting the teacher in assessing the lesson

Questions are an excellent method for assessing students' understanding of the information being taught. Additionally, asking questions to students enhances the learning process by getting them to consider the important points of a lesson.

GAINING USEFUL INFORMATION

Research finds that expert teachers ask students many questions, particularly at the beginning and end of the lesson (Schempp, 1999). In the early portions of the lesson, these questions take

the form of a friendly conversation between the instructor and student. The questions asked at the start of a lesson help shape the instructional content and teaching style. Opening questions should focus on a variety of issues, including the student's physical activity experiences, knowledge directly related to the day's topic, experiences and knowledge indirectly related but pertinent to the day's topic, motivations or inhibitions in learning, and injuries or physical limitations. Information on students' passion for golf, professional aspirations, other recreational activities, and hobbies can prove useful for a skilled teacher looking to make learning experiences relevant for students.

To construct meaningful and personalized lessons, expert teachers take the knowledge gained from asking questions and use it throughout the lesson. Information on previous activity experiences can be used to draw connections between mastered skills and the skills being learned. For example, if the student plays tennis or softball, the same mechanical fundamentals used in those sports can be applied to learning or improving a golf swing. The student's motivation for learning or improving his or her golf game can help set the tone of the lesson. For example, if the student plays golf primarily for social reasons, the teacher can take a more relaxed approach to the lesson than if the student had competitive aspirations. Finally, knowledge of injuries, health conditions, or fitness levels lets teachers know the stamina of the students and whether they must compensate for physical limitations when teaching golf skills.

Some teachers find it helpful to prepare several pertinent questions ahead of time. Asking frequent but brief questions about the lesson's main points, supplemental points, and the learning process itself is an effective method for monitoring the learning pulse of the students. It is particularly helpful to ask students to summarize, in their own words, the main points of the lesson at its conclusion. This lets both teachers and students clearly understand precisely what was learned.

In summary, decisions about the content to be taught, the tone of the lesson, and the feedback to provide as students practice can all be enhanced by a golf instructor's questions of the student. The friendly, personal nature of these questions helps to relax apprehensive students and establishes a positive, accepting atmosphere for the lesson. Finally, asking questions at the beginning of the lesson gets students talking about golf and their challenges in learning skills, which in turn should make them feel free to ask questions and provide their insights throughout the lesson.

GETTING CORRECT RESPONSES

For instruction to have an impact, students need to feel successful during the lesson. They cannot always feel successful when they swing a club, but they should be able to feel successful every time the instructor asks them a question. This is because most questions that a teacher asks should elicit correct answers from the student. Students who experience success in answering questions are more likely to continue answering them.

For example, the instructor might first think of the answer he or she wants the student to provide—usually a point the instructor wants to make in the lesson—and then structure the question so that the student can actually make the point with his or her answer.

Effective instructors avoid vague and ambiguous questions, because clear questions are more easily answered. If the instructor knows what kind of answer he or she is looking for, this sometimes helps in formulating clear questions. Vague and ambiguous questions tend to turn students off of answering even clear questions because they are never really certain of the answer, even when they know it.

Questions are more manageable when they come one at a time. At times, an instructor can get carried away and ask several questions all at once. In these moments, students are likely to become overwhelmed, not knowing which question the instructor really wants answered or even in what order.

Research indicates that most teachers wait less than one second after a question before speaking again (Brophy & Good, 1986). This is easy enough to understand. On the one hand, teachers are used to talking and unaccustomed to silence in their lessons. On the other hand, students are used to listening in a lesson rather than talking, and consequently it takes them a second or two to think of the answer and then formulate a response. Therefore, it is better for a teacher to wait at least three seconds after a question before asking another question or answering the question him- or herself. If the teacher opened the lesson with a few questions and made the student feel comfortable talking and answering questions, the student is far more likely to answer questions later in the lesson.

As questions become more complex, the instructor should increase wait time in proportion to the question's difficulty. More complex questions require more time for students to assimilate information and construct a thoughtful response. Teachers need to be patient. Telling students "This is a tough question, so I'll give you a few seconds to consider an answer" may help them formulate a more reasoned response. It also reinforces the message that the instructor does indeed expect an answer.

QUESTIONING STRATEGIES

Questions hold little instructional purpose in a lesson if they are not intended to get a correct answer from the student. Most students, however, have been conditioned over the years to listen to the teacher and not talk during instruction. Teachers' questions may therefore go unanswered, at least at first. There are two strategies that have proven especially effective in getting students, particularly reluctant students, to answer an instructor's questions. These strategies are preformulating and reformulating questions (Cazden, 1986).

Preformulation gives orientation and clarity to a question. It cues the student that a question is coming and provides the context for answering it. The following questions illustrate this point. The first question is asked with no preformulation, whereas the second makes use of the strategy.

- *Question One:* "When preparing to hit a shot, what is the first thing a player should consider?"
- *Question Two:* "If success in golf is determined, in part, by getting the ball to go where you want it to go, what is the first thing a player should determine in preparing to hit a shot?"

Reformulation reworks an original question and offers greater specificity. The original question may have been too challenging, ambiguous, or general for the students. Reformulating questions

is a progressive narrowing of the questions to align them more closely with a desired answer. An instructor's questioning strategy should not be abandoned because the student cannot or will not answer the questions. Reformulation repackages the question until only the simplest response is necessary. The following is an illustration:

- *Original Question:* "What is the most common reason for slicing the ball?"
- *Reformulated Question One:* "What is it you do that causes the ball to slice?"
- *Reformulated Question Two:* "Is your clubface square or open at impact?"
- *Reformulated Question Three:* "As a right-handed golfer, if you hit the ball with an open clubface, the ball will curve to the right. Yes?"

THE POWER OF QUESTIONS

An accomplished golf instructor uses questions often and purposefully. Questions serve multiple purposes in a lesson, but whatever their intention, they are critical for teachers to receive a clear idea of their students' understanding of what they are learning. Teaching and learning go hand in hand. Teachers can be reasonably sure they are teaching, but the only way they can be sure that the students are learning is by asking questions. Once a question is asked, the teacher must listen. At times, a teacher becomes so used to talking that listening becomes a seldom used and neglected skill. The best teachers recognize that the power of questions can only be realized by listening to the comments and responses of their students.

LISTEN TO LEARN

It does little good for teachers to ask questions if they are unable to listen to the responses that students provide. Listening, however, takes time, effort, and some skill. Better golf instructors develop routines for communicating with and listening to their students. Teachers should ask questions and listen intently for how the students respond. When listening, teachers should gather facts that help them understand what the students are thinking, feeling, and comprehending. Listening needs to be an integral part not only of student learning assessment, but also of building meaningful relationships with the students.

PROACTIVE LISTENING

Becoming a good teacher depends, in part, on valuing student input in the lesson and gaining a student's perspective on the learning experience. This means becoming a proactive listener. That is, the teacher should not merely wait until students speak up, but rather make a sustained effort to understand students by getting them to talk. Not only should teachers ask questions, they should also ask themselves, "What are my students trying to tell me? How can I help my students better explain what they mean? How can I gain a richer understanding and appreciation of their perspectives?"

LISTEN TO UNDERSTAND, NOT JUST TO REPLY

It is important that instructors listen to understand what the students know, their perspectives on their learning, and what they are trying to say before even considering how to reply. This is fundamental to productive communication (Nichols, 1995). Effective listening requires that the instructor actively accept the students' remarks and ensure that he or she has a clear

understanding of what the students are attempting to convey, rather than merely making reactive judgments to what they say. Some people call this “keeping an open mind.” Students are far less likely to provide information to a teacher that they believe is constantly judging them. When they feel that the teacher truly seeks to understand and accept, students are more inclined to honestly share their thoughts and feelings. Expert teachers believe that understanding students’ thoughts, beliefs, and knowledge is essential to teaching what the students need to learn in the way they need to learn it.

SUMMARIZE WHAT IS HEARD

Hearing the words and showing interest does not necessarily ensure one understands what was said, or what was meant by what was said. Effective listeners develop the ability to concentrate on the statements their students are making and mentally summarize what they said. Good listeners mentally review what they just heard, seek clarification on points not well understood, compare and contrast the ideas presented, and then seek ways to put the ideas expressed to good effect in the lesson.

SUMMARY

To teach students effectively, teachers must understand what their students know, think, feel, and do. The techniques used to gather and analyze this information make up the process of assessing student learning. Assessment involves a measurement of some kind and an analysis, or judgment, based on that evidence. Golf instructors assess student learning for a variety of reasons that range from identifying students’ current knowledge and potential to measuring progress and predicting future success in golf. Formative assessments are made while students are learning, whereas summative evaluations determine the amount of learning resulting from the completed instructional program.

Effective golf professionals view their students as people, not performers. Therefore, they are concerned about the people they teach and monitor their social, emotional, intellectual, and physical development in golf. Assessing student learning and development is a challenging task, so teachers use a variety of methods to gather information they need to make informed judgments about the students’ current level of skill, as well as progress made in improving those skills. Paper and pencil tests, direct observation, and video analysis all provide useful data from which a golf instructor can draw conclusions about the students’ learning. One of the most useful and often used techniques for assessing learning is asking questions and then listening to the responses students provide. Interestingly enough, it is usually only the more skilled teachers who use this relatively easy and cost-effective technique. Perhaps this is because the most highly skilled teachers have the strongest interest in knowing what their students have learned, need to learn, and want to learn.

LESSON 2-2: FOCUS AND FLOW: THE TEMPO OF TEACHING

Bored students are not found on the lesson tees of good teachers. In a class where learning is focused and the lesson flows smoothly, there is no time to be bored. Learning to teach with focus and flow requires particular skills and knowledge on the part of the teacher. In this chapter, several techniques for orchestrating lessons that are dynamic and purposeful will be examined.

LEARNING OUTCOME

After completing this lesson, you will be able to:

- Focus and maintain a consistent lesson pace to maximize student learning

READING ASSIGNMENT

Read the following lesson, which studies the effect of lesson pacing and structure on student attention and progress.

GETTING FOCUSED

Instruction and learning are a journey. Like any journey, in order to be successful and enjoyable, an instructor and student need to know where they are going, and then make consistent progress to reach their destination. Most good teachers, therefore, begin each lesson by establishing instructional goals and then providing an overview of how those goals will be achieved in the lesson. Knowing the purpose of the lesson and the activities to be completed makes the lesson more meaningful for students. Providing an overview of the lesson content and activities sets the pace of the lesson and lets students know what to expect, allowing them to more easily process the information as the lesson unfolds.

When the opening of the lesson includes an overview, students are able to make connections with their previous learning and related experiences. Linking new material to previous knowledge gives students a starting point for the lesson. Focusing the lesson is also motivating, as it allows students to build on previous successes and see the value in understanding new concepts and mastering important golf skills.

Understanding why they are engaged in the lesson's particular activities gives students an opportunity to recognize and learn the essential messages of the lesson. They have a sense of where the lesson is going and why. When the learning goals are clear, the lesson has a fundamental purpose or focus. In order to maintain this focus, teachers must revisit the lesson goals periodically throughout the lesson. Statements such as, "You keep practicing with that much effort and you'll have that chip shot mastered in no time," not only reinforce a student's effort, but also keep the lesson focus clearly at the heart of the lesson activities—in this case, improving the player's chip shot.

STARTING AND SUSTAINING FLOW

Unfortunately, no magic formula exists that will guarantee a lesson will flow smoothly from one activity to the next or that student learning will build progressively and enthusiastically to a successful conclusion. Orchestrating a lesson so that momentum builds properly takes a knowledgeable and skillful teacher. A well-conducted golf lesson has a vitality to it that is obvious to even the most casual observer. The way in which that energy is infused or maintained in the lesson is less obvious. In this section, some of the secrets that good golf instructors use to establish lesson flow will be revealed.

GRABBING THEIR ATTENTION

Focusing a lesson should be more than a simple, dry, or casual introduction. An uninspiring introduction sets a dead tone from the start and can make the student regret booking the lesson before the lesson even begins. Rather, instructors should open their lessons in ways that the students will find novel, captivating, and engaging. Instilling a sense of curiosity, enthusiasm, and excitement in the student makes him or her ready to learn and anxious to begin. It is the enthusiastic excitement and dynamic interaction between golf instructor and student that initiates lesson momentum, and a teacher will want to sustain that energy throughout the lesson.

Two of the most critical parts of a lesson are the opening and the closing. Both need considerable attention from the instructor. Therefore, the teacher should give some thought as to how to best capture the students' imagination and spark interest in the lesson.

DEVELOPING AN INTERACTIVE LESSON CLIMATE

Ideally, students will actively connect with both the content of the lesson and the teacher. The teacher should ask questions to get the students talking about the topic at hand. This not only makes them active participants in the lesson, but also gets them thinking about the information being offered to them. Students are often socialized into silence during a lesson, and therefore many are reluctant to speak, even when asked a direct question by an instructor. For this reason, questions posed in the early portion of the lesson should mostly call for "yes" or "no" responses. After the students begin responding, more in-depth questions requiring greater thought and more complex answers can be posed. It is also important to ask questions that students can answer correctly. Giving incorrect answers will likely cause students to stop answering, because no one likes to continually feel ignorant. In contrast, giving correct answers compels students to keep answering because they believe they are capable of offering reasonable answers. Beginning a lesson with questions also benefits the later portions of the class. As students feel comfortable speaking about the topic, they will more freely offer suggestions and insights as their learning progresses. Answering not only proves they know something, but makes them more active participants in the lesson, and that helps establish and maintain the flow of the lesson.

SEE AND SUPPORT THE RIGHT STUFF

When students are doing the "right stuff" (that is, what they are supposed to be doing, such as successful practice attempts), the teacher should let them know it. People generally respond better when their successes are celebrated, but the teacher should not go overboard in this regard. The teacher can tell them what they are doing right, and then get on with the next activity or

goal. Sometimes negative statements are necessary, but recognizing appropriate behavior early in the lesson sets a positive tone, piques student interest, and stimulates motivation.

KEEP IT FLOWING

A well-orchestrated lesson has a vitality that is obvious to even the most casual observer—a good lesson is fun and engaging to watch. However, the way in which that energy gets infused or maintained in the lesson is less obvious. One useful method for bringing energy into a lesson involves the teacher remaining active in students' learning activities, rather than passively observing students as they practice.

ACTIVE TEACHERS AND DYNAMIC LEARNERS

Lessons that have students spending most of their time being actively taught or supervised by their teachers, rather than having them work independently, tend to achieve more (Brophy & Good, 1986). Effective teachers are constantly in action: giving information, offering support, and nursing along the learning process. For a lesson to flow, a teacher must persistently infuse energy into the students' learning.

It is not just the teachers who are active in a dynamic learning environment. Students must move if they are to learn golf skills. Teachers can promote greater student participation in the learning process with a few techniques. Asking questions about the material being learned or its application to a game or activity engages the students' brains as well as their bodies. For example, if the instructor asks students who are practicing pitch shots when they might use that shot in a round, it gets them thinking about how the skill might actually be used. With that, the teacher has students who are moving and thinking—in other words, dynamic learners.

BRISKLY PACE LESSON ACTIVITIES

Moving the student briskly through instructional and practice activities and ensuring that students make continuous progress with high rates of success is another sign of flow. Keeping a brisk pace through a series of learning activities not only propels the momentum of a lesson, but also allows more content to be covered in less time. If the lesson gets bogged down in endless, mindlessly repetitive activities, it turns a potentially exciting and meaningful learning experience into a boring chore. The effective teacher seizes the “teachable moment” and moves the lesson forward toward the goal. A dynamic lesson moves quickly, but without being rushed. A rapid rate should not come at the expense of student learning. Students need to recognize that they are making progress—they are learning and improving their physical skills, and they should be able to see this.

KEEP STUDENTS ENGAGED

In research literature on teacher effectiveness, the most consistent finding is that the more time students spend appropriately practicing a task, the greater the learning (Brophy & Good, 1986; Schempp, 2003). Devoting most of the available lesson time to practicing skills and concepts, therefore, should be a goal of every golf instructor. There is only one way that people learn golf skills, and that is by actually practicing and using golf skills. Teachers should spend less time organizing or explaining and more time practicing the appropriate skills with students. Students

who encounter challenges in activities and find meaning in their learning tend to focus on the tasks before them and be enthusiastic participants in the lesson.

Dividing the lesson activities into modified tasks, with each activity containing a subgoal of the larger goal of the lesson, is a good technique to consider for infusing the lesson with flow. Students can experience more success, and one successful activity can lead to the next, which builds not only the student's confidence, but makes the lesson a progressive series of successful learning experiences. Repeating only a single activity over and over again makes the lesson grow stale. On the other hand, moving from one successful experience to the next keeps the lesson fresh. People learn best when they are both nurtured and challenged. Success provides the motivation and security to reach for new heights, and new activities provide the challenge to discover more success in golf.

THE SPICE OF LIFE

It is easy to fall into comfortable instructional routines, but they can soon wear into deep, dull ruts. Routines can be valuable time-saving devices for golf instructors, but too much routine crushes the spontaneity and creativity that brings life to a lesson. Research has shown that variety can permeate virtually every aspect of a lesson (Rosenshine & Stevens, 1986). Variety is not only the spice of life, but also the spice in a great golf lesson.

It takes a bit of imagination and some knowledge on the part of the instructor to discover new and varied ways of teaching golf. Some ideas for spicing up a lesson and keeping it flowing include relying more on nonverbal behavior, using new instructional strategies, devising novel learning or practice activities, incorporating technology or learning aids, reorganizing lesson formations or stations, putting up posters or playing motivating music, employing different assessment techniques, or inviting visitors to participate in the lesson as students or guest instructors. Searching for new ways to perform routine instructional tasks has the added benefit of helping to refresh and rejuvenate the teacher as well.

TIMING IS EVERYTHING

Knowing when to make a change in a lesson is an important yet difficult skill that normally takes time for an instructor to learn and master. After years of working through instructional scenarios, experienced teachers learn to anticipate situations, predict events, and generate alternatives to meet the demands of these developing situations. Inexperienced teachers have difficulty anticipating events and are often surprised and unprepared for particular situations as they occur.

Research has, however, provided some clues to the timing of activity changes and class pacing by experienced teachers (Griffey & Housner, 1991). While inexperienced teachers focus on student interest in the instructional activities, experienced teachers monitor student performance more closely and attempt to maintain an appropriate level of challenge throughout the lesson. They adjust the lesson based on student performance cues, whereas inexperienced teachers struggle to maintain student interest. Experienced teachers are concerned about the students' skill performance and understanding of the information being taught, which is easier to judge than someone's interest or enjoyment.

Experienced golf instructors are willing to make changes more quickly and more often than inexperienced teachers (Jones, Housner, & Kornspan, 1997). Inexperienced teachers often make changes after dramatic, negative occurrences in the lesson. In other words, it may take something going dramatically wrong before an inexperienced teacher makes a change. Experienced teachers are able to monitor the nuances that signal a need for an alteration before a crisis occurs. Additionally, because they are better planners, experienced golf instructors are better prepared to make the changes once they determine that a change is necessary.

MAKE TRANSITIONS SMOOTHLY

Once a decision is made to change the activity, it becomes important to make the change without interrupting the lesson flow. Momentum can often be lost when changing learning activities or when moving from one location to another. Therefore, transitions between lesson parts and activities should be signaled clearly and made quickly. Clear signals between lesson parts allow students to better follow the flow of the lesson. Having been briefed in the lesson opening about the upcoming activities, students are better able to understand what is expected of them with each transition signal, and the learning can restart quickly. Moving quickly from one activity to the next maintains the momentum, freshness, and focus of the lesson. It also reduces confusion and waiting time, which leaves more time for learning.

EXPECT SUCCESS

When a PGA Tour golfer strokes a putt, he expects the ball to fall into the hole. He expects results. Similarly, great golf instructors get results because they expect them. They expect that their students will be successful as a result of the instruction they receive. In other words, good teachers expect that their students will master the skills and concepts being taught. These teachers realize that sometimes learning will occur quickly, but sometimes it may take a while before the students are able to grasp the material and show mastery. Research has demonstrated that higher expectations are correlated with high achievement (Martinek, 1996). Students seem to have a remarkable ability to rise to high levels of expectations. If a golf instructor gives his or her best effort, it is not unreasonable to expect the same from the student.

In conveying expectations to students, teachers need to focus on individual student mastery and personal improvement rather than comparisons to others or established standards. People learn golf skills at varying rates and levels, as well as in different ways. A practice activity or piece of information that helps one player achieve a higher standard of performance will not necessarily have the same effect on every player. Similarly, one person may see a demonstration that clearly depicts the skill to be learned, while another student standing nearby sees only a confusing commotion. If each student is expected to master the skill, this expectation helps to clearly set the goal of the lesson and establish that both the teacher and student need to keep working to achieve mastery.

Lessons in which students constantly strive to master a skill or concept should flow from one activity to the next because the instructor and student both know what they are attempting to do, and both recognize the need to keep moving toward the goal. In setting high standards and expecting high levels of performance improvement, it is imperative that teachers attribute the student's success to the student's effort and ability. Students who see their success measured in effort and see themselves as able to achieve are willing to commit to their learning. Students who

believe that they lack the ability or are led to believe they are lazy will soon fulfill the prophecy of failure.

Because they are human, golf instructors often have the tendency to treat high and low achievers differently. High achievers better reflect a teacher's efforts, and the natural tendency is to expect more from them and provide them with more tangible, meaningful rewards, such as respect or admiration. Low achievers often attract either scorn or sympathy from a teacher. Low achievers will, therefore, be given unnecessary help, praised for success on simple tasks, or given acceptance for failure. Consequently, a teacher who holds high expectations for every student will enhance the learning experience for every student.

When a teacher expects great things from students, it does not take long before the students begin to believe they are capable of such achievement, and they start expecting success and achievement as well. They believe they can learn the skill or concepts being taught. Students who believe themselves incapable of learning are less likely to learn, or to even try. In contrast, students who believe they have the ability to achieve are far more likely to put forth the effort to fulfill their self-imposed expectations.

A student's perception of competence is instrumental for getting a lesson to progress in ways that promote student learning. A student learning to improve his or her putting stroke is far more motivated when a teacher, convinced the student is going to make a putt or two with enough practice in the proper technique, persists in teaching and encouraging them. If the teacher persists in teaching, students will put forth greater effort, willingly approach learning activities, persist even in the face of initial failure, seek help, and take pride when success is finally gained. Success may come in the form of a single putt, 10 putts in a row, or a new world record, but it will come. If a teacher wholeheartedly believes that, so will the student.

To facilitate success, teachers need to develop solid communication skills and dependable methods of conveying appropriate information. They must also be able to structure a learning environment in which students can grasp that information and turn it into useful knowledge and improved performance. Expecting success will not, however, guarantee success. But without a teacher being firmly convinced that the final outcome will be student mastery of the subject, there is little chance for mastery to occur. If the teacher expects success, there is a far greater chance of it happening.

AVOID MOMENTUM BLOCKERS

It takes effort and skill to get a lesson flowing and to keep it flowing. It is difficult to maintain flow and even more difficult to recapture flow once it is lost; therefore, a teacher must be able to recognize and avoid events that will derail and arrest the flow of a lesson. Avoiding disruptions, distractions, and delays is one secret of keeping students' attention. One of the surest ways of interrupting or halting the flow of a lesson is to deflect attention away from student learning and onto other matters. Factors such as lack of punctuality, quality of the equipment, or the temperature, distract attention away from the mission of the lesson—the student improving his or her golf game. Having to retrieve or set up equipment, review rules or schedules, change locations, or leave students waiting while attending to other business will also quickly kill the momentum of a lesson. In many cases, the need to interrupt a lesson is the result of poor

preparation. Therefore, time needs to be invested prior to the lesson to consider not only the instructional portions of the lesson but also the administration.

Giving consideration to factors that are known to block the lesson flow will often lead to strategies for maintaining lesson momentum. Placing equipment in convenient locations, ensuring that it is in good working order, accounting for weather and environmental factors, and locating instruction away from other golfers or maintenance crews are but a few examples of avoiding momentum blockers. Covering administrative necessities before or immediately after instruction keeps the lesson focused on learning during the most critical phases of the lesson. Every teacher should learn to recognize potential momentum blockers and deal with them quickly. The longer it takes for a teacher to address a potential problem, the more time the problem has to negatively affect the lesson.

BRINGING IT TO A CLOSE

As the end of the lesson draws near, the teacher should consider carefully how to bring it to a close. The teacher will want to find a way for the student to keep the enthusiasm, good feelings, valuable ideas and (most importantly) improved skill gained in the lesson and carry them to the golf course or the practice tee. Like a good piece of music, a well-orchestrated lesson comes to a memorable and purposeful conclusion. The following sections provide some ideas that may help lessons end on a good note.

FINAL REMEMBRANCES

Students will often most clearly remember what they did last in the lesson. Therefore, the final activity needs to be selected so the most important aspects of a lesson are highlighted. Inexperienced teachers simply end the lesson when time is up and the student must leave. Giving little thought to what a student leaves the lesson with is not effective instruction. Good golf instructors intentionally end the lesson with a student hitting a successful shot so that the student leaves with a positive image of himself or herself.

Some teachers highlight the major concepts learned in the lesson by closing with a discussion. Another effective lesson closing is having students record their lesson experiences in a journal and then having a conversation regarding what was learned in the lesson.

Although there is no single right way to close a lesson, a skillful teacher builds the lesson to a deliberate, memorable close. The student walks away knowing he or she learned something important that will now make him or her a more successful golfer.

TRAILERS AND TEASERS

One way that movie promoters attempt to attract an audience is by showing trailers or teasers. That is, they show small but meaningful segments of the movie to seize viewers' attention and make them think about coming to see the full feature. Golf instructors can do the same thing by letting students know that what they just learned is part of a bigger picture by saying something similar to the following:

- The new skill learned in the lesson will be built upon in the next lesson.

- The newly learned concepts need to be practiced so that they can develop further and lead to permanent improvement.
- Now that the student has mastered some short game skills, the next lesson will cover short game strategy and course management.

In other words, teachers should attempt to make the students look forward to coming back to the next lesson. Learning is progressive. It should not end with the lesson that is closing; rather, the lesson that is closing should open a door to future learning and more rewarding golf experiences for the student.

SUMMARY

Meaningful and interesting learning experiences are strongly dependent on a teacher's ability to give a lesson purpose and to keep the learning fresh and invigorating. In other words, a good instructor teaches with focus and flow. Identifying a specific purpose for the lesson and reminding students why they are doing what they are doing keeps both the teacher's and the students' attention on a meaningful outcome to the lesson. Undertaking instructional practices that get students actively involved in the lesson, keep their attention centered on the task at hand, and change quickly between briskly paced lesson activities allows the lesson to build momentum to a successful and satisfying close for both the instructor and the player.

A lesson that takes on the appearance of a dull dance by unwilling participants is not a pleasant experience for anyone. The lessons of good teachers are dynamic events in which successful experiences lead to long remembered and valued lessons. Successful lessons are, therefore, dependent on a teacher adopting and developing strategies that allow the lesson to unfold with focus and flow. Good teachers use strategies to get the lesson moving and maintain momentum, and then close with a purposeful, memorable experience.

LESSON 2-3: IMPROVING TEACHING

A teacher must be both skilled and knowledgeable. Improving one's teaching is dependent on one's ability to develop teaching skills and knowledge. This lesson provides proven techniques for improving teaching skills and expanding instructionally relevant knowledge. Becoming better begins with regular assessments and reflections on the skills identified for improvement. This lesson, therefore, opens with descriptions of strategies for reflective teaching and monitoring instructional behavior, and perspectives to identify potential areas for improvement. Once areas for improvement are identified, it then becomes necessary to objectively and systematically analyze teaching practices. Techniques for analyzing teaching will be presented, followed by a review of practice strategies leading to improvement. The lesson closes with suggestions for increasing knowledge and continuing one's education as a teacher. Used individually or collectively, these strategies and suggestions should help the conscientious and committed golf instructor find ways to improve teaching.

LEARNING OUTCOME

After completing this lesson, you will be able to:

- Analyze current teaching and develop effective instructional routines, knowledge, and skills

READING ASSIGNMENT

Read the following lesson, which describes strategies for teachers to use to assess the quality of their teaching.

REFLECTIVE TEACHING

Improvement demands that the teacher honestly question the assumptions and practices in his or her teaching that he or she has taken for granted, and search for solutions to important instructional challenges and problems. **Reflective teaching** occurs when instructors mentally review and question their instruction. Reflective teaching is a process of continual searching and questioning. Hellison and Templin believe that reflective teaching “means to think about [one's] teaching and especially to ask [oneself] two questions: ‘What's worth doing?’ and ‘Is what I'm doing working?’” (1991, 3). The first question demands a focus on one's values and beliefs as a teacher, and the second question leads to an analysis of instructional content, activities, and behavior.

TOPICS FOR REFLECTIVE TEACHING

Many topics are appropriate for reflective teaching, and they can all lead to improvement. Any issue of importance as a teacher will make for a good topic for reflection, from the immediate concerns of a lesson to long-term implications for society. Structuring the learning environment, student progression, and the processes and practices of teaching are all common concerns scrutinized by reflective teachers. These are the day-to-day routines and practices that define one's teaching and require periodic checks, thought, and adjustments.

Beyond the practical concerns of everyday teaching, two effective strategies for instructional improvement are reflecting on the limits of one's current knowledge and seeking new information for a specific teaching purpose. Contemplating recurring problems often leads to discovering new solutions. Understanding new techniques relative to a student's performance, training regimens, or even psychological theories of motivation may be useful topics for exploration. Reflection on what one does and does not know about one's students can help improve instructional delivery. It is also a useful topic of reflection because the better a teacher knows and understands his or her students, the better equipped he or she is to provide meaningful instruction for those students.

REFLECTIVE TEACHING TECHNIQUES

Reserving a few minutes at the end of every lesson to think back to the instructional activities that have just passed is perhaps the simplest way to reflect on one's teaching. Expert instructors develop a routine of reflecting after each lesson. The successes from the lesson are stored for future use, while any problems are examined in hopes of finding better solutions if those same problems arise again.

There are particular characteristics and practices that allow reflective teachers to maximize the findings of their deliberations (Cruickshank, Bainer, & Metcalf 1995). First, they regularly, purposefully, and carefully evaluate their teaching and its impact on student learning. Their reflections lead to rational instructional decisions. Second, reflective teachers are open-minded. They question their own views and practices, and actively explore options in search of viable alternatives. Third, reflective teachers strive to improve their practices and find specific ways to help students maximize their golfing potential. Fourth, reflective teachers take responsibility for their teaching and the results of their instructional practices. They see themselves as the sole proprietors of their teaching. No one else is going to make them better teachers. Finally, reflective teachers are inquiry-oriented. They enjoy the process of exploring options and alternatives because they are constantly questioning what they do and experimenting with new ideas and practices.

A classic technique that has proven over time to be a useful reflection exercise for teaching is maintaining a journal, to record the products of reflection for future reference. Legendary basketball coach John Wooden (2003) recorded not only his daily practice activities, but also his impressions, feelings, and judgments in his journal. He found his journal enormously helpful for discovering those activities and practices that were most successful in shaping championship teams. Posting journal entries became a regular part of Wooden's daily activities.

Perhaps the best-known journal in golf instruction was that of Harvey Penick. Like Wooden, Penick recorded his thoughts, reactions, and impressions of his instructional activities. He made his notes in a simple red spiral binder that was later edited and rewritten into one of golf's all-time bestselling books: *Harvey Penick's Little Red Golf Book* (1992). A journal provides a place for recording important ideas that might otherwise be lost and helps ensure that a teacher can extract maximum benefits from moments of reflection.

DEVELOPING TEACHING SKILLS

When it comes to developing teaching skills, there is no substitute for experience. Nothing tops teaching experience for learning how to express oneself clearly, identifying effective forms of feedback, testing stimulating learning activities, and developing organizational strategies that help lessons progress smoothly and purposefully. However, experience alone is not enough to bring about improvements in teaching. Unfortunately, many teachers continue to teach in the same way year after year with no detectable improvement in their instruction. Teaching becomes like handwriting: the same sloppy style is considered serviceable and never changes. It may even deteriorate over time. To improve and develop, one must thoughtfully analyze one's teaching skills, understand the alternatives, and then practice the innovations. This section suggests techniques for analyzing one's teaching and presents strategies for establishing instructional routines, practicing teaching skills, and seeking instructional alternatives to persistent teaching problems.

ANALYZING TEACHING

Analyzing teaching is a three-step process. The first step is observation—that is, in order to analyze a teaching skill, it must be observed in an instructional context. For teachers to analyze their own teaching, audio or video recordings are helpful. Direct observation is best for analyzing the teaching of a colleague, an assistant, or a mentor. After an observation (either live or recorded), the second step is the actual analysis itself. Although golf instructors are often skilled at analyzing golf skill performances, few are as skilled at judging a teaching performance. In the analysis phase, targeted aspects of the teaching performance are either quantified or qualified. The final step is judging the quality of the observed teaching. These judgments are based on the analysis completed in step two. For example, analysis might show that a teacher takes an average of fifteen minutes to explain and demonstrate skills at the beginning of class. Is this acceptable? Is a change necessary? Ultimately, it is the teacher who determines what needs to change and why. In determining the answers, the teacher identifies those aspects of his or her teaching that he or she wants to improve as well as the magnitude of that improvement.

Like any skill, current performance must first be analyzed before areas of improvement can be identified and plans for refinement can be developed. Four techniques for analyzing teaching are presented in the following sections: directed observation, checklist/rating scales, systematic observation, and teaching journals. Within the descriptions of each technique, both the criteria and procedure for analyzing teaching are explained. By using one or more of these methods, teachers can effectively analyze their teaching.

DIRECTED OBSERVATION

A directed observation analysis is the simplest and most common of the analytic techniques. This technique requires no or few predetermined criteria when observing a teacher. The person performing the analysis should simply position him- or herself where he or she can clearly see and hear the teacher without being a distraction to the instructor. As the lesson unfolds, the observer should make notes on aspects of teaching that he or she would like recorded, or would like to discuss with the teacher when the lesson concludes. In some instances, a guide sheet is used to focus the observation into areas such as organization, quality of explanations and demonstrations, feedback, knowledge of golf skills, and other areas of interest.

Because this technique has no predetermined focus or criteria, it permits total observation of the environment, instructor, and player. Whatever captures the observer's interest becomes a potential item of analysis. The analysis can be responsive to the needs of the observer, teacher, or students.

This technique also has several disadvantages. Two people watching the same teacher may come to two entirely different conclusions because the criteria by which judgments are being made are not the same. The technique is also susceptible to the "good teacher/bad teacher" syndrome. That is, if the observer believes the teacher is "good," then he or she focuses on the teacher's strengths while downplaying or ignoring the teacher's weaknesses and limitations. If the observer believes the teacher is "bad," then the teacher's weaknesses take center stage, while any strengths are given only mild attention. This technique is therefore at the mercy of the observer's skill, knowledge, and objectivity regarding teaching and learning.

CHECKLIST/RATING SCALE ANALYSIS

Unlike directed observations, checklists and rating scales have established criteria based on selected teaching activities. The observer watches the teaching and then completes the checklist and/or the rating scale. If a checklist is used, the observer checks off those items that occurred. Rating scales require the observer to use a numerical sliding scale to rate the degree to which the activity occurred or failed to occur. Items contained in the checklist or rating scale are normally theoretically or empirically based on the characteristics of effective teaching and learning.

Because of the predetermined criteria of the checklist or rating scale, this method of analysis is more reliable and objective than the directed observation technique. The rate of agreement between two or more observers will certainly be higher than in a directed observation. Behavior and activities that might have been otherwise overlooked can be analyzed using this technique. Specific areas of interest can be determined, and the subsequent observation can be made to focus on these areas through the use of appropriate checklists and rating scales. The information from the checklist or rating scale has greater trustworthiness for teachers seeking improvements in their instructional practice. Using multiple checklists and rating scales from a single observation leads to a more extensive and broader analysis of teaching skills.

Checklists and rating scales are not without disadvantages. First, activities or behavior not included on the evaluation sheets cannot be analyzed. Therefore, a systematic bias occurs in that the behaviors analyzed are considered the most significant and critical aspects of teaching. Second, the events and behavior analyzed are often unrelated and out of context because the specific reference for the evaluation is not included. The observer may check that feedback occurred in the lesson, but when, to whom, and under what conditions are not specified. Third, the later class events are often freshest in the memory of the observer and therefore receive greater weight in the analysis.

Although the technique does hold several liabilities, it can still prove a valuable tool for teachers striving to be better. The following figure shows an example of a rating scale.

FIGURE 2-1: SAMPLE RATING SCALE FOR TEACHING SKILLS

Instructor: _____ Date: _____

Lesson: _____ Student: _____

OBSERVER: _____ LOCATION: _____

Rate these teaching skills (1 needs most improvement, 10 needs no improvement)

I. INSTRUCTIONAL PACING

Student practice time

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Activities are briskly paced

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

High rates of student success in practice activities

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Expectations for student mastery made clear

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

II. INSTRUCTIONAL FORM

Begins lesson with goals and overview

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Stresses main concepts throughout lesson

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Transitions between activities clear and quick

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Information presented in clear, concise manner

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Teaches with enthusiasm

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Closes lesson with review and summary

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

SYSTEMATIC OBSERVATION

Systematic observation requires a specific set of criteria or categories of teaching behavior that will form the focus of the observation. These behavioral categories might include a teacher's feedback, student/teacher interaction, student practice time, or communication style. Systematic observation also requires a method of recording the observed behavior. The recording procedure may be as simple as placing a tally mark next to the category listed on a recording sheet every time it occurs. For example, in a feedback system, the number of times positive feedback is observed is tallied in a positive feedback column. Other recording procedures might include measuring the amount of time spent in each category. For example, one might record the amount of time a student is practicing golf skills in a lesson versus the amount of time spent listening to the instructor.

Systematic observation provides teachers with a clear and reliable picture of their teaching, and this helps a great deal with identifying the teaching practices they wish to improve. For example, if a teacher wishes to reduce student waiting and increase positive feedback, those behaviors can be identified and target goals can be set (e.g., have students wait no more than two minutes before moving, or give two pieces of positive feedback for every one criticism).

The disadvantage of this analytic technique is that it is time-intensive. It takes time to adequately learn an observation system, and analyzing the data may take time as well. However, systematic observation has proven to be among the best ways to directly improve teaching and coaching practice. The time invested in gathering and analyzing the data pays the biggest dividends in improved teaching. The following figure provides a sample feedback analysis system.

FIGURE 2-2: SAMPLE FEEDBACK ANALYSIS SYSTEM

Instructor: _____ Date: _____

Lesson: _____ Student: _____

OBSERVER: _____ LOCATION: _____

After each feedback statement, place a tally mark in all applicable columns

Feedback Topic

Correct movement	
Incorrect movement	
Outcome	

Specificity

Specific to movement	
General	

Character

Positive	
Negative	
Neutral	

Intention

Evaluative	
Prescriptive	
Descriptive	
Affective	

TEACHING JOURNALS

As discussed in “Reflective Teaching Techniques,” teachers often find keeping a journal to be a good way of cataloguing and exploring the decisions they make. A professional journal is a record of not only what the golf instructor did, but also why he or she made that decision and the outcome of that decision. Additionally, emotions, reactions, and insights are also recorded in a journal. The examples of John Wooden and Harvey Penick are two cases of journals used to improve instructional practices.

A teaching journal should focus on the practical matters of an instructor’s daily routines—lesson organization, player relationships, capturing and maintaining students’ attention, and so on. In a journal, a teacher can express him- or herself self as both a private individual and a trained

professional. Understanding the influence of personal factors on professional teaching behaviors leads teachers to develop greater scope and expertise in professional judgment. A journal is a good place to explore the personal in the professional.

Descriptions of critical incidents (i.e., accounts of activities on the lesson tee that are significant change events for either the teacher or the student) can be especially helpful entries. These instructional events are easily recalled and remembered, but are often thought of as trivial because the significance is only recognized through reflective analysis. Teachers develop by reflecting on and critically interpreting the incidents recorded in their journals.

IMPROVING TEACHING SKILLS AND ROUTINES

Becoming a better teacher requires sustained, deliberate practice of specific and critical skills. As has been repeatedly noted in this course, deliberate practice begins by analyzing current teaching activities and then identifying those aspects of teaching that will have the biggest impact on student learning. For the next step, a plan must be devised to practice those instructional skills. Conscious, sustained practice of key teaching routines and skills is a proven path to becoming a better teacher. In this section, suggestions for developing routines, practicing teaching skills, and seeking alternatives are offered.

DEVELOPING ROUTINES

Graceful, fluid, and automatic actions are distinguishing characteristics of experts (Bloom, 1986). The lessons of great golf instructors include fluid, elegant, and seemingly effortless instructional practices. From years of experience and knowledge of the learning environment, these teachers have rehearsed and repeated instructional patterns until they became subconscious, automatic routines. The advantage of instructional routines is that the lesson pattern becomes familiar to both the teacher and students. Familiarity with the more standard aspects of the lesson allows the instruction to proceed without the teacher making a constant series of decisions or the students being bombarded with a steady stream of directions.

When routines are established, fewer decisions need to be made and the teacher can focus his or her attention on more important issues, like student learning. Instructors with established routines do not need to think as much about where they need to be, how to use the equipment, or what they should be doing, and they can devote more time to their students' learning needs.

Research has identified several routine practices common to expert golf instructors. Effective teaching routines identified by this research include the following (Baker, Schempp, and Hardin, 1998):

- Initiating the lesson with a statement of goals
- Asking several questions to gauge the students' understanding of the material being learned
- Offering immediate, positive feedback after selected student performances
- Closing the lesson with a review of the main instructional points

The repetitive nature of these practices characterizes the teacher's instructional routine and cues the students as to what to expect in class. If a teacher is not in the habit of telling his or her

students the learning goal for the lesson or closing with a summary of key concepts, it would be wise to deliberately practice either or both of these activities for a sustained period in order to ingrain them in one's instructional pattern. In time, these effective teaching practices will become a matter of routine.

PRACTICING TEACHING SKILLS

With routines, the lesson can be carried off with greater ease, but to actually improve teaching requires practicing specific instructional skills. Several such skills were identified and described earlier in the PGA PGM program, such as effective communication skills, lesson organization, and content presentation. However, simply reading about these skills will not make someone a better instructor any more than simply reading a golf book will lead someone to the PGA Tour. To improve teaching, one must practice key instructional skills again and again.

There is little chance that any single teaching skill is going to bring increased success the first time it is tried. If a teaching skill is not successful on the first or second attempt, the teacher should analyze the cause of failure, make corrections, and try it again. All too often, when inexperienced or less skilled teachers attempt something new, they find it does not work on the first attempt and quickly abandon it as a failure or an inappropriate tool for their teaching. Few skills are mastered on the first attempt. Whether the skill is a new instructional strategy, an oral presentation technique, questioning students, or a planning scheme, it can only be mastered in the trial and error of sustained practice.

While any time is a good time for practicing teaching skills, the best time for beginning teachers to practice is when a persistent problem arises. For example, running short of good student practice activities during a lesson could signal a need to develop better planning skills. A lack of improvement by students might indicate insufficient time for practice or ineffective instructional feedback. For more experienced teachers, feeling that the lessons have grown flat and monotonous would suggest that routines have overtaken the lesson and choked the life out of teaching and learning. To reinvigorate tired instructional activities, an experienced teacher might find new ways to build relationships with students, introduce technology to instruction, or incorporate a new learning strategy.

SEEKING ALTERNATIVES

Having an impact on students' learning often demands a touch of creativity on the part of a golf instructor. A continuous flow of decisions and challenges face teachers with every lesson, and the instructional environment varies as new students, equipment, skills, and knowledge are introduced. Due to continual variations in teaching situations, there are as yet undiscovered ways for a particular teacher, student, or environment to achieve unlimited success. As long as there are teachers seeking new solutions to old problems or alternatives to current practices, there will be new innovations in the art and science of teaching. To a large degree, teachers are researchers, and their lesson tees are laboratories. As they experiment, golf instructors continually discover new and better ways to help their students learn the great game of golf.

INCREASING KNOWLEDGE OF TEACHING

The level of one's knowledge does not guarantee whether he or she will be a good teacher. However, it is not possible to teach well without a substantive store of knowledge. Research has

revealed that expert golf instructors are constantly increasing their knowledge of golf, of their students, and of their teaching, while those with lower levels of expertise do not put nearly the same effort into increasing their knowledge base (Schempp, Templeton, & Clark, 1999). Those who aspire to be the best, whether as a golf instructor or player, never stop learning. This section presents strategies that have proven successful for teachers seeking to increase their knowledge.

LISTEN AND LEARN

In two particular research studies, teachers identified both students and other teachers as important sources of knowledge for teaching (Fincher & Schempp, 1994; Schempp, Templeton, & Clark, 1999). Students provide the ultimate feedback to a teacher regarding instructional success. If a student improves, something in the lesson accounts for that. Perhaps it was the instructor's explanation of the golf swing, a demonstration, or the practice activity that helped the student learn. By talking with and listening to students, teachers discover important facets of teaching knowledge.

In speaking with and listening to other teachers, one gains new perspectives on persistent problems, discovers novel ways of meeting new challenges, or finds support for ideas to incorporate into a lesson. Teachers often make the best teachers of other teachers. Therefore, golf instructors who cultivate a network of peers tend to develop a rich and continual source of new knowledge.

TRUST ONE'S INSTINCTS AND DEVELOP INTUITION

Teachers who trust their intuitive senses in the instructional setting no longer need to deliberate about every action they take. Therefore, their instructional activity takes on a natural flow and timing. This does not mean abandoning logic or reason on a grand scale, but rather developing instincts and intuition in order to promote a greater sense and deeper understanding of the instructional environment.

Developing instructional intuition begins with recognizing similarities across teaching contexts and then making applications from one teaching situation to another. For example, a particular drill may prove to be effective with one beginning student, and therefore may help a beginning student in another lesson. Teachers' intuition breeds from an intimate familiarity with and extensive knowledge of the learning environment and everything in it, particularly students. With this level of knowledge, the teacher can sense a potential learning problem, recall successful solutions, and make adaptations. The more often teachers reach across context to establish connections and see similarities, the better they become at anticipating problems and predicting workable solutions.

As instructional decisions become more instinctive and responsive to variations in the teaching environment, intuition begins to develop. When a golf instructor begins moving away from always rationalizing every decision, and uses more intuitive decision-making, instruction becomes more dynamic because it is guided by the teacher's knowledge in action.

However, a word of caution is in order. Intuition takes extensive experience and knowledge to develop. Novice golf instructors will get better results relying on rational analysis and

preplanning lessons. This way, they will have something to fall back on if their instincts and intuition fail to provide appropriate actions and activities during the lesson.

PROFESSIONAL ASSOCIATIONS

A profession comprises an educated, experienced body of individuals who provide a recognized service to society for a fee. PGA members are recognized as credible professionals because of their credentials and the services they provide. Membership in a professional association normally results in five direct benefits.

First, the opportunity to interact with other golf professionals at local, state, regional, or national association meetings is an important consideration. The chance to share ideas and meet people with common concerns is a vital link in one's development as a golf professional. Friendships and connections made at meetings are often maintained over the years, and these important resources are only a phone call, letter, or email message away. Developing a network of professional colleagues and sharing ideas increases both knowledge and motivation.

Second, a collective group carries social power. As a group, the PGA can promote the interests of its members. This might take the form of a political action initiative with a legislative group, a promotional campaign to advertise the benefits of participating in golf, or some other collective action.

Third, a professional association serves as a knowledge source. Most organizations publish journals and books that describe the latest innovations in the industry. Meetings are held in which prominent professionals share their knowledge and wisdom with those assembled. A professional organization may also sponsor research initiatives to solve major problems facing practicing professionals. Professional standards and certification programs such as the PGA PGM program are also within the scope of responsibility of the PGA of America.

Fourth, through elected offices and awards, organizations identify leaders who provide guidance and serve as role models for the profession. These individuals set the standards of the profession and lead the way in innovative practices.

Finally, belonging to a professional organization is motivational. Most people come away from professional meetings feeling reinvigorated and supported in their efforts. Meeting other golf professionals, attending meetings, reading the latest developments regarding the golf industry, having the organization promote one's profession, and meeting the leaders in one's field are all ways of developing as a teacher and golf professional.

COURSEWORK AND DEGREE PROGRAMS

Universities and colleges offer a range of courses that golf professionals may find valuable in their work. Many colleges permit students to enroll in particular courses as part-time or non-degree students. Junior colleges traditionally offer Associate of Arts or Science degrees, while colleges and universities offer Bachelor of Arts or Bachelor of Science degrees. Once a traditional four-year degree program is completed, it is possible to enroll in post-bachelor or graduate degree programs at many colleges and universities. Post-bachelor programs allow students to take courses at a university or college without pursuing a degree. Students are free to

choose any courses they wish to take that may help to become a better golf professional. Education, business, psychology, or exercise science courses are just a few of the areas in which a golf professional may find valuable information. If a student chooses to pursue a graduate degree, several options are available, such as a Master of Arts, a Master of Science, or a Master of Education. The highest academic degree is the doctoral degree, which traditionally takes three to four years beyond the master's degree to complete.

SUMMARY

Few golf professionals believe they can do everything well in their instruction. Most experienced and expert golf instructors clearly recognize their limitations and devote significant effort to learning more about the matters that influence their instruction. Although initial certification programs may launch an instructor into the profession, development and growth as a teacher requires a sustained desire to improve. This lesson presented strategies for improving teaching. The first step is developing reflective teaching (i.e., to reflect on one's professional practice and identify strengths and weakness in teaching). From here, one can seek strategies and resources that increase skills and knowledge.

To develop teaching skills, one must thoroughly and critically analyze his or her instructional patterns and activities. Such analyses, whether using directed observation, checklist/rating scales, systematic observation, or a teaching journal, help teachers spot areas for development. Once identified, these areas can be improved if the teacher makes a concerted effort to increase his or her knowledge and practice new skills. One becomes a better teacher by deliberately practicing specific instructional skills over time.

To increase knowledge, teachers have a variety of resources to draw from. A good start is listening to and learning from peers and students, because these people are most familiar with a given teacher's practices and work environment. Developing instincts and intuition is also necessary to elevate one's level of expertise as a teacher. Teachers can find a wealth of new information on the latest research, equipment innovations, or teaching ideas by joining professional organizations or seeking ways to continue their education. Finally, institutions of higher education offer both degree and non-degree programs that permit teachers to take advanced coursework on topics pertinent to their teaching concerns. The key to becoming a better teacher is to never stop learning to be a better golf professional.

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PART 3: KNOWLEDGE OF THE GAME

The first two parts of this course manual have mostly focused on the mental aspects, philosophy, and theories behind proper teaching. This part is more concerned with the actual physical actions produced when playing the game of golf. It is more specific to the game of golf, and builds on the game knowledge presented in the Level 1 and Level 2 PGA PGM courses. Part 3 covers three fundamental topics, as shown in the following sections.

TEACHING METHODOLOGIES

The Level 2 teaching course introduced the concept of a teaching methodology, and specifically studied the methodologies of top teachers for teaching the full swing. Lesson 3-1 takes a similar look at various methodologies for teaching the short game (which is a facet of golf that students often do not place enough importance on) and for teaching when on a golf course with students, as opposed to being in an off-course instructional setting.

PHYSICAL PERFORMANCE AND FITNESS

In the Level 1 and Level 2 teaching courses, the lessons about fitness and performance focused on golfer stance and posture, examined players' postural deficiencies, and discussed corresponding corrective activities. Lesson 3-2 delves into the golfer's actual movement patterns in order to further evaluate his or her proficiency, and also discusses individual physical evaluations for determining movement preferences.

GOLF CLUB PERFORMANCE

When evaluating a student's swing, the teacher faces a fundamental question: "Was the golf shot caused by the swing, or by the design of the club?" The correct answer is, "It was caused by both." Golf instructors cannot teach a consistent swing to a student who is using ill-fitting equipment, nor can they effectively fit a player with poor swing mechanics. Therefore, the most effective approach to game improvement is through an integrated combination of instruction and equipment considerations.

Lesson 3-3 is designed to provide an understanding of how to effectively conduct a golf club fitting based on ball flight evaluations and to make equipment recommendations, alterations, and performance upgrades that optimize the player's performance and learning. This lesson educates apprentices in the art of dynamic fitting and how to properly use the tools necessary to accurately fit clubs.

LESSON 3-1: INTRODUCTION TO SHORT GAME AND ON-COURSE TEACHING METHODOLOGIES

The Level 1 and Level 2 teaching courses provided a wide array of information about teachers and students—how students process the information provided by teachers, how teachers develop their full swing methodologies, and how teachers continue to develop their skills. Level 2 also introduced the necessity of a teacher having an effective teaching methodology, or a set of tools, methods, and theories that the teacher uses to deliver lessons and create a learning experience that helps students get the most out of their abilities and achieve their goals in the game of golf. The methodology summarizes the teacher's views, beliefs, and attitudes about both golf and teaching, and explains why he or she continues to teach.

In Level 2, PGA PGM students started developing their own teaching methodologies for teaching the full swing. However, this methodology does not necessarily apply to every teaching situation and every golf skill. The development of an effective full-swing teaching methodology needs to be followed by the development of additional methodologies for teaching the short game and teaching when on the golf course with students.

To help beginning teachers understand and develop their own methodologies, The PGA of America developed methodology questionnaires and asked the top teachers in the country to document their best practices and some of the factors that contributed to their short game and on-course teaching methodologies. The expert teachers' responses offer insight into the issues they faced early in their careers, their professional development at various points in their careers, and their use of technology, drills, learning and teaching aids, and personal experience. This lesson presents the responses to both questionnaires and the common threads that were woven through many of the expert teachers' answers.

LEARNING OUTCOME

After completing this lesson, you will be able to:

- Use a variety of teaching methodologies to meet the specific needs of the golfer

READING ASSIGNMENT

Reading the following results of the Short Game Methodology Questionnaire and the On-Course Methodology Questionnaire, and complete the pre-seminar activities for each questionnaire.

THE IMPORTANCE OF SHORT GAME INSTRUCTION

The importance of the short game is typically appreciated by the golf instructor, but undervalued by many of the students he or she teaches. In some cases, a student's ineffective short game performance can be attributed to poor execution of the fundamentals and mechanics of the specific shot; in others, it is due to the student's lack of practice or experience. All instructors face the challenge of helping students appreciate the importance of the short game and its relationship to the overall golf score, while at the same time improving the students' pre- and in-

swing short game flaws. The value of an effective short game will need to be reinforced to the student by the instructor and can rarely be overstated.

DETERMINING A STARTING POINT

Before a student and teacher begin a short game training program, the teacher must assess the student's current skill level. This assessment can take a number of forms. The teacher can use a personal assessment program that he or she has designed, or one of a variety of programs on the market. Alternately, he or she can simply observe the student hitting various short game shots from a variety of situations. However, the exact method of assessment is less important than its effectiveness in helping the teacher determine the student's skill level and the areas of his or her short game that most need attention.

For example, a beginning student might benefit from time spent developing an effective chip shot, while a more experienced student who has mastered chip shots might lack adequate distance control when pitching. Regardless, the teacher must help the student develop the missing skills and prioritize the short game shots that the student will encounter on the course.

HELPING STUDENTS DEVELOP REALISTIC EXPECTATIONS

A primary goal of any instructor should be to help the student develop a realistic expectation level of his or her performance based on the amount of time he or she has to practice and play as well as his or her commitment level to improve. In a way, golf is a fairly simple game—knock a ball from here to there with a stick, and knock it into the hole. However, “simple” is not the same as “easy.” It just looks easy, particularly on television when one watches the greatest players in the world hit incredible shots in routine fashion. These players have practiced exhaustively since they were in grade school, have had the finest teachers in the world, play with the best equipment, compete three out of every four weeks during the year, and feel that par is a bad round. In comparison, the typical viewer is lucky to squeeze in two games a week, practices infrequently, takes too much of instruction from friends, and uses clubs that are not matched to his or her swing. Yet this golfer somehow expects to perform like the professionals.

It is much healthier and more enjoyable for the student to have a reasonable level of expectation. An over-competitive mindset is unrealistic and puts too much pressure on what should be a more relaxed experience. No player is ever going to be perfect, so golfers should become familiar with the words of Tommy Armour, who said, “Missing simple shots is part of being human.”

One benefit of the assessment process is that it allows the teacher to help the student set realistic expectations for his or her short game performance. Consider the following breakdown of a male golfer with a handicap of 15-19¹:

The golfer averages slightly less than five greens in regulation per round. In 10 chipping or pitching situations from within 50 yards, the golfer is equally likely to hit a shot to within five feet of the hole as he is to make an error and miss the green—each outcome occurs slightly less than twice per round. The average putt left after a successful chip or pitch is 14 feet, and the golfer is equally likely to three-putt or one-putt from this distance.

¹ This breakdown was supplied by Peter Sanders of ShotbyShot.com, Complete Game Analysis.

Potential starting points for an instructor working with this student include eliminating the severe missed shots that do not end up on the green or eliminating the three-putts. In either case, the student must believe that the goals set are attainable, and the goals must highlight that every short game shot does not have to result in a “gimmie,” and every 14-foot putt does not need to be made. These goals are attainable by the student and would help lower his or her score.

SHORT GAME METHODOLOGY QUESTIONNAIRE RESULTS

The goal of the Short Game Methodology Questionnaire is to offer a snapshot of what an experienced teacher is thinking at that particular moment in time as it relates to his or her instruction on the short game. The questionnaire was sent to 100 expert teachers, including teachers listed in the current *Golf Magazine* Top 100 and *Golf Digest* Top 50, and The PGA of America’s national Teachers of the Year.

The qualitative responses were analyzed and grouped into major themes for each question. The information in this lesson includes a sample of the responses of the expert teachers who participated and their answers to follow-up interviews based on their responses. The names of the respondents have been removed to preserve their anonymity. Answers to questions that required respondents to rank a set of alternatives or list recommendations are presented in rank order or reflect recommendations that had the highest frequencies.

The questionnaire is limited in scope, and it does not eliminate the need for teachers to continue their own research and work on their teaching methodologies. The responses cannot answer all of the PGA PGM students’ questions or offer everything necessary to teach at the same level as those responding to the questionnaire. For example, knowing the specific short game drills used by an expert teacher does not mean that a developing teacher can convey the information as effectively as the expert.

To help PGA PGM students continue their own studies, the questionnaire included a request for any books that were helpful in the teachers’ development or that offer further insight into their short game teaching methodologies. These resources are described in “Suggested Reading” on page 119.

WHAT INDIVIDUALS INFLUENCED YOU THE MOST AND HELPED SHAPE YOUR SHORT GAME METHODOLOGY?

Unlike the full swing methodologies, more of the teachers’ short game methodologies were influenced by Tour players than by traditional teachers. Responses included well-known teachers such as Bob Toski and Jim Flick, lesser-known teachers, authors such as Dave Pelz, players such as Seve Ballesteros and Tom Watson, and close friends and family members. Overall, the responses illustrate that one’s short game methodology can be influenced by any number of individuals or sources. A few specific responses are as follows:

- “My dad influenced my thoughts on putting, and he helped shape how I teach putting. Bob Hamilton, former PGA Champion, on bunker play and wedges. He is believed to have been one of the best wedge and bunker players to have ever played. I also taught and worked with Jodie Mudd, and was out on tour with him quite a bit. I am the type of person who really watches, listens and asks a lot of questions. One of my greatest strengths is the skill of

observation. Through these experiences, I put together what and how I teach. It is hard to say who was most influential, as they all contributed to my thoughts on the short game.”

- “No one person influenced my short game teaching style. My short game methodology is mainly the result of my playing experience—trying to become the best player that I could be. So my short game teaching techniques are from my own personal experience and also watching other players that I competed with throughout my playing career.”
- “Teaching thousands of students gave me short cuts to develop a sound short game approach.”

WHAT WERE YOUR MAJOR WEAKNESSES WHEN TEACHING THE SHORT GAME EARLY IN YOUR CAREER, AND HOW DID YOU OVERCOME THEM?

Many respondents thought that they talked too much or gave students too much information as they were developing as teachers, and did not know how best to communicate information to their students. As is ordinary for developing teachers, some said they lacked short game instruction experience and a clear understanding of shot technique. Many of these potential problems have been discussed in this course and in other courses in the PGA PGM program.

Regardless of the early weaknesses, what the respondents had in common is that they worked to overcome their weaknesses, and their performance improved with time and experience. The key is not just to recognize areas that are in need of development, but also to take the necessary steps to improve.

A few specific responses are as follows:

- “I tended to teach all mechanics, sort of a connect-the-dots type of technique without leaving room for feel, tempo, and creativity. Experience and observation of other teachers helped.”
- “I did not understand the REAL difference between chipping and pitching! I found someone knowledgeable to show me the differences and WHY they had to be explained differently.”
- “I did not understand technique, or that there were several different ways/methods. I read, experimented, and sought out advice to overcome my lack of understanding.”
- “I didn’t understand how to teach/develop a player’s distance control/feel and what was necessary to develop different shots in chipping and pitching. I thought there was “The Way” for every player, whether chipping, pitching, or putting. When I began to approach short game teaching from the perspective of “Your Way” and set the goal of versatility, combined with a player’s individual style, yet based on principles, not preferences, my short game instruction became a strength.”

WHAT DO YOU DO TO CONTINUE YOUR DEVELOPMENT AS A TEACHER OF THE SHORT GAME?

The factors that influenced the expert teachers are as diverse as the teachers themselves. Because the sources of influence can vary so wildly, developing teachers should remain open to input from all sources. A few specific responses are as follows:

- “I continue to experiment, observe, read, and visit with other professionals.”

- “I listen more to my students who are good short game players, listen to PGA/LPGA Tour players in describing what they think/feel. Work on my own short game by trying various methods. Listen to other top instructors teach it. Research it on the Web. Ask questions of my best junior players.”
- “I am continually upgrading my presentation/message based on my student’s success and failures, discussions with other teachers, seminars, books, videos, experts in other fields.”
- “I listen and learn from older teachers and players, as they have been there. I keep a video library on the best short games I have ever seen.”

RANK THE ORDER OF IMPORTANCE OF THE FOLLOWING IN HELPING YOU DEVELOP YOUR SHORT GAME METHODOLOGY

Over half of the respondents said that “Personal Experience” and “Observing” were the number one and two factors in helping them develop their short game methodology. Third through fifth were “Watching Competitive Golf,” “Discussions with Fellow Professionals,” and “Reading.” “Specialty Education” and “PGA Education” programs were named roughly the same number of times and should be considered of equal importance. “Watching Video” and “Watching the Golf Channel” were considered to be less important.

The response that was given least often was “Other.” However, the few expert teachers that did list it generally named factors that they considered quite important in their development, such as “Taking lessons,” “Experience through teaching,” or “Observing my students.” This reinforces the notion that education opportunities are available from many sources, and any factor could be a key to a beginning teacher’s development.

BRIEFLY DESCRIBE YOUR SHORT GAME METHODOLOGY

Responses to this question ranged greatly in content. In some cases, key points were more technical in nature and limited to specific short game setups and swing techniques, while other respondents highlighted the student-to-teacher relationship, the need for individuality, and the importance of performance. Excerpts of a few specific responses are as follows:

- “The motion is a miniature version of the full swing. All swings must be on plane with an effective radius and appropriate clubface.”
- “I teach that all short game shots are one of three basic formats: no wristed stroke, hinge and hold, hinge and release (more L to L). Then I change the club and/or characteristics of the club. I control trajectory by clubface, ball position, shaft lean, exit location, and release (effective loft). I help the student have stock short game shots, and then add variations as the skill level progresses. I have the player play with the most simple shots that they are the most skilled to play with on any given day.”
- “I believe the most important aspect of getting results from the student is teaching shaft lean at impact. That is done through solid fundamentals in the setup and working with the student to learn the variety of lengths in the swing for distance control. There are so many elements to the short game, so I make sure they understand the proper setup first, and then teach them shaft lean. So many players hit poor shots because they scoop and really don’t understand

impact. I have learned if you can teach shaft lean to a new golfer they will adapt it to their full swing.”

- “It’s not that much different from my full swing. One has to learn to control the distance and the trajectory of the shot. One controls the distance with proper impact that is obtained by swinging the club on the proper plane, and distance is controlled by length and tempo of the stroke.”

HOW MUCH DO YOU USE EACH OF THESE TEACHING METHODS IN THE AREAS OF CHIPPING, PITCHING, BUNKER PLAY, AND PUTTING?

The ranking of the teaching methods for each individual short game area is shown in the following figure.

FIGURE 3-1: FREQUENTLY USED SHORT GAME TEACHING METHODS

Chipping	Pitching	Bunker	Putting
Verbal Explanation	Verbal Explanation	Verbal Explanation	Verbal Explanation
Instructor Demonstrations	Instructor Demonstrations	Instructor Demonstrations	Instructor Demonstrations
Asking Questions	Asking Questions	Instructor Feedback	Asking Questions
Instructor Feedback	Student Demonstration	Asking Questions	Answering Questions
Student Demonstration	Answering Questions	Student Demonstration	Instructor Feedback
Answering Questions	Instructor Feedback	Answering Questions	Student Demonstration
Verbal Discussion	Verbal Discussion	Verbal Discussion	Guided Discovery
Guided Discovery	Guided Discovery	Guided Discovery	Verbal Discussion
Video Analysis (Pre to Post)	Video Analysis (Pre to Post)	Video Analysis (Pre to Post)	Video Analysis (Pre to Post)
Video Feedback	Video Feedback	Video Feedback	Video Feedback
Video Demonstration	Video Demonstration	Video Demonstration	Other
Other	Other	Other	Video Demonstration

These responses indicate that “Verbal Explanation” is the most common approach used when teaching the short game, followed by “Instructor Demonstrations” and “Asking Questions.” “Instructor Feedback,” “Answering Questions,” and “Student Demonstrations” were indicated roughly the same number of times and should be considered of equal importance. “Verbal Discussion” and “Guided Discovery” were similar in responses, followed by “Video (Pre to Post)” and “Video Feedback.” “Video Feedback” came in second to last. The few teachers that responded “Other” used chalkboards or photos of a correct setup or swing to highlight key points.

WHAT ARE THE MOST COMMON PRE-SWING FLAWS YOU SEE, AND HOW DO YOU CORRECT THEM?

CHIPPING

The most common pre-swing flaws when chipping were an incorrect setup, incorrect ball position, and improper weight distribution. Problems with grip and posture were mentioned at roughly the same rate, and alignment and club choice were also mentioned, but less frequently. Excerpts of a few specific responses are as follows:

- “Poor setup. I put them in the exact correct position 10 times in a row without ever letting them swing.”
- “Improper weight distribution at address. I explain how the location of the spine in relation to the ball at address determines the location of weight.”
- “Too high a loft of club used. I highlight the positive effect of roll by example. Then I have them try to hit the ball with a similar setup and utilize a variety of different clubs to highlight the point.”

PITCHING

When pitching, the most common pre-swing flaws were an incorrect ball position, incorrect setup, and a flawed grip. Incorrect posture, shaft position at address, and aim were mentioned at roughly the same rate. Additional problems included an incorrect clubface at address and incorrect weight distribution. Excerpts of a few specific responses are as follows:

- “Incorrect grip and posture. I guide them by discussion to a better understanding of what is correct first before they hit any shots.”
- “Incorrect ball position. I explain the relation of the ball position and the angle of the leading edge of the club and its effect on the bounce of the club.”
- “Incorrect body alignment. I highlight correct alignment and allow them to choose the degree of square to slightly open stance they would prefer. Then we experiment with various degrees to determine the body alignment that is the most effective for them.”

BUNKER PLAY

The two most common pre-swing errors for bunker play were an incorrect ball position and incorrect setup. Flaws in the grip, clubface position at address, and alignment were referenced an equal amount. Additional pre-swing issues involving posture and weight distribution at address were also mentioned. Excerpts of a few specific responses are as follows:

- “Clubface too open, stance too open, and ball too far back in the stance. Learn first how to use the bounce of the club with a more squared stance and clubface... it is far easier for most players and hits very high quality and useful shots.”
- “Typically, they do not have a good understanding of what they are trying to do and how the setup can influence their success. I highlight my preferred setup with ball and face position as well as the width of stance.”

- “Stance too open, and how it causes an improper release of the club. I explain how the open stance causes the player to have a severe path for the shot and highlight the benefit of a square stance.”
- “Ball position too far forward at address. I highlight that the ball position does not necessarily match where the bottom of the swing tends to be with a correct motion.”

PUTTING

The most common pre-swing responses for putting were an incorrect setup and incorrect clubface alignment. Ball position issues at address was the third most common response. Problems with posture, eye placement, and club fitting were reported at roughly the same rate, and the least reported problems involved the grip, forearm alignment, and shaft angle at address. Excerpts of a few specific responses are as follows:

- “Most putters are too long for the student, which produces bad posture at address. I determine the appropriate length and adjust as necessary.”
- “Improper position of eyes at setup. I explain how looking at the hole with the last look impacts the path of the putter.”
- “Poor forearm alignment, poor arm-to-shaft relationship, and poor hand-to-hand and hands-to-clubface relationship. I use a mirror as feedback to develop and reinforce these skills once they have been covered.”
- “Poor shaft position at address. I usually see too much lean of the shaft back (too much loft as a result) rather than shaft lean forward. I prefer a zero or slightly negative loft of the club at address.”

WHAT ARE THE MOST COMMON IN-SWING FLAWS YOU SEE, AND HOW DO YOU CORRECT THEM?

CHIPPING

The most common in-swing flaw for chipping was too much flip or scoop with the hands at impact, followed by excess body motion. An incorrect path and incorrect angle of approach were the third and fourth most common, and errors concerning clubface position and centeredness of contact followed, with a similar number of responses. Additional comments involving rhythm and release were also mentioned. Excerpts of a few specific responses are as follows:

- “Scooping. I give them my line drill to brush the ground in the right place. This helps them develop the feel of the correct motion as well as the correct bottom to the swing.”
- “Clubhead/shaft throwaway. I help them develop the feel of swinging the club with a flat left wrist, a bent right wrist, or a combination of both swing feels.”
- “Weight on the back foot. I set the player up with 80% of their weight on their left side and then place a 2x4 six inches behind the ball. The object is to make contact with the ball without hitting the board.”

PITCHING

As with chipping, the two most common pitching problems were a flip or scoop at impact and excessive body movement during the swinging motion. Clubhead path errors and deceleration were mentioned an equal amount, followed by problems with the angle of approach and the clubface position. Comments regarding rhythm, lack of release, and centeredness of contact were mentioned the least often. Excerpts of a few specific responses are as follows:

- “Flip or scoop at impact. I have the student hit shots while utilizing the Hold the Finish Drill. Focus is on extension of the arms through impact, which helps to eliminate excess hand action at impact.”
- “Scooping at impact. I utilize the Toe Up to Toe Up Drill, which helps them develop the feel of a proper release through impact as well as a greater awareness of a square clubface during the motion.”
- “Deceleration, because they take the club too far back and sense they need to slow down. I have them focus on rehearsing the necessary backswing arc and the radius required to accelerate through impact.”

BUNKER PLAY

The two most common responses for bunker play were incorrect body movement and an incorrect angle of approach. An incorrect clubhead path and clubface position at impact were equal in response, followed by incorrect swing speed. Centeredness of contact and lowering the head and body through impact were also mentioned. Excerpts of a few specific responses are as follows:

- “Swing bottom too far behind the ball with the weight falling back. I get the student to trust an in-swing motion that has the divot traveling more left and their weight moving more forward through impact.”
- “Too steep a downswing, resulting in divots that are too deep. I get their swing plane more correct by first having them work on the more correct motion in pitching, and then I move them into the bunker attempting to create the same motion.”
- “Amateurs tend to be afraid to swing with the necessary speed and energy due to a fear of hitting the ball too far. When they understand that the ball flies out of the bunker on the sand it’s sitting on, they tend to be more aggressive with the motion and the results improve. I utilize drills (Splash Drill) that highlight the effect of the sand moving the ball to help.”

PUTTING

The most common putting problem was an incorrect path of the putter during the motion. This was followed by excess body motion, flip, and an incorrect putter face during the stroke. Rhythm was also mentioned, as were timing and the length of the stroke. Excerpts of a few specific responses are as follows:

- “A lack of path or face awareness. I use the Tracks and Gate Drill to help the student create greater awareness of the proper path as well as the influence of the putter face at impact on the results.”

- “Incorrect shaft angle at impact. Typically, the shaft is not returned to impact at the original angle of address. I have the student make practice strokes in front of a mirror or video camera attempting to create the appropriate angle of the shaft. Generally, the feel is fairly specific to the individual, so I let them tell me what it feels like. From there, practice strokes are made, followed by an attempt to recreate the same stroke on the ball. Better roll (less skidding) and a more solid impact are positives that help the student determine if the motion is getting more correct.”
- “Better players tend to have too much rocking in their shoulders, forcing their head to work back and away from the hole during impact. This makes the contact thin and tends to open the putter face. Making the shoulders more rotational allows the head to stay steady and makes it easier to hit the center of the face with the putter releasing properly.”

DO YOU TEACH SPECIAL SHORT GAME SHOT TECHNIQUES?

The full text for this question was, “In addition to the traditional short game shots, do you teach special short game shot techniques (i.e., high flop or low spinning shots) to your students? If so, please list these additional shots as well as any specific pre- or in-swing components that you feel are important.” The wording of the question was intentionally left open-ended to offer the respondents the greatest opportunity to expand upon the variety of short game shots they teach their students.

The vast majority of respondents (specifically, over 92%) teach specialty short game shots, and in some cases taught them in every short game lesson. As one respondent said, “I teach these shots to students who have demonstrated a competence with the basic shots around the green.” 5% rarely teach specialty shots or only teach them to “better players.” The remaining 3% do not teach the additional shots at all. Because so many of the top teachers include specialty shots in their lessons, developing instructors should develop their own approach to teaching both basic and specialty shots. Excerpts of a few specific responses are as follows:

- “They are taught through understanding how to use preset angles and unique hand/body syncing for the creative shot. I could write on forever... but with a better player they just learn to trust certain things with their eyes and hands without overprocessing.”
- “The better players need to be proficient from tight lies, heavy rough, various slopes, and various lies from the sand. They also need to be able to hit low checking shots as well, but should focus more on the basic scoring shots that are more simple to execute.”
- “I preach an ‘old school’ philosophy with the sand wedge: lean the grip forward for a lower type shot with some run, grip pointing at belly button for a traditional high soft pitch shot with little run, and lean the handle back to add loft and not expose the bounce for a safe, flop shot (which we all know is an oxymoron).”
- “Variations of the flop shot, spinner wedges, knock down wedges. Setup is key for any of these shots, and they vary depending on the shot. Another key is impact, shaft location and clubface angle. By varying impact shaft location, along with shaft exit, each wedge can produce nine different trajectories and distance with the SAME length backstroke.”

DO YOU DESIGN SPECIFIC PRACTICE ROUTINES THAT FOLLOW SHORT GAME LESSONS? IF SO, DESCRIBE ONE

The full text for this question was, “Do you design specific practice routines (i.e., specifically how to practice) for your students to follow at the completion of the lesson? If you do, please describe a specific routine that you have recently designed specific to a short game lesson.”

The responses to this question were overwhelmingly positive. All respondents but one indicated that they design specific practice routines for their students at the completion of a lesson, and the one dissenter said, “I do it once in a while, but not on every lesson.” Follow-up comments indicated that the majority of these routines are specific to the student and take into consideration the student’s goals, the amount of available practice time, competitive rounds played, and the student’s preferences in types of practice (i.e., transfer practice or skill practice). The routines varied greatly and are an extremely important component of the student’s improvement. Excerpts of a few specific responses are as follows:

- “I feel this is THE biggest area for coaching to improve. If I asked a student to practice 50 putts a day, twice a week, inside 10 feet for a month to improve their feel, and the student wasn’t any better, then the student should send the police for me.”
- “Every student is assigned 4 x 3 practice... practicing to three different hole locations from four different distances off of the green (creating 12 unique shots). Most students are assigned tests to measure their practice.”
- “I always recommend practice games that exaggerate golf course/competitive round situations. The most important part of the development of a great short game is learning to pull off what you have practiced under pressure. I call it Choke Prevention Training.”
- “I have practice routines for short game and also warm-up routines before play that I teach my students. I also provide videos on my website for them to access for review.”
- “Hit five balls from a north, south, east and west position on a cup from three and six feet. Keep track of the percentage of putts made from each distance. Once you determine which direction and distance is your weakest point, then you need to hit twice as many putts from that spot. You can’t improve if you don’t know exactly what needs to improve.”

HOW LONG DO YOUR SHORT GAME SESSIONS TYPICALLY LAST?

The responses were as follows:

- 15 to 30 minutes: 10%
- 31 to 45 minutes: 17.5%
- 46 to 60 minutes: 50%
- 61 to 75 minutes: 7.5%
- 76 to 90 minutes: 2.5%
- Other: 12.5%

The “Other” responses referred to longer programs that would typically fall under the category of half-day or full-day golf schools rather than individual lessons.

WHAT PERCENTAGE OF YOUR LESSONS ARE SHORT GAME, AS COMPARED TO FULL SWING?

The responses were as follows:

- 0 to 19%: 7.5%
- 20 to 39%: 57.5%
- 40 to 59%: 32.5%
- 60 to 79%: 2.5%
- 80 to 100%: 0%

DO YOU SCHEDULE SHORT GAME LESSONS INDEPENDENT OF FULL SWING LESSONS?

Well over half of the respondents (65%, to be exact) said that they schedule short game lessons independent of full swing lessons. Follow-up comments from the 35% of respondents who said “Sometimes” or “No” said that they incorporate time into each scheduled full swing lesson for a review of short game skills. Excerpts of a few specific responses are as follows:

- “Yes, they are part of the whole process. We are trying to become better players so we work on whatever we need to get to our goals of being a better player.”
- “I use short game to reinforce full swing principles—as putting improves chipping improves, as chipping improves pitching improves, etc.”
- “Yes. If it is a new player to the game, I start them with putting, move into chip shots, and then move into the pitch. They progress much faster to the full swing this way.”
- “Yes, but I think it is a good idea to try and incorporate some short game instruction into most full swing lessons. The curriculum of my golf school sessions and junior camp includes 30% to 50% of the lesson time on short game.”

ESTIMATE THE PERCENTAGE OF SHORT GAME INSTRUCTION TIME DEVOTED TO THE FOLLOWING AREAS OVER THE COURSE OF A YEAR

The responses were as follows:

- Chipping: 21.1%
- Pitching: 27.5%
- Bunker Play: 16.1%
- Putting: 35.3%

Follow-up conversations show that many of the respondents encourage their students to focus attention specifically on putting due to the high percentage of putts versus other short game shots played during a round of golf. In addition, putting was viewed as a skill that golfers of all levels could learn to perform correctly. As one respondent stated, “I always encourage the student to focus on their putting. There is no better area of the game to make up for a bad drive, a misdirected approach shot, or poor short game shot.”

DO YOU USE ANY DRILLS WHEN TEACHING THE SHORT GAME? IF YOU DO, NAME YOUR FAVORITE DRILL FOR EACH SHORT GAME AREA

The vast majority of respondents (97%) find drills effective in developing a student's short game. Overall, the drills submitted by respondents specifically focused on improving the student's technique and swing issues, improving the student's scoring performance, or a combination of both. A few drills suggested by respondents are as follows (note that for the sake of simplicity, the drills are written for right-handed golfers):

- “Spot Chipping Drill. I have the student pick a specific point on the green where they want the ball to land. I have them start out hitting the ball with an 8-iron, then a pitching wedge, and then a sand or lob wedge. The goal is for the student to develop the feel of the necessary swing to land the ball on the target as well as the resulting roll produced by the club.”
- “Grid System Drill. I have markers on my range marked in increments of 10 from 30 to 90 yards. I have the student pitch at the markers and over the markers, creating various games for them to play. At the same time, they are observing the ball's flight and working on controlling the distance.”
- “The No-Choke Drill. I have the student go through their entire pre-shot routine exactly the way they would on the course. On the last look at the hole, I have them stare at the smallest part of the hole where the ball will enter the hole and count to five. They start the putter back while still looking at the hole. The instant the forward stroke starts, they look back at the ball just in time to see the putter strike the ball.”

“Suggested Drills, Training Aids, and Games” on page 113 describes a number of other drills that were suggested or utilized by respondents.

DO YOU USE ANY TRAINING AIDS OR TEACHING AIDS WHEN TEACHING THE SHORT GAME? IF YOU DO, NAME YOUR FAVORITE AID FOR EACH SHORT GAME AREA

84% of the respondents said that they use training or teaching aids on a regular basis and feel positively about the effectiveness of these aids. 8% responded that they did not use aids, with many giving the reason that they do not like purchasing training aids. The remaining 8% use training aids, but only when teaching putting.

As with the drills, the training and teaching aids tended to be simple in design. Many aids were made by the respondents themselves, using materials such as a PVC pipe, 2×4's, dowels, or string. A few aids used by respondents are as follows:

- “Shaft extension. In this case, an extension (most typically a dowel or cut down shaft) is added to the end of a short iron. The goal is for the student to hit the ball without hitting their forward side with the extension. Too much wrists at impact will make this difficult.”
- “Swingyde. This is a training aid that connects with the shaft and encourages the student to create the proper wrist hinge in the backswing and follow through.”
- “I utilize objects such as ping pong balls, dice, etc. to show how sand removes ANY object when the swing and setup are correct.”

- “I mark a thin black line around the entire ball and have the student utilize the line as an alignment tool as well as to determine if impact is correct.”

“Suggested Drills, Training Aids, and Games” on page 113 describes a number of other aids that were suggested or utilized by respondents.

DO YOU USE ANY SPECIFIC ASSESSMENT TOOLS OR SKILL TESTS TO MEASURE THE STUDENT’S SKILL LEVEL? IF SO, WHAT ARE THEY?

The full text for this question was, “Do you use any specific assessment tools or skill tests when determining a student’s beginning short game skill level and to measure his or her learning progress within and across lessons and as a result of practice? If you do, please briefly describe them.”

In this context, assessment tools are tools that help the teacher determine the initial skill level of the student and verify the student’s golf game is improving as expected. Examples of assessment tools include game tracking score cards, video, and launch monitors. 87% of the respondents confirmed that they use some type of assessment tools. Some respondents prefer to use tools that are available for purchase, some design and build their own tools, and others use a combination of the two. Excerpts of a few specific responses are as follows:

- “I use a 12-foot ring and a five-foot ring around the hole for initial testing and then for feedback. In the context of measuring progress, I ask students to track the number of up and downs from 30 yards, in over 10 rounds, and also to track the type of shot they attempted to hit. Most will track the up and downs, very few track the type of shot attempted.”
- “We go over rounds or tournament rounds at the beginning of the lessons. They also bring score cards with stats. I have also used Shot by Shot. I am in the process of starting to use The Game Plan by Eyeline Golf.”
- “For an average player I use PARS-style testing to see the up and down capabilities of the player. Advanced players will deal more with the shot-making skills. I generally put them in a variety of situations to accomplish various shots.”
- “I use 2×2 boards, every 10 yards, starting at 20 yards all the way out to 100. We count how many balls it takes to hit the boards and track that each week.”

HOW DO YOU DETERMINE THAT STUDENT LEARNING IS TAKING PLACE?

The key for developing teachers is to recognize the signs and importance of the learning process. The responses, in order from most to least mentioned, were the following:

1. The extent to which the student can transfer improved technique and shot performance to the course
2. The student’s ability to demonstrate correct technique
3. The student’s ability to summarize key points
4. The student’s ability to answer questions
5. The student’s improvement in shot performance as indicated by an assessment tool, skills test, etc., from the beginning to the end of a lesson, and across lessons

6. The student's improvement in technique as indicated by video
7. Other

The few teachers that responded "Other" named factors such as "By the questions they ask" or "How quickly they can assess and bounce back from a faulty execution."

DESCRIBE ANY UNIQUE SHORT GAME TECHNIQUES OR PROGRAMS YOU USE WITH STUDENTS

Many respondents indicated that the programs they offer are not considered unique, but instead are the result of their various experiences and their students' needs. In many cases, they felt that other top teachers were offering similar programs. However, even when the techniques were similar to other teachers, there was a unique component that differentiated each program from the others. Excerpts of a few specific responses are as follows:

- "Making sure they practice like they are going to play by working on taking one ball and pitching, chipping, or hitting a bunker shot with that one ball and then putting it out. The more things you can do to simulate game situations, the better."
- "For my tournament players, I organize shot game contests with other players of like ability."
- "I have my better players constantly work on hitting shots on five-yard increments. We also work on hitting low, medium, and high shots with all the wedges from various distances."
- "I use a player stat sheet that allows students to track their up and down percentage and putting percentage that shows you where your practice needs to improve."

WHAT ADVICE WOULD YOU OFFER A NEW PGA INSTRUCTOR TO HELP IMPROVE HIS OR HER SHORT GAME TEACHING?

The most common suggestion for new PGA instructors was to seek out any and all educational opportunities that are available. This includes spending time observing expert instructors, reading game and non-game materials, and continuing to interact with other professionals. Excerpts of a few specific responses are as follows:

- "Seek out mentors who are considered to be great teachers by other PGA professionals. You can observe great teachers in person, or watch their teaching style on TV from a DVD. Your journey starts with Golf Knowledge, and there is plenty of it out there. If you want to be the best, you have to have a thirst for Golf Knowledge. The quest is never-ending, and you must seek out this knowledge by observing other great teachers, going to seminars, studying books and videos, and using videos by other great teachers to learn more about communication with a student."
- "You need to teach as much as possible. Nothing takes the place of experience, and there is nothing better than being right in the mix of it, teaching."
- "I strongly encourage Level 3 PGA PGM students to solve any and all weaknesses in their own short game so that they can teach from personal experience, having overcome the challenges offered by this part of the game. My suggestion includes developing skill in: putting, all short shots (chip, pitch, lob, cut, etc.), and bunker play."

- “If the student understands why they are trying to do a certain task, then and only then will they be able to repeat the process. If you hit a good shot and don’t know why, how do you repeat it... and if you hit a bad shot and don’t know why, how do you correct it?”

SUGGESTED DRILLS, TRAINING AIDS, AND GAMES

The following sections provide a sampling of the short game drills, training aids, and practice games that were suggested and utilized by the teachers who responded to the questionnaire. While this list is by no means exhaustive, it does offer some tools to help students develop their teaching skills and practices. For the sake of simplicity, the drills presented in this section are written from the standpoint of a right-handed golfer.

CHIPPING

The following sections describe drills, drills with training aids, and practice games designed to improve a student’s chipping skills.

DRILLS

Right Heel Up Drill—This drill helps eliminate extra hand action during the chip shot and develop the feel of solid and consistent contact with the ball. After addressing the ball with correct fundamentals for the chip shot, the student should position his or her right foot with the toe in contact with the ground and heel up in the air. Using this adjusted setup, the student should hit shots with different clubs, varying the length that the ball rolls.

Hold the Finish Drill—This drill highlights the finish position of the swing. It also helps the golfer create the appropriate amount of extension through impact and eliminates excess wrist action at impact. After addressing the ball with the correct chip shot setup, the golfer should make a swing and hold the finish of the motion. After impact, both the left arm and right arm and shaft should be extended with the position held for three or four seconds.

Balanced Stroke Drill—After addressing the ball with the proper chip shot setup, the student should make a swing and hit the ball while attempting to balance the length of the swing back and through. Using the same club, the student should vary the amount of motion made in the backswing and downswing while attempting to maintain the balanced motion. Once he or she is comfortable with the drill, the student should vary the club choice along with the overall length of the motion and note the difference in carry distance and the amount of roll.

DRILLS WITH A TRAINING AID

Tee in Ground Drill—This drill helps the golfer ensure solid and consistent contact with the ball. This drill begins with the student positioning a tee four inches in front of the ball on the target line. After taking a proper address position to the ball, the student should swing the club back and through, brushing the grass beneath the ball and also hitting the tee in front of the ball.

Miss the Tee Drill—This drill assists the student in making solid and consistent contact with the ball. It begins with the student positioning one tee to the outside of the ball and one tee to the inside. Using the correct chip shot setup, the golfer should attempt to swing the clubhead back and through without hitting the tees.

Extended Club Drill— For this drill, the student needs a 9-iron or pitching wedge and either a broken shaft or wooden dowel extending from the butt end of the club. From a proper chip shot setup, the student should attempt to hit a ball, making sure that the extension does not hit his or her side after impact. If the extension hits the student's body, the student used too much wrist action through impact.

PRACTICE GAMES

Vary the Target Practice—This type of practice helps the student develop the feel for the distance each club will roll the ball once it hits the green. After positioning practice balls five to 10 feet from the edge of the green, the student should pick three different targets on the green that vary in length from the practice balls. Using proper fundamentals and mechanics for the chip shot, the student should practice using different clubs and alternating between the different targets.

Rope Practice—The practice routine begins with the placement of a segment of string in a six-foot circle around a practice green pin. From different angles and distances, the student should hit chip shots using proper fundamentals and mechanics, trying to keep the ball within the confines of the circle. This routine is a great tool in helping the student determine proper club choice from different situations and will help the student develop a feel for getting the ball to a distance from which he or she can one-putt.

Same Pin Practice—This practice routine helps the golfer gain confidence in his or her chipping skills and his or her ability to "score." It begins with the positioning of small piles of balls 5 feet, 10 feet, and 15 feet from the edge of the green. Using the same pin as a target, the student should alternate randomly between the small piles, hitting a chip shot followed by putting out the result.

PITCHING

The following sections describe drills, drills with training aids, and practice games designed to improve a student's pitching skills.

DRILLS

Feet Together Drill—This drill helps minimize the amount of body motion and enhances the feel of the correct mechanics of the motion. After addressing the ball with correct posture for the pitch shot, the golfer should position his or her feet together. From this adjusted setup, the golfer should hit shots, attempting to maintain balance and distance control. Initial shots might be hit thin, but after a few swings the golfer should become comfortable with the motion and be able to make solid contact.

Two Piece Backswing Drill—This drill begins with the golfer addressing the ball with a proper pitch shot setup. From this position, the golfer should bring the club back to waist height so the shaft of the club is parallel to the ground and the toe of the club points up. After verifying this position visually, the student should swing the club slightly farther back and then hit the ball. This stop-and-go motion will initially be awkward, but will quickly become more comfortable.

Toe Up to Toe Up Drill—This drill emphasizes the motion of the swing in two places. First, the golfer should bring the club back to the same waist-high position used in the Two Piece

Backswing Drill. Next, the golfer should swing the club through impact, hitting the ball and attempting to stop the club at waist height in the follow-through so the shaft of the club is parallel to the ground and the toe of the club points up.

DRILLS WITH A TRAINING AID

Hit the Tee Drill—This drill helps the student eliminate any unnecessary wrist or hand action being used to help lift the ball in the air. It begins with the golfer positioning a tee four inches in front of the ball on the target line. After taking a proper address position for a pitch shot, the club should be swung back and through, brushing the grass beneath the ball and also hitting the tee in front of the ball.

Miss the Tee Drill—This training drill begins with the golfer positioning one tee on the outside of the ball and another tee to the inside. The space between the tees should be slightly wider than the width of the clubhead. After addressing the ball with a proper pitch shot setup, the golfer should attempt to hit the ball while avoiding the tees. If he or she hits one of the tees, the student should replace the tee and repeat the drill.

Swingyde Practice—This drill is effective in helping the student square the clubface and create the proper amount of wrist hinge during the swinging motion. First, attach the Swingyde to either a sand wedge or lob wedge. The student should then take a practice swing with the goal of the training aid making contact with the student's lead arm in the backswing and through swing. Next, the student should attempt to hit a ball with the training aid, attempting to maintain proper contact between the aid and the lead arm. Finally, the student should make the motion without the training aid attached and attempt to recreate the motion made in the first two swings.

PRACTICE GAMES

Same Pin Practice—This practice routine helps the student determine the proper club choice from specific distances and helps the student get a feel for the height and roll of each club. Position a small pile of balls 20, 25, and 30 feet from the edge of the green. Using the same pin as a target, the student should attempt to hit shots, alternating from the various predetermined distances.

Tough Pitch Practice—This practice routine begins with the student placing the ball in one of a set of pre-selected difficult positions around the green. The student should attempt to hit the ball using the proper fundamentals and mechanics of the pitch shot. Over the course of the practice session, the student should hit from each of the pre-selected positions. With time, the student will develop confidence in his or her ability to get the ball close to the hole or at least on the green, no matter how difficult the situation.

Pitching Mission Impossible—This practice routine begins with the student picking a pitch shot situation that would typically not be found during the regular course of play. From this position, the student should attempt to hit the shot to a specific pin with the intent of playing the ball out. If the total score is greater than three, the shot should be replayed until a score of two is achieved. During a practice session, at least five of these “impossible” shots should be attempted, with a score of two being the goal.

BUNKER PLAY

The following sections describe drills, drills with training aids, and practice games designed to improve a student's bunker play.

DRILLS

Line Drill—This drill helps the student determine the ideal ball position for a bunker shot, and also develops the student's confidence in the swinging motion. Before the drill begins, the teacher should draw a line on the ground perpendicular to the target line. The student should address an imaginary ball on this line, with the proper fundamentals for a bunker shot and the line directly between his or her feet. The student should then take a number of practice swings and make sure that sand is taken with each swing. After taking multiple swings, the student should make sure that there is a consistent bottom to the swing, and also determine the points where the club tends to enter and exit the sand. The middle point between these two points is the ideal ball position.

Ball/Three Ball Drill—The student should place two balls in the bunker on the target line, and ensure that the balls are touching each other. The student should then address the ball with a proper setup for a bunker shot, and attempt to make a swing that displaces enough sand under the two balls to lift both out of the bunker. When the student can consistently displace both balls, he or she should attempt the same drill with three balls.

Splash Drill—This drill helps the student develop confidence in his or her ability to control the bottom of the swing and develop a feel for the amount of motion needed to carry the ball out of the bunker. The golfer should begin the drill by addressing an imaginary ball with the proper setup for a bunker shot, and then take a set of practice swings with the goal of lifting a divot the size of a dollar bill out of the sand on each swing.

DRILLS WITH A TRAINING AID

Rope Practice—This routine helps the golfer develop a greater feel for the amount and speed of swing necessary to carry the ball the appropriate distance from the pin, and also helps the student gain confidence in his or her ability to get the ball close to the hole. This drill begins with the student positioning a small segment of string in a six-foot circle around a practice green pin. From different positions and distances, the student should hit bunker shots with proper fundamentals and mechanics. With each shot, the student should attempt to keep the ball within the confines of the circle.

Tee Drill—This drill demonstrates how sand lifts the ball up and out of the bunker and helps the student gain confidence in the motion and the necessary sand needed to displace the ball from the bunker. The student should stand in a greenside bunker and place two tees (which take the place of the golf ball) in the sand. While using a proper address and setup, the golfer should swing the club back and through, attempting to hit both tees out of the bunker.

Hit the Board Drill—This drill helps the student develop a feeling for where the bottom of the swing is and the amount of swing necessary needed to lift the ball out of the bunker. The golfer should place a short 2×4 in the sand and place a small amount of sand on top of the wood. After addressing the ball with the suggested greenside bunker setup, the golfer should attempt to make

a swing that lightly brushes the sand off the board. Initial swings should be relatively short and easy, with more length and speed gradually being added while maintaining the “brushing” impact with the board.

PRACTICE GAMES

Tough Bunker Shot Practice—This practice routine requires the student to choose a bunker shot situation where there is a high lip and little green to work with. From this specific situation, the golfer should attempt to hit five balls to within a predetermined distance from the pin. For example, a golfer with a high handicap should be able to get all the balls out of the bunker, but not necessarily within one-putt distance. A lower handicap golfer should be able to get one of the five to within six feet of the cup.

Random Bunker Challenge—This practice routine begins with the student throwing five golf balls into the bunker. From the position where the balls end up, the student should attempt to hit each ball out of the bunker. Ideally, the golfer should set a specific goal for the situation. For example, an experienced golfer might determine that three of the five shots should get within 10 feet of the pin. A higher handicap golfer from this position might try to get one of the five to within 10 feet of the pin, with the remaining shots within two-putt distance. Once the original goal is made, another situational shot can be attempted.

Difficult Lie Practice—In this routine, the student attempts shots that would be considered extremely difficult by most standards (such as the integration of buried lies, balls placed into the side of the bunker, situations where one or both of the golfer’s feet are outside the bunker while the ball is in the bunker, etc.). Shots should be attempted from these various lies and the results noted. In some cases, even the most skilled golfer will only be able to get the ball out of the bunker and, hopefully, on the green. In other cases, the shot might prove easy for the golfer and a better result would be expected. In either case, the goal is for the golfer to become comfortable with hitting shots from situations that mimic the golf course.

PUTTING

The following sections describe drills, drills with training aids, and practice games designed to improve a student’s putting skills.

DRILLS

Ladder Drill—The object of this drill is to help the student develop a feel for distance—specifically, the relationship between distance and the amount of swing needed. Before starting the drill, the student should place five balls on the green, with the first ball five feet away from the hole, the second 10 feet from the hole, and so on at intervals of five feet. The player should then putt each of the balls in order, starting with the one closest to the hole.

Eyes Closed Drill—This drill helps the student develop the feel for the motion required to putt the ball specific distances. It begins with the student setting up on a level section of green, and then putting a ball a random distance across the green (not at the hole). The student should estimate the distance the ball rolled and the length of the stroke, and then attempt to putt a second ball the same distance with his or her eyes closed. The cycle of putts should be repeated

until the student is capable of putting the second ball an equal distance to the first ball. At this point, the first ball can be re-struck to establish a new distance.

Ladder Drill with a Twist—This drill begins similarly to the Ladder Drill, with the student placing five balls on the green in five-foot intervals between five and 25 feet from the cup. He or she should then attempt to two-putt each ball, moving from the closest ball to the longest. Next, the student should follow the same procedure, but progress from the farthest ball to the closest. Finally, the student should follow the procedure once more, but try to two-putt each ball in a random order.

DRILLS WITH A TRAINING AID

Club Behind Cup Drill—The student places a ball 10 feet away from the hole, and a shaft perpendicular to the target line 18 inches behind the hole. The goal is for the student to make a stroke with enough speed to put the ball in the cup or past the cup without hitting the shaft. When the student has consistent control over the speed of the putt, he or she should attempt the drill from a greater distance.

Through the Gate Putt Drill—The student begins by placing two tees six inches apart, and a ball three feet away. He or she should then attempt to putt the ball through the tees. After accomplishing this, he or she should move farther away from the tees in increments of three feet. When the student can consistently putt the ball through the tees from various distances, he or she can move the tees closer together in one-inch increments.

Tee to Tee Drill—This drill begins with the student positioning a tee in the ground on a relatively level area of the practice green and a second tee approximately 10 feet away. Initially, the golfer should putt multiple times from one tee to the other, attempting to hit the opposite tee. Once he or she is consistently successful at hitting the opposite tee, he or she should move the practice station to an area of the green where there is a greater degree of break to the putts. Variations of this practice include increasing the distance between tees or the degree of slope of the putt.

PRACTICE GAMES

One Station / Multiple Targets—This practice session begins with establishing a putting station that allows the student to attempt putts of varying distances and breaks. In random order, the golfer should attempt to putt the ball as close as possible, noting any improvement in the first putts over time. Next, the golfer should attempt the same putts, but complete the process of putting out as if he or she was on the course.

Circle the Hole Drill—The golfer should place 10 balls around a single hole at a set distance of 15 feet. Ideally, the variety of putts should have a slight variation in the break. Starting at the first ball, the golfer should work his or her way around the hole, finishing out all putts and attempting to two-putt as many situations as possible. As the individual's distance control improves, the set distance should be increased in five-foot intervals.

10% Distance Drill—This drill begins with the golfer positioning five balls approximately 20 feet from the hole. From this distance, the golfer should attempt to putt all five balls to within two feet (10% of the distance) of the hole. After this is accomplished, the golfer should move to

a greater distance and follow the same routine until all five balls are within a 10% distance of the hole. Once comfortable with this process, the student should add an additional twist of finishing the putts out, starting the drill over if the ball does not end up the appropriate distance from the hole, or if the ball is three-putted.

SUGGESTED READING

Instructional books completely devoted to the short game make up a relatively small portion of the literature available on golf instruction. However, many books that focus primarily on the full swing also include one or two chapters that focus on the short game. In either case, these materials can be invaluable to the teacher's professional development, but not every resource is equally useful. Much of the information is written for the golfer who wants to develop their own game, rather than for those who want to teach the game. The sheer volume of books that are specific to the full swing and the short game can make it difficult to choose the right resources without getting bogged down. To help with this problem, respondents were asked to list any books that were helpful in their development or would offer further insight into their teaching methodologies. The purpose of this section is to highlight the most often named books with a focus on the short game.

The resources that were named most often by participants are as follows:

- *The Putting Bible*, by Dave Pelz
- *The Short Game Bible*, by Dave Pelz
- *Getting Up and Down*, by Tom Watson
- *The Art of the Short Game*, by Stan Uley
- *The Art of Putting*, by Stan Uley
- *Golf: The Best Short Game Instruction Book Ever*, by Golf Magazine
- *PGA Teaching Manual*, by Dr. Gary Wren
- *Putt to Win*, by Dave Stockton
- *From 60 Yards In*, by Ray Floyd
- *Vector Putting*, by H.A. Templeton
- *Secrets of the Short Game*, by Phil Mickelson
- *Extraordinary Putting*, by Fred Shoemaker
- *Short Ways to Lower Scoring*, by Paul Runyan

PRE-SEMINAR ACTIVITY: SHORT GAME METHODOLOGY QUESTIONNAIRE

Just as the Short Game Methodology Questionnaire captured a snapshot of the thoughts of experienced teachers, it can help new teachers begin to form their methodologies and track their changes over time. As much as is possible, answer the following questions from the questionnaire, and be prepared to share your answers at the Level 3 seminar. Be ready to discuss how your current teaching philosophy and related methodologies have been influenced by other

teachers and your interactions with students. How has input and feedback from others caused you to review, reflect on, and alter your teaching methodologies?

- What individuals influenced you the most and helped shape your short game methodology?
- What were your major weaknesses when teaching the short game early in your career, and how did you overcome them?
- What do you do to continue your development as a teacher of the short game?
- Rank the sources listed below in the order of their importance (with 1 being the most important) in helping you develop your short game methodology:
 - Observing other instructors teach
 - Reading books and magazines
 - Discussions with fellow professionals
 - Watching instructional videos
 - Watching short game instruction on the Golf Channel
 - Watching competitive golf in person or on television
 - Attending PGA Education programs
 - Attending Specialty Education programs
 - Personal experience through play / competition
 - Other (please list)
- Describe your short game methodology in 500 words or less.
- What specific short game information presented in the PGA Teaching Manual (Chapters 8, 9, and 10) do you consider important and use regularly in your short game methodology/
- How much (from 0% to 100%) do you use each of these teaching methods in the areas of chipping, pitching, bunker play, and putting?

		Areas			
		Chipping	Pitching	Bunker Play	Putting
Methods	Verbal Explanation				
	Answering Questions				
	Asking Questions				
	Verbal Discussion				
	Instructor Demonstration				
	Student Demonstration				
	Video Demonstration				
	Video Feedback				
	Video Analysis (Pre to Post)				
	Instructor Feedback				
	Guided Discovery				
	Other				

- What are the most common pre-swing (grip, posture, ball position, etc.) flaws you see in each of the following areas, and how do you correct them?
 - Chipping:
 - Pitching:
 - Bunker:
 - Putting:
- What are the most common in-swing (incorrect clubface, path, weight movement, etc.) flaws you see in each of the following areas, and how do you correct them?
 - Chipping:
 - Pitching:
 - Bunker:
 - Putting:
- In addition to the traditional short game shots, do you teach special short game shot techniques, such as high flop or low spinning shots? If so, list these additional shots as well as any specific pre- or in-swing components that you feel are important.
- Do you design specific practice routines for your students to follow at the completion of the lesson? If so, please describe a specific routine that you have recently designed specific to a short game lesson.
- How long do your short game lessons typically last?
 - 15-30 minutes
 - 31-45 minutes
 - 46-60 minutes

- 61-75 minutes
- 76-90 minutes
- Other (Please explain)
- What percentage of your lessons are short game as compared to full swing?
 - 0-19%
 - 20-39%
 - 40-59%
 - 60-79%
 - 80-100%
- Do you schedule short game lessons independent of full swing lessons?
- Estimate, by percentage, the amount of time spent teaching the following short game areas over the course of the year when conducting short game lessons.
 - Chipping:
 - Pitching:
 - Bunker:
 - Putting:
- Do you use drills when teaching the short game? If so, please list the name of your favorite drill in each of the following areas:
 - Chipping:
 - Pitching:
 - Bunker:
 - Putting:
- Do you use training and/or teaching aids when teaching the short game? If so, please list the names of your favorite aids for each of the following areas:
 - Chipping:
 - Training Aid
 - Teaching Aid
 - Pitching:
 - Training Aid
 - Teaching Aid
 - Bunker:
 - Training Aid
 - Teaching Aid

- Putting:
 - Training Aid
 - Teaching Aid
- Do you use any specific assessment tools or skill tests when determining a student's beginning short game skill level or measuring his or her learning progress (within a lesson, across lessons, or as a result of practice)? If so, please describe them.
- How do you determine if learning is taking place?
 - The student's ability to summarize key points
 - The student's ability to answer questions
 - The student's ability to demonstrate correct technique
 - The student's improvement in technique as indicated by video or a similar source from the beginning to the end of each lesson, and across lessons
 - The student's improvement in shot performance as indicated by an assessment tool, skills test, etc. from the beginning to the end of a lesson, and across lessons
 - The extent to which the student can transfer improved technique and shot performance to the course
 - Other (please describe)
- Describe any unique short game techniques or programs you use with students.
- Are there any short game instructional books or short game chapters in golf instruction books that you would recommend students read?
- Add any comments or experiences you wish to share regarding your teaching of the short game that you feel would benefit students.

THE IMPORTANCE OF ON-COURSE INSTRUCTION

Due to the complex nature of golf, many teachers find it useful to spend time with students on the golf course, outside of a practice context. Doing this illuminates the areas of the student's game that most need to be improved or will have the greatest effect on the student's score, which allows the teacher to target his or her instruction. The student may need to develop greater control over the ball's flight to improve his or her on-course performance, or a more effective course strategy when playing certain types of holes, or a more consistent pre- and post-shot routine. By targeting these needs, the teacher can offer the most improvement possible, and therefore offer greater enjoyment.

DETERMINING A STARTING POINT

The starting point for on-course instruction is often based on the student's skill level. For example, a new golfer typically finds playing golf an intimidating experience. Possible starting points for this student include gaining a better understanding of course etiquette or scenarios involving *The Rules of Golf* that he or she could encounter. A more experienced player could need a greater understanding of the influence of uneven lies on the ball's flight. In either case,

the teacher must help the student develop the missing skills as well as help him or her “fill in the blanks” of what is missing his or her game.

Another potential strategy involves learning about the student’s on-course performance through observation on the course and dialogue on the practice tee. Any information offered in these scenarios could be helpful to determining a starting point.

HELPING THE STUDENT GET THE MOST FROM THE EXPERIENCE

A good teacher helps the student keep his or her on-course performance in perspective. The vast majority of golfers play for enjoyment, not for a living. The question for the instructor is, “How do I help my students get the most enjoyment from their golf?”

A recent study on why people play golf stated, “Males and females both indicated that hitting good shots, the personal challenge the game presents, and an enjoyment of the outdoors are the most important reasons why they play golf.” All teachers should keep those findings in mind. Help students appreciate the excitement of a well-executed shot. Highlight the unique challenge of golf and the opportunities that are presented each time they go onto the golf course. Last, help them see the beauty of the course. These other elements of the game, rather than the score, can be sources of satisfaction and pleasure.

ON-COURSE METHODOLOGY QUESTIONNAIRE RESULTS

As with the questionnaires described previously, the goal of the On-Course Methodology Questionnaire is to offer a snapshot of what an experienced teacher is thinking at that particular moment in time as it relates to his or her instruction when on the course with students. In addition, the responses should help students jump-start the design of their own individual on-course instruction programs.

The methodology used for this questionnaire is the same as was used for the Short Game Methodology Questionnaire described in “Short Game Methodology Questionnaire Results.”

To help PGA PGM students continue their own studies, the questionnaire included a request for any books that were helpful in the teachers’ development or that offer further insight into their short game teaching methodologies. These resources are described in “Suggested Reading” on page 130.

DESCRIBE YOUR ON-COURSE INSTRUCTION METHODOLOGY

Responses to this question varied widely. In some cases, the key points were technical, with the primary focus on swing technique, while others highlighted the student-teacher interaction and the importance of performance results when on the course. Some respondents made several of these points, but weighted them differently. Excerpts of a few specific responses are as follows:

“50% of my training and coaching is conducted on course. It doesn’t matter what ability level, they have to learn, test, and then do it in order to improve as a golfer. Practice on the range attempting to incubate a golfer only delays growth of getting over the fears of playing on the golf course... I teach individuals or foursomes for two hours in length. If we only finish five holes, it doesn’t matter. I slide etiquette and *The Rules of Golf* in as the opportunity arises. I love to play

scramble format so that I can demonstrate and we can stay together throughout the round to discuss each shot and situation. I have them focus on thought process development with every shot: see it, feel it, do it, and grow it... Most importantly, I teach them that golf is not a game of 'perfect' and that learning to forgive yourself and celebrating the little successes is the greatest secret to loving the game for a lifetime."

"On-course instruction must be based on an accurate assessment of the ability of the pupil. I think it is essential to have worked with your pupil enough to know their strengths and weaknesses before going on the course."

"My time on the course is all about creating both short and long shots, which is typically done with one student. It has nothing to do with the number of holes we play, but how many scenarios I can create in one and a half hours. I take all skill levels and, obviously, the things I create depend on the student. All lessons are verbally very encouraging, as that is what ANY teacher of any subject would do. Each time we create a situation, we experiment with club selection, and shot shaping and trajectory control are all done with technique and creativity. Effective course management is all about the 'math' of the shot. Pre-shot routines are discussed depending on the skill level."

"I teach the mental/emotional game at every lesson. But sometimes I must see my students play to see how they react. Some students are perfect on the lesson tee and really show their emotions more on the golf course. In real time, it is best to help your students emotionally. I give a profile to those students who really need this type of help (which is most of my students). Pre- and post-shot routines are taught on the range and developed on the golf course. Visualization is learned when they see the way each shot should look after they hit it."

"I look to accomplish two distinct things on the course. One: see if the swing holds up on the field of play and, if not, what the weak and fragile links are. Two: I want to see the strategy of the player and make sure that it matches with the skill level, thus creating an arena that will produce more enjoyable results and leave open avenues for improvement in skill and on-course actions."

DO YOU PREFER TO OBSERVE THE STUDENT PLAY A CERTAIN NUMBER OF SHOTS BEFORE PROVIDING FEEDBACK? IF SO, DESCRIBE YOUR METHODOLOGY

The vast majority of respondents (71%) preferred to observe their students play a number of shots before providing instructional feedback. Another 21% preferred to give immediate feedback. One respondent favored immediate feedback because the students were required to complete a five- to eight-hour full swing and short game session before going onto the course, so the instructor had already observed the student. Another cited the lack of time together on the course.

The remaining 8% of the respondents said that their strategy depends on the student and what the specific goals are for the session. For example, a goal of working on uneven lies could be addressed immediately, while working on driving accuracy might require observation time prior to corrective steps being taken. Excerpts of a few specific responses are as follows:

- “I start teaching right after each shot. You generally don’t have enough time to watch somebody for a few holes before anything is said, so I just start right on the tee and ask them what is their strategy with this shot. I do this for all of the other shots and then point out to them how anything from the lie of the ball to the shape of their swing will determine the result of the shot.”
- “It all depends upon the student. Generally speaking, it is prudent to see several shots played by the student before jumping in with advice to see if there is a pattern to the mistakes or if it was an isolated incident. This is where video can be very effective, as I can keep a record of all the shots my student hits on the course.”
- “I watch for three holes, caddy for them and pick their clubs for three holes, and then watch them with feedback for three holes.”
- “Every shot is an opportunity to coach and learn. Doesn’t matter how good they are!”
- “After they have hit a few shots, I will then start asking them what picture they are seeing for the shot at hand. I will then give them other options, explain why these options may be better for their skill level, have them hit shots using these options.”

DO YOU USE VIDEO DURING ON-COURSE INSTRUCTION? IF YOU DO, WHAT PERCENTAGE OF THE LESSON TIME IS DEVOTED TO USING VIDEO?

76% of respondents consider video to be a valuable on-course tool. However, its use during on-course instruction is not as common as suggested by the respondents’ overall positive attitude. The summary of the extent to which these respondents use video in on-course instruction is as follows:

- 1 to 10%: 38%
- 11 to 20%: 21%
- 21 to 30%: 14%
- 31 to 40%: 10%
- 41 to 50%: 0%
- 51 to 60%: 7%
- 61 to 70%: 7%
- 71 to 100%: 3%

The 24% of respondents that do not use video cited reasons including the following:

- Do not want to keep up with the equipment
- Do not want to take time away from the lesson
- Potential inconsistency of the camera position
- Do not want the technique to become too much of a focus for the student

WHY DO YOU USE VIDEO?

According to respondents, the most common uses for video during on-course instruction are to document the student's pre-swing errors and pre-shot routine. The third most common response was to show the student's in-swing errors, followed by documenting the student's post-shot routine. Some respondents cited other uses, including the following:

- "When on the course, there is no way a student is going to remember all the scenarios you create and what to do for each, so I create a 'library' for them on a flash drive."
- "I video the whole on-course lesson and send the DVD to them so they can watch their playing lesson."
- "It depends on what they need... I might show a junior throwing a fit, and then the next shot's result after the fit."
- "I use video to keep a record for my own reference."

WHAT PERCENTAGE OF YOUR LESSONS ARE CONDUCTED ON THE COURSE, COMPARED TO THOSE AT THE PRACTICE RANGE?

The summary of the responses is as follows:

- 1 to 10%: 29%
- 11 to 20%: 29%
- 21 to 30%: 32%
- 31 to 40%: 2%
- 41 to 50%: 5%
- 51 to 100%: 3%

ARE YOUR ON-COURSE LESSONS PART OF YOUR FULL SWING OR SHORT GAME LESSONS, OR INDEPENDENT OF THEM?

The summary of the responses is as follows:

- Independent of full swing or short game lessons: 71%
- Part of full swing or short game lessons: 21%
- Sometimes independent of full swing or short game lessons: 8%

DO YOU USE PREDETERMINED DISCUSSION POINTS BASED ON THE STUDENT'S HANDICAP OR SKILL LEVEL? IF SO, DESCRIBE A SPECIFIC EXAMPLE THAT YOU USED RECENTLY

58% of the respondents said that they have predetermined discussion points that are based on the student's handicap or skill level when conducting on-course instruction, while the remaining 42% do not. Excerpts of a few specific responses are as follows:

- “No, I don’t. On-course lessons are so subjective of the student, I don’t think you can treat everyone the same. Usually on-course lessons are how to hit shots, especially uneven lies and how to play certain holes, especially for ladies.”
- “Yes. I always ask students about their past instruction, condition of their body, strengths and weaknesses in their game, practice schedule, goals and ambitions, background in other sports, playing partners, level of joy when playing and practicing, and why they have come to see me.”
- “Yes. As I am booking in the session, I ask questions at that time to predetermine the skill level and what the student wants to accomplish during the session.”
- “Yes. I have general course management techniques I use for all levels of students. But I hand-write notes specific for the handicap level of the student, or specific for that student only.”

WHAT TOPICS DO YOU THINK ARE MOST IMPORTANT FOR STUDENTS AT EACH SKILL LEVEL?

The full text for this question was, “Below are potential topics to cover when conducting on-course instructional sessions. Match the handicap/skill level with the topics that you think are most appropriate to teach at that level. In addition, feel free to add additional topics that you consider relevant to the skill level of the student.”

The following figure shows the top five topics covered by instructors when conducting on-course instruction. Note that the figure highlights the most common topics, and should not be considered the absolute guide to on-course instruction. Instead, the topics should be considered a starting point for on-course instruction.

FIGURE 3-2: TOP FIVE ON-COURSE INSTRUCTION TOPICS FOR VARIOUS SKILL LEVELS

Beginner	25-36 Handicap	15-24 Handicap	5-14 Handicap	Handicap Under 4	Professional
Course Etiquette	Pre-Shot Routine	Club Selection	Full Swing Technique	Adapting to Different Weather Conditions	Trajectory Control
Rules	Course Etiquette	Chipping Technique and Situational Shots	Putting Technique and Situational Shots	Adapting to Difficult Course Conditions	Adapting to Difficult Course Conditions
Putting Technique and Situational Shots	Putting Technique and Situational Shots	Pitching Technique and Situational Shots	Pitching Technique and Situational Shots	Shot Visualization	Pre-Shot Routine
Club Selection	Bunker Technique and Situational Shots	Bunker Technique and Situational Shots	Full Swing Uneven Lies	Shot Shaping	Shot Shaping
Full Swing Technique	Rules	Putting Technique and Situational Shots	Chipping Technique and Situational Shots	Chipping Technique and Situational Shots	Shot Visualization / Adapting to Difficult Weather

ADD ANY ADDITIONAL COMMENTS OR EXPERIENCES THAT YOU THINK WOULD BENEFIT A LEVEL 3 PGA PGM STUDENT

The most common suggestion from the top teachers for a new PGA instructor is to seek out any and all educational opportunities that are available. This includes spending time observing expert instructors, reading game and non-game materials, and continuing to challenge one's methodology and approach to on-course instruction. Excerpts from a few specific responses are as follows:

- “Help your students to take the attitude of loving the process, loving the challenge, loving the pursuit of discovering how much improvement can be attained.”
- “Try to get them on the course every third lesson, if at all possible.”
- “It’s easier to get players to take on-course instruction. However, my advice is that when you are giving on-course instruction, don’t play unless you are there to show someone how to perform. It’s better to completely focus on the player’s game than your own.”
- “Please be open to hearing all instructors, and listen to what they have to say. You may not agree with them, nor am I asking you to agree with them, but be open-minded. You may learn something that you didn’t know before. Be creative in your teaching stations... Stay in touch with your students, call them, email them, text them. Show them you care about their game and them as an individual.”
- “Keep a record of your lessons. Watch better players as much as possible and keep an open mind. Continue to work on your own game, and prepare for each lesson as a professional would prepare for a round of golf.”
- “You must ensure that there is transference from the range to the course. If your students scores aren’t improving relative to their skill improvement, you must discover where the gap lies, which is often on the course.”
- “Do not learn to be a great teacher in order to make money. That will come. If you are good, they will find you.”
- “Learn from everyone. READ, WATCH, and LISTEN.”

SUGGESTED READING

The suggested reading list supplied by the responders was very limited in scope when compared to the variety of books suggested for the On-Course Methodology Questionnaire and the Short Game Methodology Questionnaire. Some of the respondents felt that the list of reading material was fairly limited in scope. One said, “This is a neglected subject in many golf instructional books.” Another respondent guessed that more books were not mentioned because of some of the programming available on the Golf Channel. “Nothing is better than walking around with Tom Watson while he plays nine holes.”

The resources that were named most often by participants are as follows:

- *Golf Is Not a Game of Perfect*, by Dr. Bob Rotella
- *Golf Is a Game of Confidence*, by Dr. Bob Rotella
- *The Golfer’s Mind: Play to Play Great*, by Dr. Bob Rotella
- *The Little Red Book*, by Harvey Penick

- *Statistical Analysis of the Average Golfer*, by Dr. L.J. Riccio
- *Golf Etiquette*, by Barbara Puett and Jim Apfelbaum
- *Easier Said Than Done*, by Rick Jensen
- *A Round of Golf with Tommy Armour*, by Tommy Armour
- *Every Shot Must Have a Purpose*, by Pia Nilsson and Lynn Marriott
- *Butch Harmon's Playing Lessons*, by Butch Harmon

PRE-SEMINAR ACTIVITY: ON-COURSE METHODOLOGY QUESTIONNAIRE

As much as is possible, answer the following questions from the On-Course Methodology Questionnaire, and be prepared to share your answers at the Level 3 seminar. Be ready to discuss how your current teaching philosophy and related methodologies have been influenced by other teachers and your interactions with students. How has input and feedback from others caused you to review, reflect on, and alter your teaching methodologies?

- Describe your on-course instruction methodology. When describing your methodology, address elements such as:
 - The number of students typically taught
 - The number of holes typically played in a lesson, or the typical duration of an on-course lesson
 - The typical skill level of the students you teach on the course
 - How you give equal attention and time to each student when teaching a small group
 - How you create a positive learning environment that is fun and relatively free of stress, and in which each student can achieve a reasonable amount of success, and does not put any student in situations what lead to unreasonable failure, embarrassment, etc.
 - If, and how, you teach club selection
 - If, and how, you teach shot shaping and trajectory control
 - If, and how, you teach special situations such as poor and uneven lies, difficult fairway and greenside bunker shots, difficult chip and pitch shots, trouble shots, etc.
 - If, and how, you teach effective course management
 - How you teach technique for various golf skills played on the course
 - If, and how, you teach pre- and post-shot routines, and the mental game, such as visual imagery, how to manage emotions, positive and logical self-talk, deep breathing, etc.
 - If, and how, you teach *The Rules of Golf*
 - If, and how, you teach the etiquette of the game
 - Other elements
- When conducting on-course instruction, do you prefer to observe the student play a certain number of shots before providing instructional feedback? If you do, please describe your methodology.

- Do you use video when conducting on-course instruction? If you do, what percent of the lesson time is devoted to using video?
- Why do you use video?
 - To show the student's pre-swing errors
 - To show the student's in-swing errors
 - To show the student's pre-shot routine
 - To show the student's post-shot routine
 - Other (please describe)
- What percentage of your lessons are conducted on the course when compared to lessons conducted at the practice range?
- Do you schedule on-course lessons independent of full swing or short game lessons, or are they a part of your full swing and short game lessons?
- Do you have predetermined discussion points that you cover that are based on a student's handicap or skill level? If so, please describe a specific example of those discussion points you have recently used and the handicap or skill level of the student.
- The following table shows potential topics to cover when conducting on-course instruction sessions. Please match the handicap or skill level with the topics that you think are most appropriate to teach at that level. In addition, feel free to add additional topics that you consider relevant to the skill level of the student.

	Beginner	25-36	15-24	5-14	< 4	Professional
Rules						
Course etiquette						
Club selection						
Chipping technique and situational shots						
Pitching technique and situational shots						
Bunker technique and situational shots						
Putting technique and situational shots						
Full swing technique						
Shot shaping						
Trajectory control						
Pre-shot routine						
Post-shot routine						
Shot visualization						
Full swing uneven lies						
Short game uneven lies						
Adapting to difficult course conditions						
Adapting to different weather conditions						
Other (please describe)						

- Are there any specific books or on-course instruction chapters in golf instruction books that you would recommend for Level 3 PGA PGM students to read?
- Please add any comments or experiences you wish to share regarding your teaching that you feel would benefit the Level 3 PGA PGM students.

CONCLUSION

No matter what many golfers think, there is more to the game of golf than developing the perfect full swing. Obviously, the short game represents a significant percentage of the total strokes taken on the course. The variety of short game situations that the student will encounter on the course and the potential techniques that can be practiced and utilized to hit those shots are limitless. The instructor who appreciates the importance of the short game on the student's performance will help lower the student's score while raising the student's enjoyment of the game.

There is also more to the game than being on the course and striking the ball. The players who seem to appreciate the game the most for their entire lifetimes are the ones who immerse themselves in the game's lore: architecture, equipment, agronomy, rules, physical training, swing technique psychology, stories, tournaments, records, players, course, collectibles, literature, and so on. The golf professional who is educated in the game's lore brings an added dimension to the lesson tee. He or she understands that learning the game is more than just learning how to play.

LESSON 3-2: FITNESS AND PERFORMANCE

Golf professionals can use a variety of exercises and tests to evaluate a student's movement patterns. Some tests are useful for junior players, while others are more appropriate for adults. The results of these evaluations, combined with the student's particular goals as an athlete and golfer, are what will help a fitness instructor put together a training program that will help the student realize his or her goals. Although the guidelines for creating junior training programs are largely applicable to the design of adult training programs as well, there are some additional concerns that factor into creating adult programs; therefore they are treated separately here.

LEARNING OUTCOME

After completing this lesson, you will be able to:

- Conduct a physical evaluation of a golfer and develop a corrective exercise program

READING ASSIGNMENT

Read the following lesson, which discusses how to carry out evaluations of golfer fitness and develop an exercise program based on the results of those evaluations.

JUNIOR PHYSICAL EVALUATIONS

There are a variety of performance evaluations that can be used to determine a junior player's physical ability. In order to determine physical ability, the instructor must first determine motor skill ability. Testing the junior player on throwing, striking, running, hopping, skipping, jumping, kicking, and even swimming and bicycle riding is valid, as these are activities most young players should be proficient in by early adolescence. As a junior player grows older, these skills need to be incorporated in order to ensure proper motor skill continuation throughout the player's growth.

Early on in the training process, the instructor should have the junior player respond to a questionnaire concerning the student's goals and objectives. At this stage in the process, it must be determined whether it is actually the student's ambition to play golf (as opposed to someone else's ambition, such as his or her parents), as well as how many sports the student participates in. At about age 12, juniors tend to start to determine their sport of choice, as well as whether they are going to be competitive or recreational in that sport. Specialization should not occur until later in the teenage years.

JUNIOR PERFORMANCE TESTS

Evaluating juniors throughout their growth and development helps ensure proper skill progression throughout their golf careers. The instructor can either set up specific motor skill test days or incorporate motor skill training activities into the golf program.

All the testing and exercise activities should have an accuracy and distance component for throwing, striking, and kicking. Multiple activities incorporating a variety of implements should also be utilized for a well-rounded athletic development program. Skipping, hopping, swimming, and bicycle riding should be evaluated based on movement patterns. The arm and leg cross crawl

pattern of movement is the main criteria for evaluation. Does the student create proper movement with the activities? Does he or she have good body control during skipping, cycling, hopping, and swimming? Does the motion look fluid, or is the student struggling with the activity? These are the questions that need to be answered while watching the movements.

The following are several important tests for performance that can be used for evaluating junior players:

- **Skipping**—Set up an area about 20 yards wide and ask the student to skip across the area. Evaluate the student's arm-leg action, body control, and skipping action.
- **Hopping**—Set up an area 10-15 yards wide and ask the student to hop across. Evaluate the student's body control, hopping action, arm action, and overall body position during the movement. Does the student lose body control while hopping (for example, by falling forward)?
- **Throwing**—Have the student throw a baseball, golf ball, football, and/or big ball for distance and for accuracy. Evaluate the cross crawl pattern of movement. Does he or she throw with the right arm and step with the left leg? Is the upper body rotating to the throwing side during the cocking phase of the throw, and does the student follow through after releasing the ball?
- **Kicking**—Have the student kick a football, soccer ball, and/or big ball for distance and also for accuracy. Evaluate cross crawl movement pattern. Does he or she kick with the right leg and swing the left arm? Does the upper body rotate during the motion?
- **Swimming and Cycling**—These tests may simply involve asking the student if he or she can swim or cycle unaided. Has the student taken swimming lessons? Swimming is a large coordinated motor skill, meaning one's extremities are working in sequence to transport oneself through the water. Can the student pedal a bike and maintain balance? Cycling determines balance and control during an activity.
- **Abdominal Stability**—Have the student maintain a front pillar position for as long as possible, as shown in the following figure. The older the individual, the longer he or she should be able to keep the hips in line with the shoulders. The player should be able to maintain this position for at least 30 seconds. The maximum time for this test is 120 seconds.

FIGURE 3-3: ABDOMINAL STABILITY



- **Balance Test**—This is a single-leg stance test. Have the individual stand on one leg, placing the other foot on the inner thigh of the leg he or she is standing on. The student should

maintain this pose for up to 120 seconds, and also try this same pose with his or her eyes closed.

- **Standing Long Jump**—Mark a line on the ground, and have the student stand behind the line and jump forward as far as he or she can. To determine the distance jumped, measure from the start line to the heel of the foot that landed closest to the line.
- **Push-Ups**—Have the student lie on the ground with his or her hands placed on the ground, shoulder width apart at chest height, feet together, and toes on the ground. Place a towel or six-inch block under the student's chest. Have the student press up so his or her arms are straight and his or her back is flat, with hips in line with the shoulders. Once the student is at the top, he or she should lower back down, bending at the arms until the chest touches the towel or block, and then rise back up. Repeat until the student can no longer touch the block or press back up. Count the number of completed push-ups.
- **Modified Endurance Test**—The modified endurance test is for determining overall fitness levels. Juniors who are seven years old and younger will run 400 yards and kids who are eight and older will run 800 yards. Use a stopwatch and time the students as they run the total distance.

The abdominal stability, balance, standing long jump, push-up, and modified endurance tests are performance tests to determine power, strength, and muscular endurance. The numbers and times recorded during these tests should improve with training and sport participation. As the test scores progress, overall golf performance will improve as well.

ADULT PHYSICAL EVALUATIONS

The initial physical evaluation for adults is important for determining mobility, stability, and motor control of the hips, shoulders, and mid-section. Instructors need to rule out any contraindicated conditions. The student needs to fill out a health risk appraisal and, depending on his or her age, should have a doctor's release form that indicates he or she is fit to increase activity.

The health risk evaluation should include, but not be limited to, whether or not the student has experienced any of the following:

- High blood pressure
- Arthritis
- Cancer
- Stroke
- Heart disease
- Diabetes
- Joint replacement
- Vertigo
- Dizziness
- Pacemaker insertion

- Visual problems
- Scoliosis

Other important questions include whether the student has ever worked out before, whether he or she belongs to a fitness center, and whether he or she sustained any injuries in the past. Instructors will want to go back as far as possible in learning the student's injury history, as every injury is important—each one presents a particular compensation pattern in the body.

The most important question to ask every student is, “What are your goals?” It is of the utmost importance to determine what each student is trying to accomplish with his or her golf program and physical training program. Follow-up questions should determine how much time the student plans to spend per day or per week trying to accomplish his or her goals.

The initial time invested in pursuit of these goals may be minimal, but as the individual continues to improve physically and in terms of his or her golf performance, he or she may increase the time spent on these goals. As discussed in the Level 2 PGA PGM *Intermediate Teaching and Golf Club Alteration* course, the initial physical program may be warm-up activities or pre-shot routines. These students may return to their instructors for more guidance on overall game improvements.

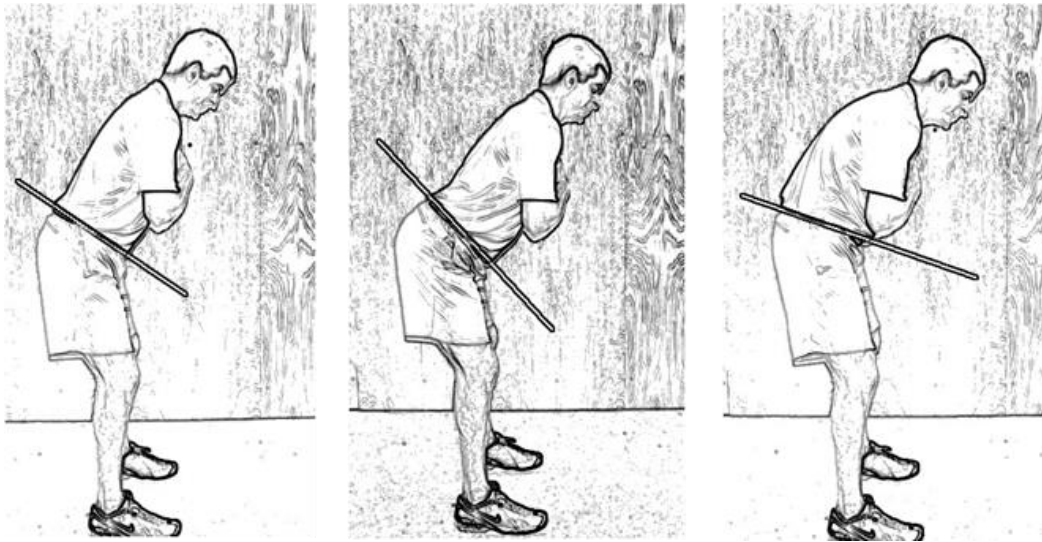
ADULT EVALUATION ACTIVITIES

There are four main movement evaluations that will help an instructor determine the swing performance of the individual student. These movement evaluations are additional activities that can be performed after observation of the student's postural tendencies. There can be any number of physical evaluations conducted, but instructors should not test merely for the sake of testing—there needs to be a reason for each test. The four exercises in this section are specific to golf motions and can easily be compared to the student's swing.

STANDING PELVIC TILT

In this evaluation, the student stands in a golf stance and then performs a pelvic tilt. A pelvic tilt involves raising and lowering the belt line while staying in golf stance, as shown in the following figure.

FIGURE 3-4: STANDING PELVIC TILT



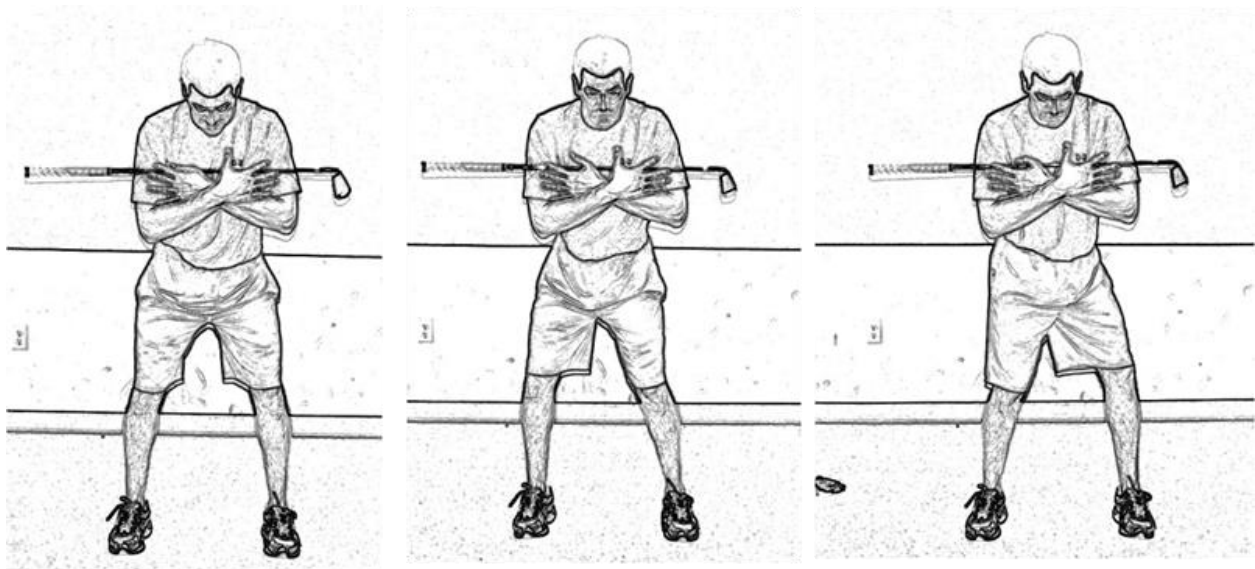
The instructor should note the physical capability of the student when performing the pelvic tilt. The correct movement is the tilting of the pelvis up and down with minimal or no movement in the upper body while maintaining golf posture. Students who are unable to perform this action will have a tendency to change golf posture during their swing, either rounding the shoulders to accomplish the movement or raising and lowering the whole body to create movement. There are a number of individuals who are unable to create any motion in the mid-section.

The importance of the motion to the golf swing is power generation and control during the swing. The pelvis needs to tilt and rotate during impact for proper sequence. This helps to maintain posture and maintain the angles during the swing. Physical corrections include increasing abdominal stability and pelvic mobility, activating the gluteus, and lengthening the hip flexor, quadriceps, and lower back.

STANDING PELVIC ROTATIONS

In this evaluation, the student stands in golf posture. While maintaining a stable upper body, the instructor has the student rotate his or her hips right and left, as shown in the following figure.

FIGURE 3-5: STANDING PELVIC ROTATIONS



The instructor should evaluate the rotation in the student's hips and the stability in his or her mid-section. The belt line should travel horizontally with respect to the ground or make a linear movement from the right side to the left side. The shoulders should also remain still.

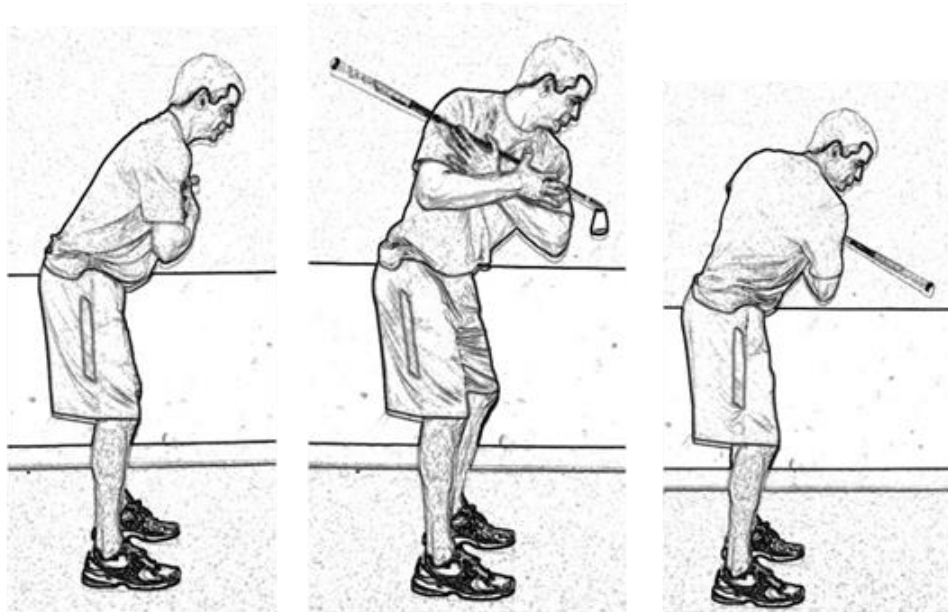
Students who are unable to perform the movement usually have the torso rotating with the hips, as they are unable to separate the upper and lower body. Some students have a different range of motion to the right or left. Stance preference will determine the range of motion limitations. Swaying the hips or lifting one side or another is also a common mistake in the movement. For example, if the student is rotating to the right, the right hip will become higher than the left with minimal rotation to the right side.

This motion is important for determining hip-shoulder separation and proper hip rotation during the golf swing. Physical corrections include increasing the student's hip and pelvic mobility and stability, increasing abdominal stability, and activating the gluteus.

STANDING TORSO ROTATIONS

In this evaluation, the student stands in a golf posture and, while maintaining a stable hip and leg position, rotates his or her torso left and right, as shown in the following figure.

FIGURE 3-6: STANDING TORSO ROTATIONS



The evaluation concerns the range of motion of the torso and the angle of rotation. Placing a club across the shoulders allows for a good visual of distance traveled and angle of torso rotation. To minimize the shoulders creating the rotation, the instructor can place the club across the back of the shoulders. The torso should travel left and right with ease. The right shoulder should be low when rotating left, and the left shoulder should be low when rotating right. The instructor must also look for hip motion during the activity.

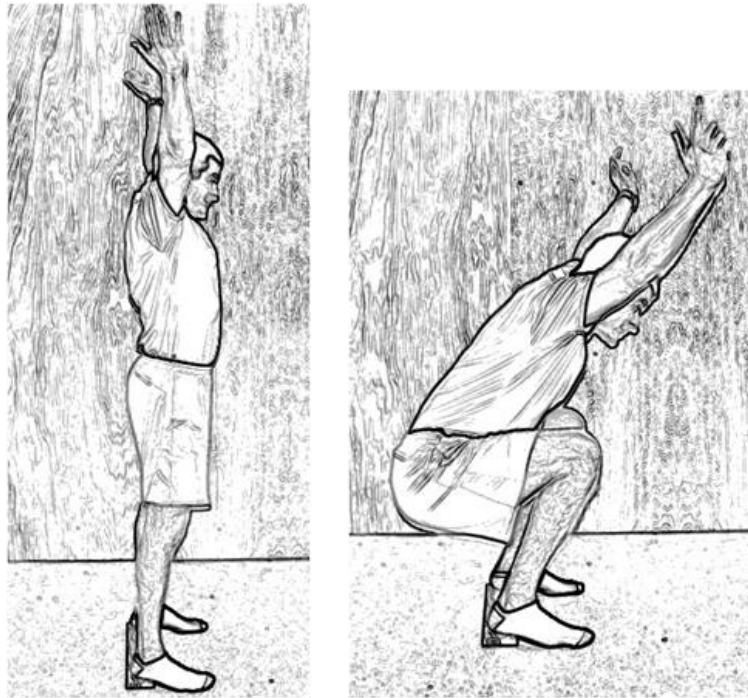
The individual should maintain a stable hip region during activity. Motion in the hips causes a loss of stability in the mid-section. The end range of motion usually causes a hip motion and turn to aid in rotation.

This evaluation helps the instructor diagnose if the student is unable to separate the movement of his or her shoulders and hips from the rotation of his or her shoulders during the golf swing. Corrections for this problem include increasing the mobility of the torso or, specifically, thoracic spine; increasing the stability of the abdomen and hips; and lengthening the chest and lower back.

DEEP SQUAT

The student stands with his or her feet shoulder width apart and raises his or her hands above his or her head. The student then squats down, trying to lower his or her hips as close to the ground as possible, while keeping his or her arms straight overhead. The individual should squat down so that the hips are below the knee line and feet are flat on the ground, with his or her hands in line with his or her feet, as shown in the following figure. Optionally, the instructor can have the student hold a club or lightweight pole overhead.

FIGURE 3-7: DEEP SQUAT



The instructor should determine depth and body position during the activity. Does the individual get his or her hips below the knee? Is the player keeping his or her arms straight overhead? Are his or her feet flat on the ground?

An advanced version of this evaluation is used to determine knee and ankle movement, arm angle, and hinging of the hips when lowering and raising the body. It begins with the student performing the squat without shoes, which allows the instructor to see if the feet are rotated inward or outward. Do the student's feet roll in or out when performing the squat? Analyzing the knee joint during the squat will determine inward or outward motion. There are a few instances where the instructor might actually observe inward rotation of the knee during the squat. As the student performs the squat, the instructor needs to look for shifting of the body during the motion. Does the student favor one side when squatting down or rising up?

The inability to perform a squat motion limits the student's mobility or athletic motion during the golf swing. There is some research that shows a correlation between this inability and rising up at impact. Corrections for the problem include increasing hip mobility, thoracic mobility, and abdominal stability; and lengthening the latissimus, hip flexor, and quadriceps.

DESIGNING A TRAINING PROGRAM

A training program that progresses along with the student is critical for the student's continual motor skill and sport skill development. The main components of a physical training program are strength, speed, power, mobility, flexibility, stability, nutrition, and recovery.

COMPONENTS OF A PHYSICAL TRAINING PROGRAM

Strength refers to the increase in one's muscular size and ability to lift or hold more weight. Force times distance equals work. If one increases the amount of work being performed, that increases the amount of strength being generated. Gravity is the resistance that creates the increase in work. An increase of strength allows for an increase in speed and power development. **Speed** and **power** are interchangeable terms that refer to the ability to move an object rapidly. Golf is a game of speed. Individuals need to learn how to train quickly and under control in order to create greater swing speed. Power is defined as force times distance divided by time.

Strength exercises are often interpreted as power movements. For example, the bench press or squat, for instance, is strength movement because there is no time limit on the movement. Two examples of power activities are an Olympic lift and the 100-yard dash. The Olympic lift requires a rapid movement of a weight from one's knees to the shoulders (or above the shoulders) as quickly as possible. The 100-yard dash is running from point A to point B as fast as one can.

Flexibility refers to the length of a muscle in a specific movement, such as touching one's toes. The end range of motion determines the movement, and the joint or the muscles involved in the movement determine the end range of motion. **Mobility** is the ability to move around a joint. This is similar to flexibility; however, mobility is more of a movement term and flexibility is a static term.

The golf swing is a dynamic action—therefore, determining a range of motion during the swing is more important than a held position. Think of mobility as a rotational movement or the incorporation of multiple joints in a motion.

Stability is the ability to hold a specific position for a period of time. This is normally associated with the mid-section of the body. Joints such as the hip and shoulder need to create stability throughout the movements in the golf swing. Players will tend to lose their balance if they are unable to hold a stance for a period of time. In addition, the inability to stabilize on one leg often causes a loss of balance.

Nutrition comes from proper diet. The simple form of nutrition involves creating a balance in food intake, incorporating protein, carbohydrates, fats, fruits, vegetables, and nuts into one's meals. Timing is an important component in creating proper nutrition. Eating every two to three hours brings about continual digestion and full utilization of the essential nutrients in the food. Consuming a protein to carbohydrate ratio of 1-2 after a workout, round of golf, or tournament is important to enable the body to replace the lost nutrients and start the muscle recovery process.

Recovery is the most overlooked training aid. Juniors often stay up late and end up getting less than the optimal amount of sleep (which is seven to nine hours per day). They also often have sporadic eating habits, which can decrease the amount of essential vitamins and minerals available for growth and development. The body builds up muscle, bone, and the immune system through the recovery process.

The rest between exercise bouts will also determine the energy system being trained. For example, when training for speed, it is essential to rest 60-90 seconds between sets. When training for maximum strength or power, it is important to rest two to three minutes between exercise bouts. This allows for optimal recovery of the phosphocreatine system and formation of Adenosine tri-phosphate (ATP), which is the energy source for one's body.

ENERGY SYSTEMS

The human body has two main energy systems: the **anaerobic** and **aerobic** energy systems. The anaerobic system can be broken down into two sub-groups: the ATP-PC system (where PC stands for phosphocreatine), and the lactic acid system (or anaerobic glycolysis system).

The aerobic system requires oxygen for energy, while the anaerobic system does not. The aerobic system is used during sustained activity for at least three minutes, while the anaerobic system is used during activity of less than one minute. The ATP-PC system provides the power for activities that last for less than 10 seconds. The anaerobic glycolysis system is used during activities that last from 10 seconds to about one minute.

There is an energy system continuum that incorporates the three classifications, meaning that each activity has a percentage of involvement throughout the duration of the movement. For example, a long distance runner starts off and requires a bit of the ATP-PC system, then transfers to the anaerobic glycolysis system, and finally to the aerobic system. Throughout the run, he or she may need a boost of power, at which point the ATP-PC system kicks in before the runner returns to using the aerobic system.

The golf swing takes less than two seconds and primarily employs the ATP-PC system. The walking between shots, standing, and talking requires oxygen, and therefore uses the aerobic system. The development of the aerobic system is important to aid in phosphocreatine restoration.

For the creation of exercise activities, it is important to understand how the body recovers from certain bouts of activity and how the muscles adapt to training, as follows:

- Power movements are best at 1-5 repetitions, with recovery between sets at 2-5 minutes.
- Maximum strength movements are best at 1-3 repetitions, with recovery between sets at 2-5 minutes.
- Strength movements are best at 4-8 repetitions, with recovery between sets at 2-3 minutes.
- Hypertrophy, or increase in muscle size, is best at 6-12 repetitions, with recovery between sets at 60-90 seconds.
- Muscular endurance is best at 12+ repetitions, with recovery between sets at 0-60 seconds.

These variables are best suited for highly trained individuals looking for optimum training. In optimal training, the fatigue factor and recovery are essential in the development of muscular power and maximal strength. The long rest allows for the replenishment of the phosphocreatine stores and the nervous system. For instance, training with power movements for greater than five repetitions has shown to greatly increase fatigue and potentially increase injury.

The general public will follow more of a muscular retraining program that fits into the muscular hypertrophy and muscular endurance protocol. This higher repetition range allows for myelination of the nervous system to the muscles. This allows the muscles to increase in strength, stability, and activation. The individual needs to relearn how to move specific muscles and muscle groups that are necessary to move the skeletal structure into the proper position.

DESIGNING A JUNIOR TRAINING PROGRAM

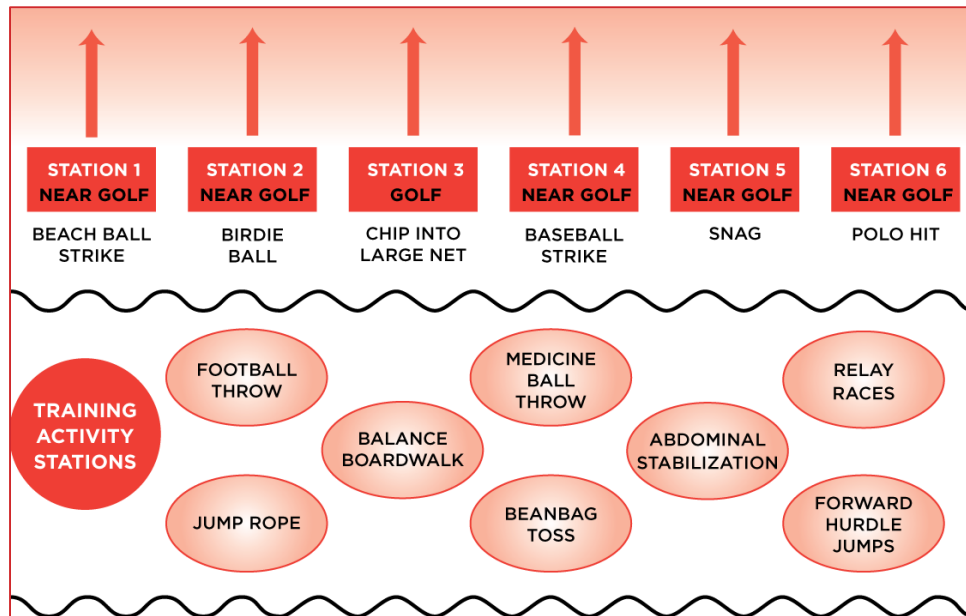
The priority in designing a junior training program is to improve the students' overall athleticism. The instructor must make sure that either the student's fundamental movement skills are being addressed or that the player is already proficient in these movements. Incorporating the movements into the sessions is important throughout the students' development. The individuals will all have phases of accelerated growth that will delay sport skill progress. These are the stages of development where continuing the fundamental movement skill training will allow the individuals to continue to progress appropriately.

The emphasis in a junior program should be athletic development. A junior can start resistance training as early as six years old; however, the initial strength gains will be primarily an increase in nerve endings innervating the muscle.

Incorporating games and activities into the training program tends to be beneficial for junior players between the ages of six and nine. Using medicine balls, stability balls, dumbbells, and cables are the best way to start a junior on an athletic improvement program. When working with adolescents, a program that pushes the student through the fundamentals of training is essential.

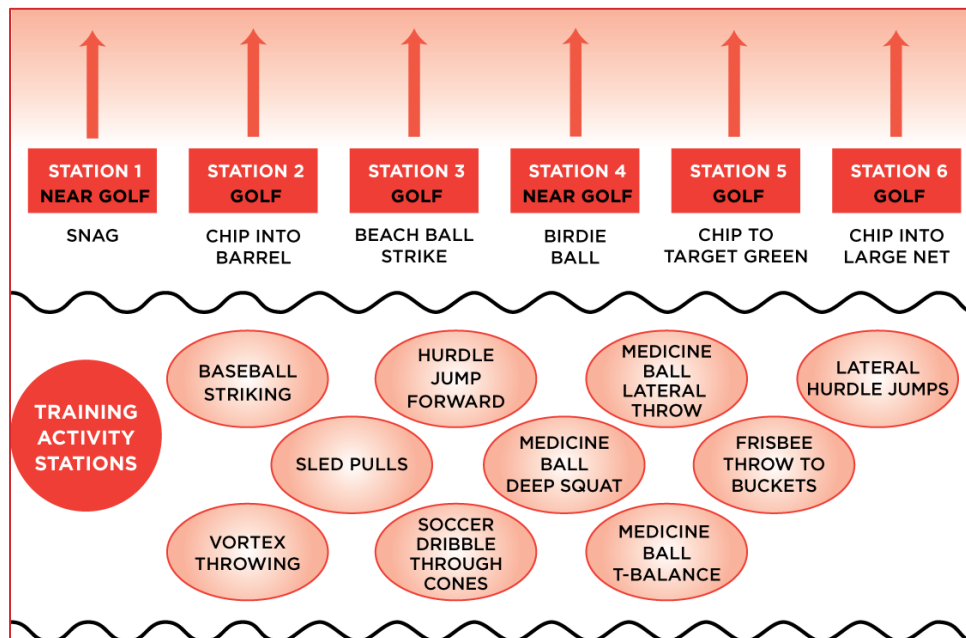
Creating training activities along with golf activities during camps or weekly golf programs for juniors ensures the continuous development of the students' fundamental skills. For example, with students aged five to seven, a program alternating near-golf and golf stations with training activity stations in the background could be used, such as the layout shown in the following figure.

FIGURE 3-8: SAMPLE JUNIOR TRAINING SETUP (AGES 5-7)



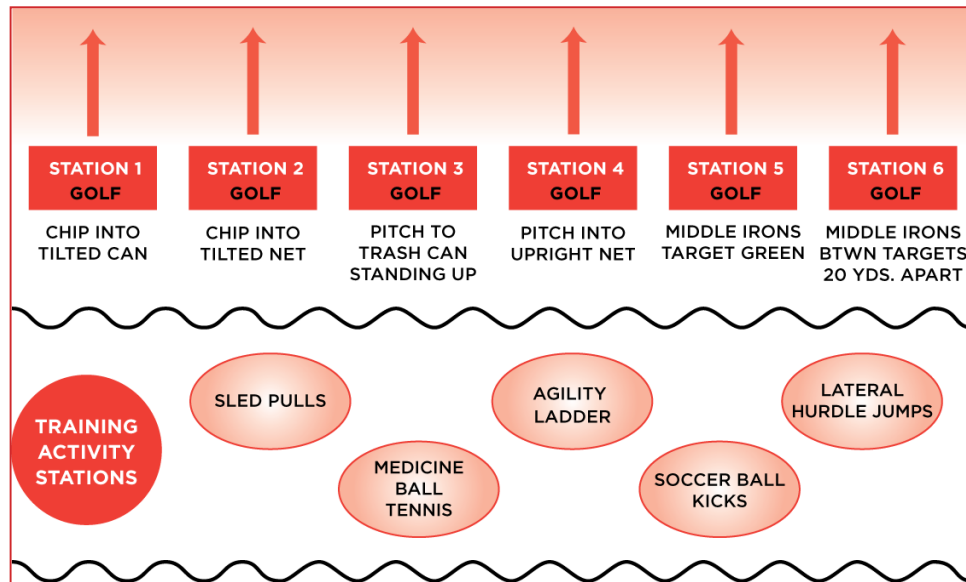
With juniors eight to 10 years old, a program that alternates stations, but reduces the frequency of near-golf stations, may work best. An example is shown in the following figure.

FIGURE 3-9: SAMPLE JUNIOR TRAINING SETUP (AGES 8-10)



For older juniors, ages 11 to 13, instructors can eliminate the near golf stations and have only golf stations with the training activity stations in the back of the range, as shown in the following figure.

FIGURE 3-10: SAMPLE JUNIOR TRAINING SETUP (AGES 11-13)



The junior development training progressions should follow these guidelines:

- **Stable to Unstable**—The progression should start with a stable base, in which the student has both feet on the ground. With this stable base, the student should first be taught an athletic stance rather than a golf stance, because juniors tend to have difficulty mastering a firm golf stance right away. As was discussed in the Level 1 PGA PGM *Introduction to Teaching and Golf Club Performance* course, the “All or None” muscle theory states that if a muscle fiber does not fire, then the entire muscle group will not fire. Moving a student too quickly to an unstable environment will cause the body to activate the dominant muscles to work to help stabilize the body. The instructor needs to create a firm foundation by training the body to move from an unstable state to one that is more stable as a foundation for the golf swing.
- **Movement Before Resistance**—The junior athlete should focus on the technique of the movement, not how much weight he or she is lifting. Most juniors are unable to produce speed or power efficiently. Teaching the sequence of movement and ensuring proper activation is more important than increasing the amount of weight they are lifting. Students should first master the movement, and then gradually increase the weight.
- **Abdominal Control (Stability) Before Variety**—The abdominal and lower back areas are often lacking in strength or stability because of peak height velocity or growth spurts. The “Stable to Unstable” guideline also applies to the abdominal region. In order to allow for proper muscular development, it is important to teach the student how to stabilize and support his or her own body weight and proper movement through the abdominal region with proper contraction. Additionally, there are a number of juniors who breathe incorrectly. Breathing predominantly with the chest instead of the diaphragm causes a disruption in abdominal stability. As an individual inhales, his or her abdominal area should increase in size, and when exhaling, the area should get smaller, with minimal movement in the chest area.

- **Unilateral Activities:** The majority of sporting activities are performed on one leg or utilizing one arm. The golf swing has a transfer of weight from one side of the body to the other. Proper training should be performed on the single extremity to ensure balanced strength in the legs and arms. Using dumbbells instead of a bar for arm training allows for proper movement and balanced training, as well as proper breathing patterns.
- **Athletic Before Specialization:** If a junior is trained as an athlete, this allows for more golf-specific training on the range or course. This is the fundamental movement training of skipping, jumping, hopping, throwing, kicking, and striking. There needs to be a mastery of the fundamentals in order to ensure advancement with the specifics of the sport.
- **Proper Firing Patterns:** Cross crawl patterns of movement can be disrupted with improper training. Additionally, the utilization of barbells and holding one's breath during lifting movements can disrupt cross crawl firing patterns. The extension of the right leg and left arm are essential components of a proper golf swing. The rotator motion of the golf swing incorporates proper cross crawl patterns of movement.

These guidelines can also be incorporated into an adult training program. Adults who do not have a previous training history are similar in many ways to juniors who are still developing. These adults may be awkward with the majority of training movements due to their lack of muscular involvement or muscular activation. Training the adult to be a better athlete will help him or her improve their golf swing through increases in core stabilization and hip stability.

DESIGNING AN ADULT TRAINING PROGRAM

The priority in designing an adult training program is to correct the largest area of concern. The minor concerns are usually improved with correction of whatever the major concern is. The design of the program is, of course, dependent upon the student. The ideal setup would be for the student to perform five to 15 basic exercise activities a day as the minimal requirement. Their activities can incorporate strength, power, and mobility work into a general training program to help improve overall performance categories. If the overall athleticism of the student improves, the golf swing motion is easier to correct.

Daily activities are best dedicated to improving muscle firing or nervous system activation, increasing mobility, and decreasing postural imperfection. Carrying out daily exercises helps combine mobility, stability, and strength into the program. Power is part of a larger training program routine that includes acceleration and deceleration in the training schedule. Resistance training program routines are broken into chronic program variables and acute program variables. Chronic program variables are year-long and monthly programs. The annual training program details are more geared towards professional, collegiate, and/or amateur players who compete throughout the year. If an individual has a specific goal he or she is trying to achieve, a chronic program can be designed for him or her.

The creation of a chronic program allows for the instructor to visualize a long-term approach with the student. Questions to help create the long-term program include the following:

- How many training sessions will there be per month?
- How many golf practice sessions per month?

- Is there a tournament, vacation, or social activity that needs to be planned for?
- Does the student need to peak for a particular event?

The acute training program is what occurs in the daily training session. The daily program is established on the basis of the chronic program. Establishing the chronic program design allows an instructor to determine the proper progression of exercise activities. Questions to address when writing the daily training program include the following:

- Is it a power session, endurance session, or general strength session?
- What type of exercise activity will be performed?
- How many sets are going to be performed?
- What is the recovery time between sets?

A daily adult training program may resemble the one shown in the following figure.

FIGURE 3-11: SAMPLE ADULT TRAINING PROGRAM

Exercise	Number of Sets	Number of Reps	Rest
Supine Crunch	2	15	
Reverse Crunch	2	10	
Side Hip Raise	2	8 Each Side	
Rotational Crunch	2	8 Each Side	
Back Extensions	2	10	
Kneeling Opposites	2	8 Each Side	60 Sec.
Counter Balance Squat	2	10	
Side Glute Activation	2	4 x 4 Sec.	60 Sec.
Off Bench Bucks	2	8 Each Side	
Supine Hip Bridge	2	4 x 4 Sec.	60 Sec.
Dumbbell One Arm Rows	2	8 Each Side	
Prone Y Raise	2	10	60 Sec.
Wrist Curls and Extensions	2	10 Each Side	45 Sec.

A warm-up and cool down can be performed with the foam rollers, massage stick, or even a light ride on the bicycle. A nutritional cocktail comprising of 20 grams of whey protein and at least 40 grams of carbohydrates should be consumed within 30 minutes of working out to get the greatest benefit from the workout routine.

The volume of training should not exceed 90 minutes. For some students, the duration may only be 10 to 15 minutes, if that is the time that the instructor deems appropriate for the student's goals and time allotment.

The benefits of a training program are derived from consistency. The more often an individual works out or trains, the more improvement he or she will see in training and golf performance. The workout is a stress that is placed on the body, and the body will adapt to the stress and build muscle, strength, stamina, or whatever improvements the student is trying to bring about. This is referred to as the **SAID (Specific Adaptations to Implied Demands)**, which suggests that an individual who only trains his or her lower body will only get stronger in the lower body. This is why it is important to incorporate all aspects of training (strength, speed, power, mobility, stability, and recovery) into each training session.

The majority of training program designs will fall in the hands of an exercise specialist, but it is important for the golf professional to understand proper progression and a training program overview to help educate clients and get them the help they need.

LESSON 3-3: GOLF CLUB FITTING

Golf clubs significantly influence the ball's flight, and the golfer's reaction to that ball flight affects the player's swinging motion. Therefore, to facilitate the student's learning of golf, an effective teacher must take the student's equipment into account in order to get the desired result. In this case, the desired result should be the student making an optimum golf swing with a correctly fitted golf club and being rewarded with an optimum ball flight. In other words, a good swing should equal good ball flight. In contrast, if the student makes a good swing with an incorrectly fitted club, or a poor swing with a correctly fitted club, the ball flight will probably be undesirable. The route to a better, more enjoyable golf game is to practice, play, and seek professional swing advice. However, this method can be effective only if the student uses quality equipment that is properly fit.

In general, swing issues caused by golf clubs that do not fit can only be alleviated by fixing the cause—the clubs that do not fit. Removing the cause of the swing issue can provide accurate ball flight feedback—that is, the ball will go where the club says it should go at impact. When this happens, swing corrections become simpler; when it does not, the teacher must teach the player to produce compensating swing movements to get the correct swing results. Through these compensating motions, it is possible to get a good ball flight from poorly fitted equipment.

Because golf clubs and golf swings are intimately connected, a golf club fitting is most effective when it is conducted by a teacher who knows about golf swings in general and the swing of the person being fitted specifically. An effective fitting maximizes the player's swinging motion while providing the correct feedback for the resulting ball flight. This helps the teacher and student develop the best possible swinging motion. However, a golf club that does not fit can handicap a teacher in his or her ability to read the student's ball flight and help the student change and improve.

Club fitting that does not consider the swing tends to condemn the player to the swing he or she already has instead of helping the student become a better player. Therefore, the initial lessons with a student should include a thorough equipment evaluation and a golf club fitting session conducted by the teacher. The result of this session should indicate to the teacher how to proceed with the teaching program.

LEARNING OUTCOMES

After completing this lesson, you will be able to:

- Demonstrate how to fit golf clubs to a golfer
- Conduct an effective club and ball flight performance evaluation and make recommendations to improve performance
- Explain the rationale for equipment changes, how they will affect the golfer, and the expected results
- Distinguish between the need to alter the golf club or to provide swing instruction in order to optimize performance

READING ASSIGNMENT

Read the following lesson, which describes how and when to evaluate and alter a student's golf equipment.

Portions of the text and illustrations in this lesson are incorporated, with permission, and are based on information provided by Henry-Griffitts Limited (from the *Henry-Griffitts Golf Club Fitting Manual*, 2011), and Ralph Maltby and The Golf Works (2011).

PURPOSE AND RESULT OF AN EFFECTIVE GOLF CLUB FITTING

The purpose of club fitting is to allow players to play their best, considering their physical attributes, abilities, and personal preferences. An effective club fitting should match golf clubs to the individual player while eliminating as many negative ball flight variables as possible that are caused by the golf club. This should result in the player enjoying the game more and playing to his or her ability level. An effective fitting should allow a player to swing in balance with the least amount of effort that will produce the best ball flight. The golf professional has the greatest chance of success in properly fitting golf clubs because being able to teach and understand the swing are necessary fundamentals when evaluating the cause and effect of ball flight and the proper feel at impact.

Some of the keys in evaluating a player's ball striking are tempo, timing, technique, attitude, physiology, and ability. These keys are evaluated to troubleshoot ball striking and ball flight problems, and also to correct any swing balance problems that further influence both swing and fitting problems. Maintaining balance during the swing is very important—many amateur golfers can tend to fall toward or away from the ball or toward or away from the target during the swing. Better players tend to stay in balance throughout the swing. Therefore, the professional should always consider balance in both teaching and club fitting.

Instruction during the fitting process should include teaching the student to evaluate his or her own golf swing through balance and ball flight. The professional's goal should be to help the player find a balanced swing that provides desirable ball flight and a key for evaluating future swings. The player must walk away from the fitting session knowing how to hold his or her balance and sense solid shots. A properly fit club will reward and influence a consistently balanced swing motion.

GOLF CLUB ELEMENTS

Golf club fitting always involves some form of trade-off. Fitting is not arriving at a particular set of magical numbers that will instantly transform the player's game. The reality is that there may be many solutions to the same fitting problem, but the golf club recommendations made based on the data collected during the fitting may result in favorable ball flight fitting trade-offs—for example, the fitter may have to trade some distance performance in order to improve factors that will provide greater accuracy. To properly and effectively fit golf clubs, the professional should become familiar with the golf club elements that influence ball flight and player performance.

The elements that can be changed during the club fitting and the performance aspects they affect are shown in the following figure.

FIGURE 3-12: THE EFFECTS OF CLUB COMPONENTS ON BALL FLIGHT

	Large Influence	Moderate Influence	Slight Influence
To Affect Direction	• Lie Angle • Head Design • Face Angle	• Length • Deflection Point • Shaft Flex	• Loft • Weight
To Affect Trajectory	• Loft • Shaft Flex • Head Weight • Shaft Weight • Face Angle	• Head Design	• Length
To Affect Consistency of Hit	• Length • Lie Angle • Loft	• Shaft Flex • Weight	• Grip Size • Deflection Point • Face Angle
To Affect Centeredness and Concentration of Hits on the Clubface	• Length • Loft • Lie Angle	• Shaft Flex • Deflection Point • Head Design	• Weight • Grip Size • Face Angle
To Affect Distance	• Length • Loft	• Deflection Point • Weight • Shaft Flex	• Lie Angle • Face Angle

Provided by Henry-Griffitts, 2011; Modified by Maltby, 2011

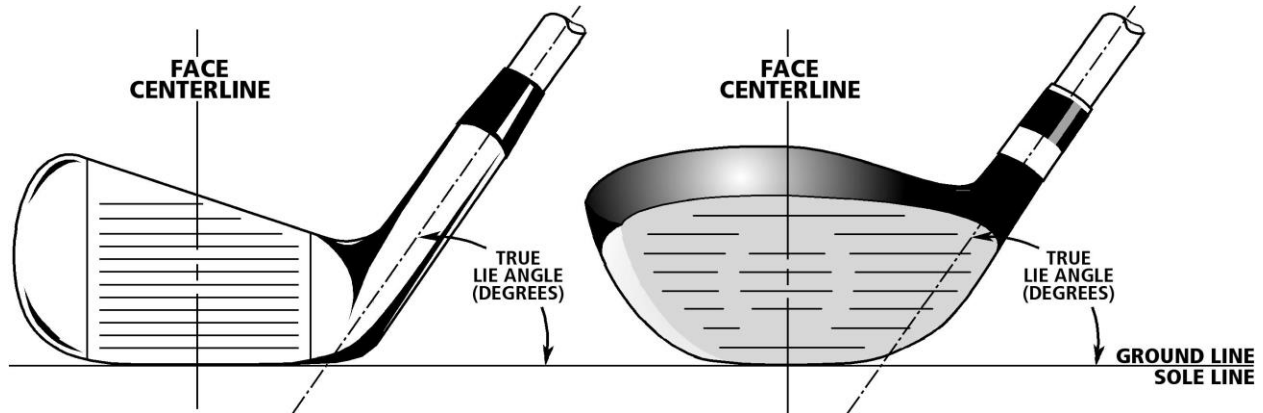
Each of the club components is described in more detail in the following sections.

LIE ANGLE

Clubs with inaccurately set lie angles can be the root of many golf swing problems. The lie angle of a golf club is the primary influence on ball flight direction; therefore, accurately setting the lie angle is a key to golf club fitting. The lie angle at impact also influences solidness of feel, ball carry distance, trajectory, the amount of back spin, and the amount of ball roll.

The true lie angle is the angle that the centerline of the shaft forms with the ground line when the club is soled directly over the face centerline. A club's true lie angle is shown in the following figure.

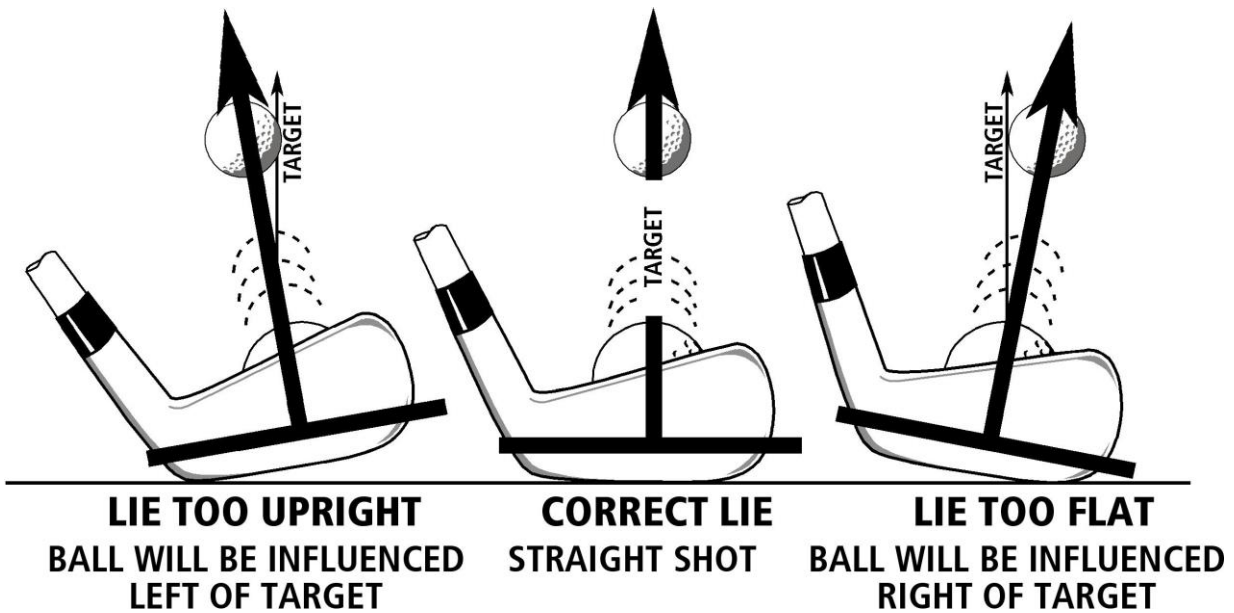
FIGURE 3-13: DEFINITION OF LIE ANGLE



Provided by Maltby, 2011

The effect of the lie angle on ball direction is shown in the following figure.

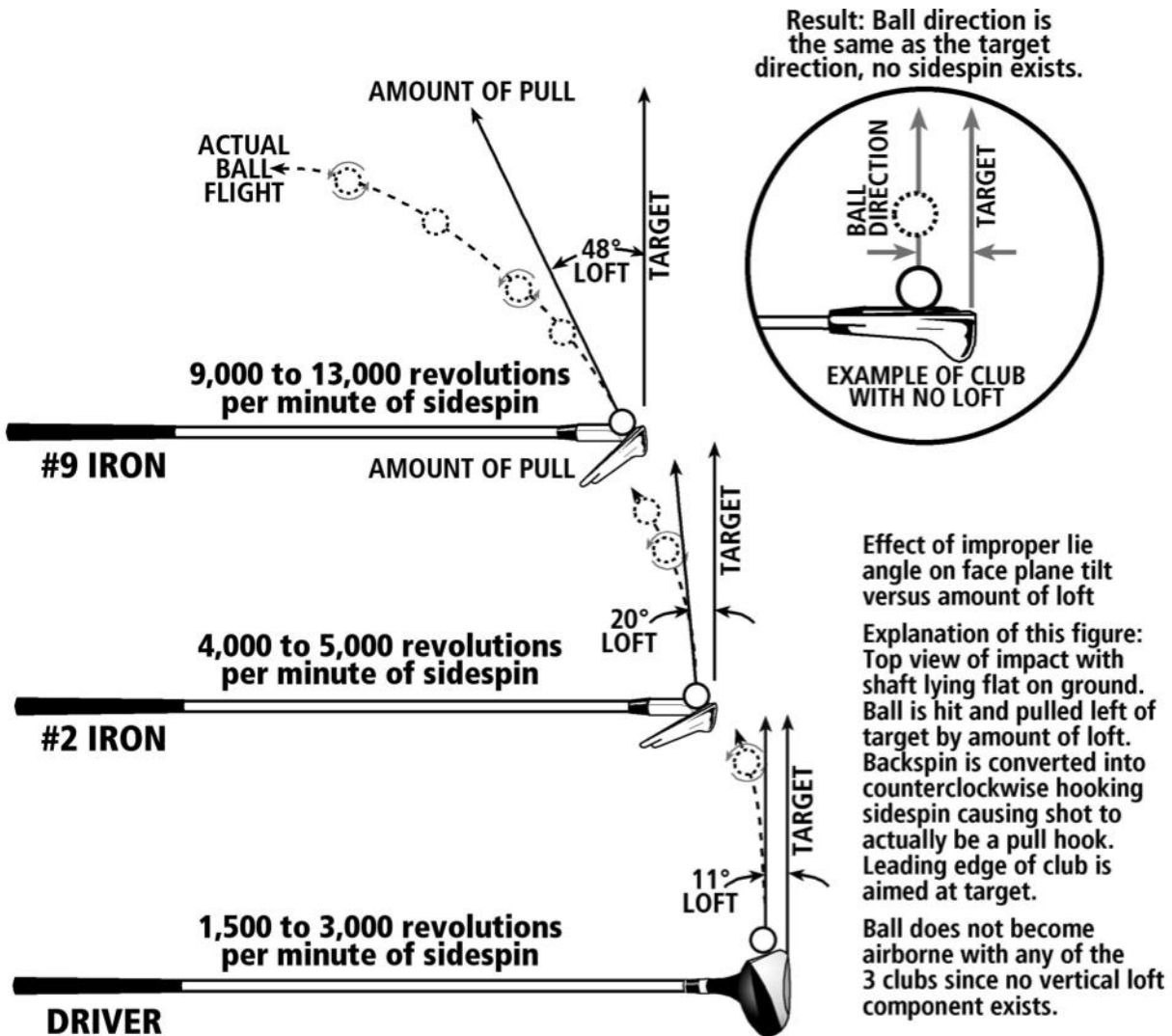
FIGURE 3-14: DYNAMIC LIE ANGLE AND ITS EFFECT ON DIRECTIONAL CONTROL



Provided by Maltby, 2011

As the figure shows, even if the leading edge of the clubhead is perpendicular to the target line at impact, the ball flight will move to the right of the target line if the clubhead is too flat or to the left if the clubhead is too upright. This influence is greater in clubs with greater clubhead loft, as shown in the following figure.

FIGURE 3-15: INFLUENCE OF LOFT ON LIE ANGLE



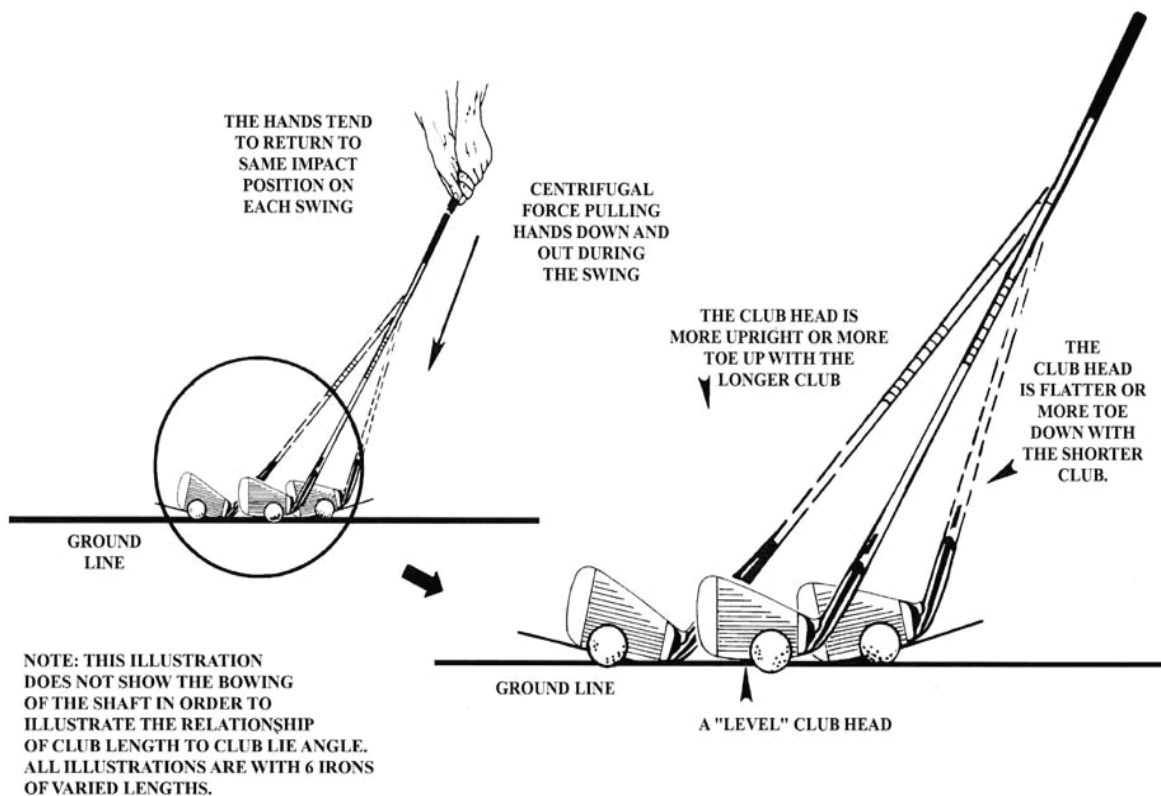
Provided by Maltby, 2011

The club fitter must interpret lie angle as a toe up or toe down position of the golf club as it contacts the ball during the swing. However, the astute club fitter must be aware of the factors other than the lie angle that affect the clubhead attitude (that is, toe up or toe down) as it strikes the ball. For example, the stiffness of the shaft and the clubhead speed relate directly to the dynamic lie angle at impact. Because of these factors, the accurate lie angle for an individual golfer is not the same as the true lie angle that results from naturally soling the club on the ground. The player's lie angle at impact (also called the effective lie angle or dynamic lie angle) can only be determined dynamically when the golfer strikes a golf ball with his or her normal golf swing. In order to facilitate this determination, a lie board must be used by the club fitter. The lie board is a tool that can be used to determine accurate club lie angles for each golfer; its use is described in more detail in "Using a Lie Board."

When a golf club is swung, the actual position or attitude of the clubface at impact with the ball depends primarily on the true lie angle of the club and the length of the club. The flexibility of the shaft and the speed of the clubhead also influence the dynamic lie angle. The effective lie angle is a combination of the true static lie angle and the length variables, plus or minus the change in angle necessary to return the club to the level hitting position at impact. This change is necessary due to the change in hand position at impact and the bowing of the shaft during the swing.

The club length and its effects on lie angle are shown in the following figure.

FIGURE 3-16: EFFECTS OF CLUB LENGTH ON LIE ANGLE



Provided by Maltby, 2011

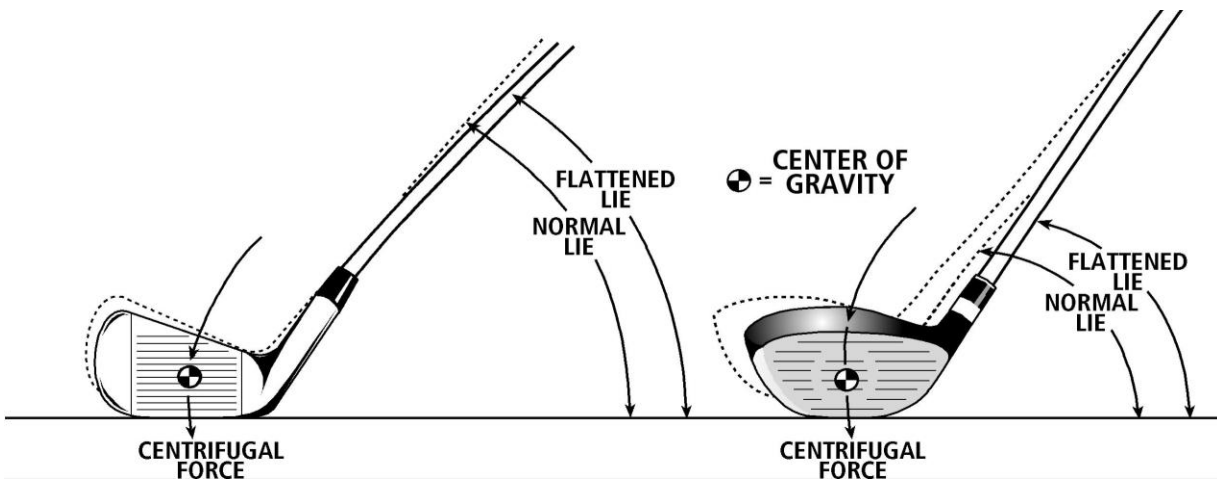
Assuming the player's hand positions at impact do not change, increasing the club length will make the club more upright (that is, bring the toe up) and decreasing the length will make it flatter (that is, bring the toe down). The relationship between the two is approximately $\frac{1}{2}$ degree of angle between the sole line and ground per $\frac{1}{2}$ inch of club length.

The club fitter must also be aware of the forces that are exerted on the golfer when swinging the golf club. The golfer must resist the pull or centrifugal force of the club on his or her hands, which affects the position of the player's hands at impact. The pull can sometimes exceed 60 pounds at impact, depending on the speed of the swing, the weight of the club, and the length of the club. This force also acts on the clubhead, especially when the club is swung at a high speed,

and reaches its maximum influence near impact. Depending on the flexibility or stiffness of the shaft, this force results in shaft bowing and effectively flattens the club's lie angle for some players, especially for longer clubs.

The effect of centrifugal force on the shaft and clubhead is shown in the following figure.

FIGURE 3-17: EFFECTS OF CENTRIFUGAL FORCE AND SHAFT STIFFNESS ON LIE ANGLE



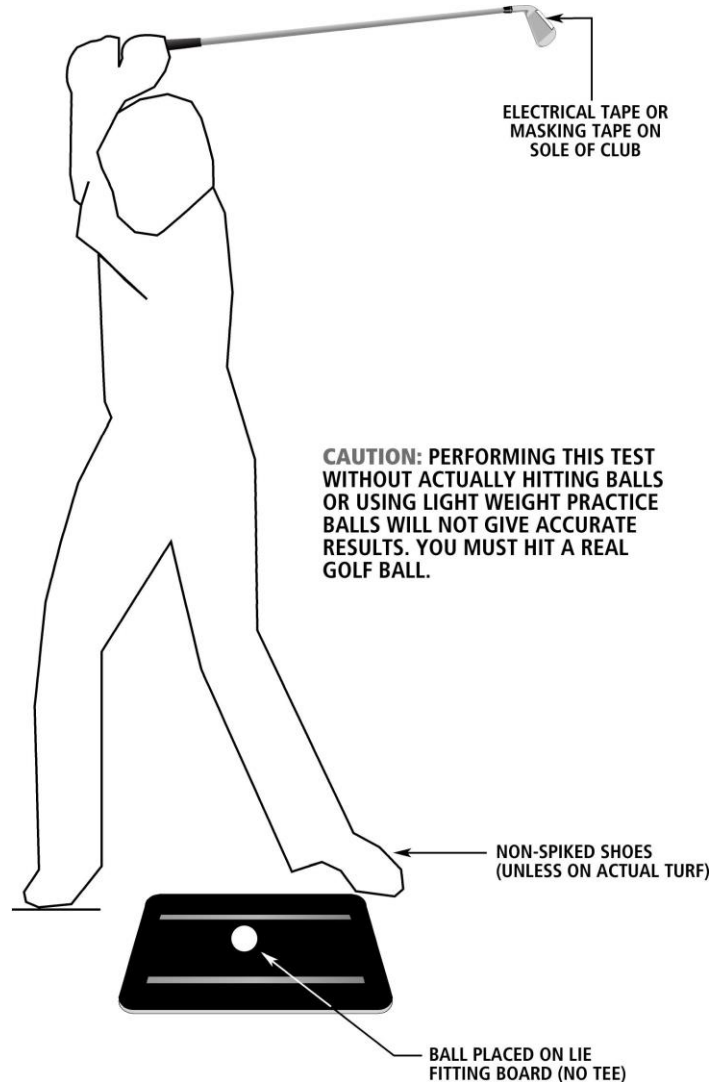
Provided by Maltby, 2011

USING A LIE BOARD

Future developments in high-speed motion capture technology may one day produce a more accurate way to measure lie angle, but until then, a lie board remains the best tool for measuring and determining the optimum lie angle for a player. A lie board has a smooth plastic surface from which the player hits balls; when vinyl electrical tape is applied to the sole of the club, striking the ball will transfer a mark to the sole indicating the point of contact between the sole and the lie board. The marks must be concise and without distortion; splatter marks will not provide accurate readings. These marks, when accurately interpreted in conjunction with the ball flight, reveal a great deal about the fit of the club's lie angle and the resulting influence on the golfer's swing.

The following image shows the use of the lie board.

FIGURE 3-18: DYNAMIC LIE ANGLE FITTING USING THE LIE BOARD



Provided by Maltby, 2011

Use the following process to analyze and determine a club's lie angle specification for a particular player:

1. Begin with the player using his or her own 6-iron.
2. Substitute fitting clubs and determine the proper effective lie angle.
3. Let the player hit the club with the correct lie to develop dynamic balance.
4. Continue to explore the other parameters of the fitting (such as length, shaft, and grip). Return to the lie board at the end of the fitting to confirm that the lie of the fitted club remains correct and coincides with the fitted shaft flex, deflection point, and length.

Because most manufacturers have created their own standards, the lie angle required by a player must be specified relative to the standard lie angle provided by the fitting set. For example, a

player may require a club with a lie angle that is “1 degree upright” or “2 degrees flat” relative only to the standard set by the manufacturer of the specific club. The professional performing the fitting must know the standard lie angle of the fitting clubs and the lie angle standard of the clubs desired by the player.

Remember that lie angles, when accurately set, will produce different ball trajectories, especially if they are different from the lie angles the golfer has been using. Moving a player to a more upright club may make the ball fly higher, while moving to a flatter club may lower the ball flight. Setting the lie accurately means that the initial ball flight direction will be approximately the same as the face angle at impact—it does not mean the ball will always fly toward the target. In general, the ball will fly wherever the face is pointed at impact.

Sole impact lie tape has recently been introduced, but it has the potential to confuse the fitter and provide inaccurate information. Some manufactured sole impact lie tape is marked with the degrees of lie angle adjustment needed, and these markings can be misleading. The amount of adjustment needed depends on the sole radius, and is not consistent from brand to brand or model to model.

The following recommendations apply when using the lie board:

- When setting up the lie board, be sure the standing area and the hitting surface are on the same level.
- Ensure the tape is applied to the sole so it is completely covered, especially at the leading edge of the sole.
- Place the ball forward of center on the lie board hitting surface.
- Instruct the player to strike the ball with his or her normal swinging motion.
- Only certain marks will give accurate information. Excessively thin or fat hits produce misleading marks. Look for scuff marks on the lie board to determine the sole’s impact with the board. Listen for the solid sound of a club striking the plastic surface indicating an accurate, readable mark. Only use the information generated by consistent marks and solid contact with the board.
- Use only a real golf ball on the lie board, not light practice balls or plastic whiffle balls.

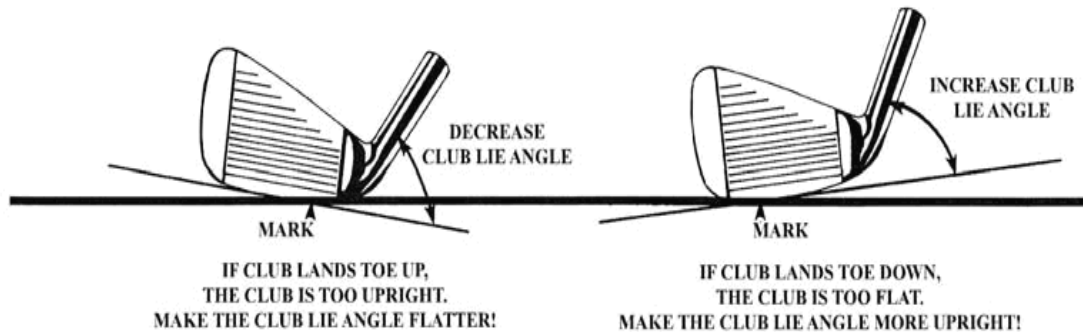
INTERPRETING THE RESULTS OF USING A LIE BOARD

To interpret the marks obtained on the lie board, keep the following concepts in mind:

- If the club’s sole impacts the lie board with the toe up, the lie angle of the club is too upright and needs to be made flatter. This means that the sole impact marks will be toward the heel of the club.
- If the club’s sole impacts the lie board with the toe down, the lie angle of the club is too flat and needs to be made more upright. This means that the sole impact marks will be toward the toe of the club.

These relationships are illustrated in the following figure.

FIGURE 3-19: IMPACT OF A CLUB ON A LIE BOARD



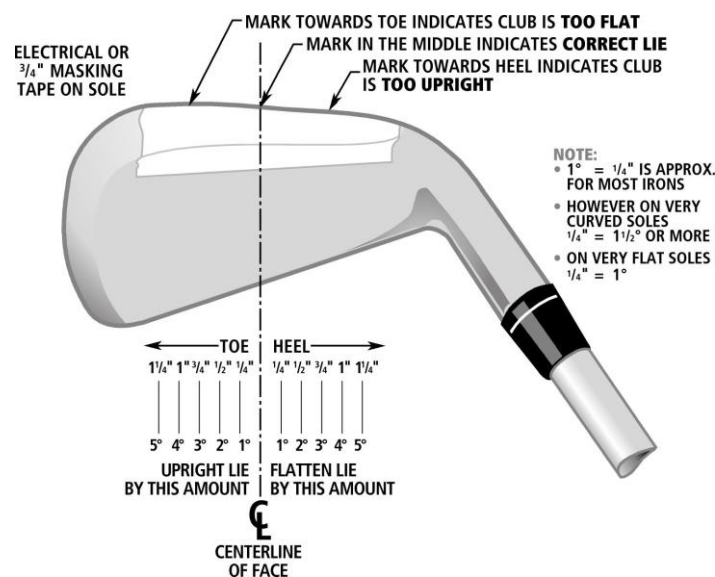
Provided by Henry-Griffitts, 2011

Assuming the clubface angle is square and the path is inside-to-inside at impact, the most obvious interpretation of the lie board marks is as follows:

- Marks at the center of the sole, toe to heel, are considered to be accurate and correct lie readings. Clubs striking the board at this point on the sole will tend to produce a straight ball flight.
- Marks toward the heel of the sole are considered too upright—that is, the club is too upright. Clubs striking the board in this position will tend to influence ball flight to the left.
- Marks toward the toe of the sole are considered too flat—that is, the club is too flat. Clubs striking the board in this position will tend to influence ball flight to the right.

The following figure shows how to interpret the sole mark and begin the correction process.

FIGURE 3-20: APPROXIMATE CORRECTION FOR SOLE MARK FROM FACE CENTERLINE



Provided by Henry-Griffitts, 2011; Modified by Maltby, 2011

Do not confuse upright or flat lies with upright or flat swings. They are not the same, and one does not necessarily produce the other.

Experience at reading sole impact marks during the fitting of the lie angle can be an aid to a PGA Professional's teaching. Keep in mind that a leading edge, toe-down mark may be a result of a closed clubface at impact and a correct clubhead path. Conversely, a trailing edge, heel-down mark may be caused by an open clubface with a correct path. These marks may not be an incorrect lie angle.

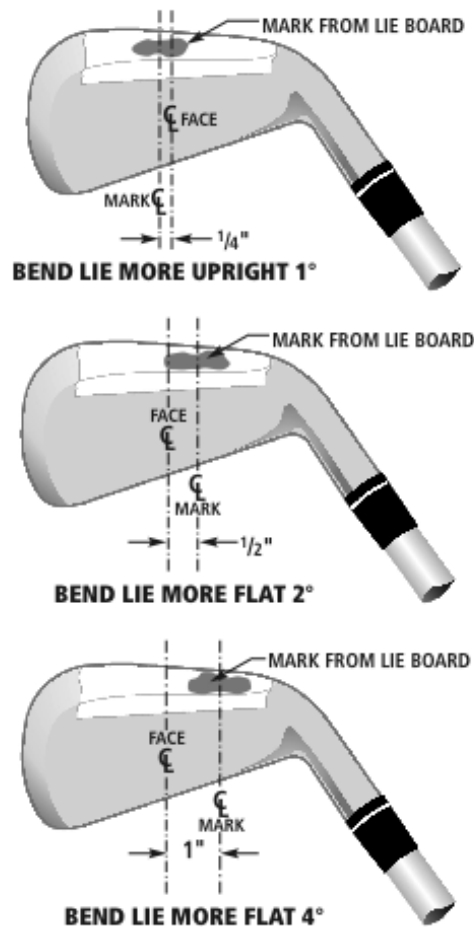
Another example of a sole impact mark that may be confusing is a center, leading edge mark that may be caused by a too upright club, a closed clubface, and an out-to-in clubhead path.

Therefore, take care in reading and interpreting the sole impact marks. Let the ball flight be the guide in interpreting whether the mark on the sole is a good one to use or not. The best way to check lie is to use only those marks that resulted in a relatively good shot, meaning decent directional control, acceptable trajectory and minimal curve to the ball. This is where professional teaching knowledge of the swing mechanics is invaluable in recognizing that poor ball flight may be caused by a bad face angle to path relationship resulting in a sole impact mark that is not a reliable indicator of a correct lie angle.

Additionally, the shape of the club's sole, and specifically the radius of the sole, will influence the relationship between the position of the marks on the sole of the clubhead and the angle of the clubhead at impact with the lie board. A more cambered sole will show less sensitivity to changing lie angles, while flat soles will show greater sensitivity. The sensitivity can range from $\frac{3}{8}$ inch per degree of lie angle for clubs with a large sole radius to $\frac{1}{8}$ inch per degree for clubs with a small sole radius. There can be other extremes, but these are very rare.

Consider the examples of marks commonly found during a lie board fitting, as shown in the following figure.

FIGURE 3-21: INTERPRETING THE LIE BOARD MARK ON THE SOLE



NOTE: Remember, the 1/4" used here to calculate the amount of lie angle change in degrees will vary depending on the actual sole radius from heel to toe.

Provided by Maltby, 2011

The mark position and shape accurately shows the correct dynamic lie angle if the center of the mark is centered toe to heel and slightly off the leading edge. The ball flight will start at the target with a normal trajectory, normal back spin, and best distance (assuming that all other club specifications are accurate). In all instances, this will be an optimum golf shot.

CLUB LENGTH

Club length is a factor in determining centeredness of hit and is directly related to the distance the ball is hit. A poorly fit club length can result in the player making compensating moves in his or her swing, resulting in the golfer having difficulty with centeredness of hit. Properly fit club length will result in the face being properly centered at impact, good directional control, proper trajectory, solidness of feel at impact, and maximum distance.

When fitting length, it is necessary to determine if desired distance should be a trade-off with greater accuracy. When fitting length, the professional should use the longest shaft that results in square hits, a balanced swing, and the greatest directional control. If longer shafts result in off-center hits, the shaft length may not be the only factor causing the off-center hits, and the professional must investigate to discover if the length or some other specification is causing the problem. Face impact tape can be very helpful in determining centeredness of hit for the professional and the player.

A driver can be used to determine optimum club length. For example, if the player can successfully hit a driver that is one inch longer, then the driver will probably determine length for the fairway metals, hybrids, and irons accordingly.

Club length affects lie angle as described in the previous section, but it also affects club weight and swing weight. Consider a metal wood club with a head weight of 200 grams, a shaft weight of 115 grams, and a grip weight of 55 grams for a total weight of 370 grams. Increasing or decreasing the shaft length by ½ inch will change the total weight by +/- 2 grams and the swing weight by +/- 3 points.

Use both total weight and swing weight as a guide for troubleshooting potential problems and determining the best weight for a given player. Lead tape makes it simple to experiment on the range to determine if a heavier swing weight will benefit the golfer.

Be aware that people on the flat side of standard may tend to hit standard length or shorter clubs more accurately because the length is making the lie angle more accurate. Therefore, it is possible for this type of player to hit clubs that are ½ inch to 1 inch longer accurately if the lie angle is flattened.

Some general guidelines for metal wood lengths are as follows:

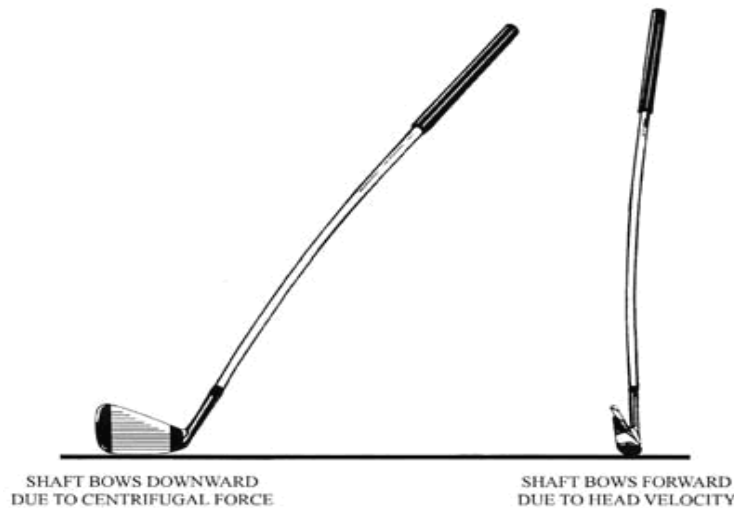
- If an 11° driver is recommended at 44 ½ inches, the length recommendation for the next appropriately lofted fairway wood should be 43 ½ inches. That means the next fairway wood length would be 42 ½ inches. Put the loft needed on the length club that properly fits.
- A good rule of thumb is for a driver length to not exceed 45 inches for men and 43 inches for women. This correlates to a 5-iron length of 38 inches for men and 37 inches for women.

SHAFT STIFFNESS AND FLEX POINT

The shaft's purpose is to allow the clubhead to repeatedly return to the proper impact position. When matching a shaft to a player, the professional must consider the shaft stiffness, flex point, and shaft weight, and the effect that each has on ball trajectory, the consistency of hit, distance, direction, and solidness of feel.

Shaft stiffness or flex is a measure of how much the shaft bends or its resistance to bending when the shaft is put under a force load. The way the shaft flexes is shown in the following figure.

FIGURE 3-22: SHAFT BOWING AND FLEXING

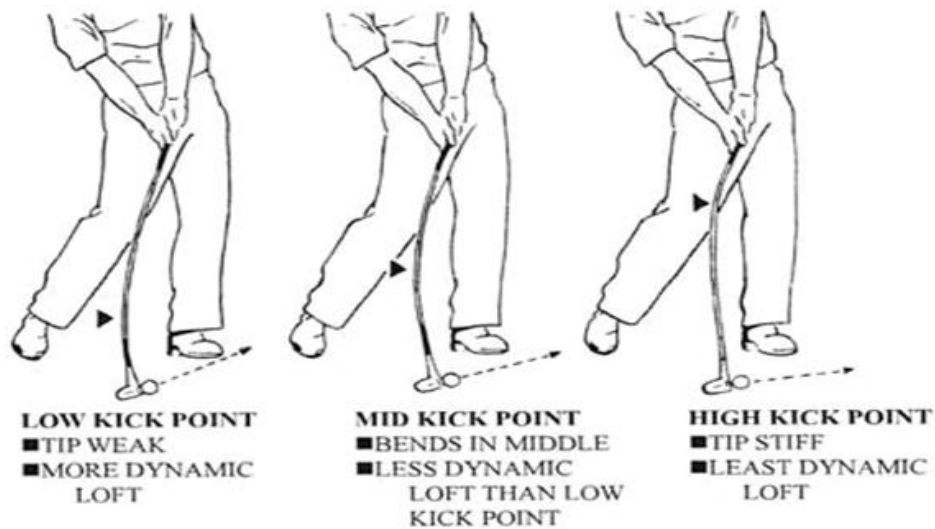


Provided by Henry-Griffitts, 2011

When fitting shaft flex, recommendations should be based on several factors. These factors include swing speed, release pattern, shaft material, ball flight, player feel, and player feedback. All of these factors may be equally important. An astute club fitter will not make recommendations based solely on swing speed and/or the player's skill level. If the shaft stiffness is accurate, the player will more frequently strike square hits with increased clubhead speed and a more consistent ball flight. The sound made at impact will be crisp, and there will be less difference between solid hits and misses.

The shaft deflection point or flex point is the point of the shaft where it bends the most while in motion. The deflection point of the shaft helps determine the shot trajectory. The lower the deflection point, the higher the launch angle. The higher the deflection point, the lower the launch angle. This relationship is demonstrated in the following image.

FIGURE 3-23: SHAFT FLEX POINT



Provided by Henry-Griffitts, 2011; Modified by Maltby, 2011

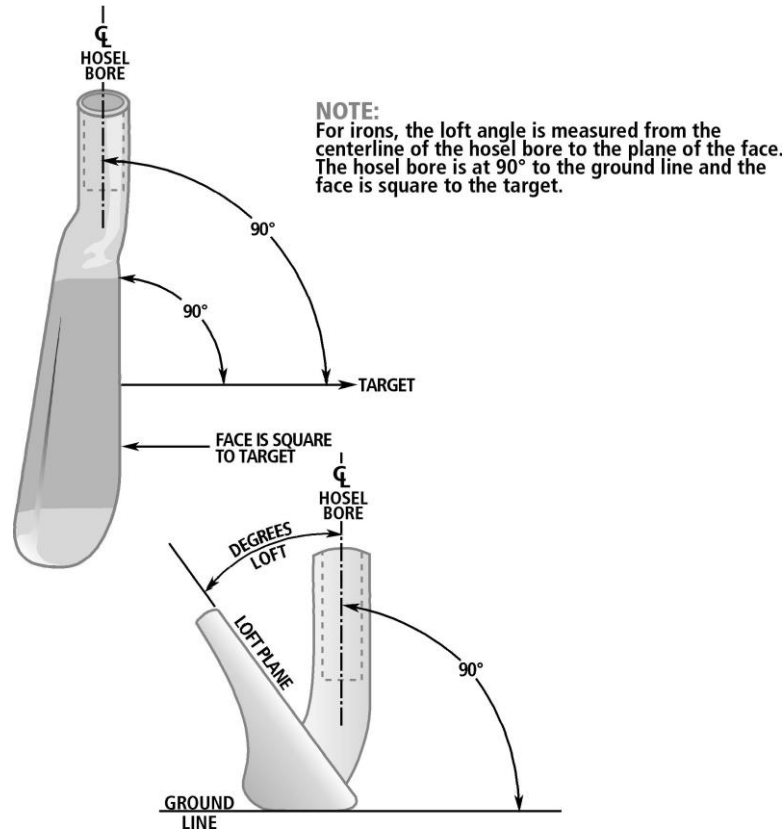
The more flexible the shaft, the longer the shaft, or the lower the deflection point, the more the shaft may bow forward and downward during the swing. This bowing will affect the effective loft of the club at impact and the angle of the sole in relation to the ground, as described in “Lie Angle.”

Ball curvature changes may occur as deflection points and flexes are varied. This is due to the player’s reaction to the ball flight trajectory height or lack thereof, produced by different flex and deflection point combinations.

LOFT ANGLE

The loft angle is the angle measured from the centerline of the hosel to the face plane located at the centerline of the face. The centerline of the hosel should be 90° to the horizontal, and the face angle should be 90° to the target. The clubhead should be properly soled directly over the centerline of the face. Loft angle is illustrated in the following figure.

FIGURE 3-24: DEFINITION OF LOFT ANGLE



Provided by Maltby, 2011

Loft is a major factor influencing the trajectory at which the ball leaves the clubface. Loft also has a profound effect on the athletic motion and the balance a person can obtain during a golf swing. Increasing loft in the driver will often improve balance and distance. Too little loft is one of the biggest killers of a golf swing. Golfers will go through a variety of swing manipulations to get a ball airborne with a more desirable shot trajectory. These swing manipulations will destroy any semblance of the player's athletic motion and balance.

The launch angle of the ball, or the angle between the ball trajectory and the ground, is determined by the following:

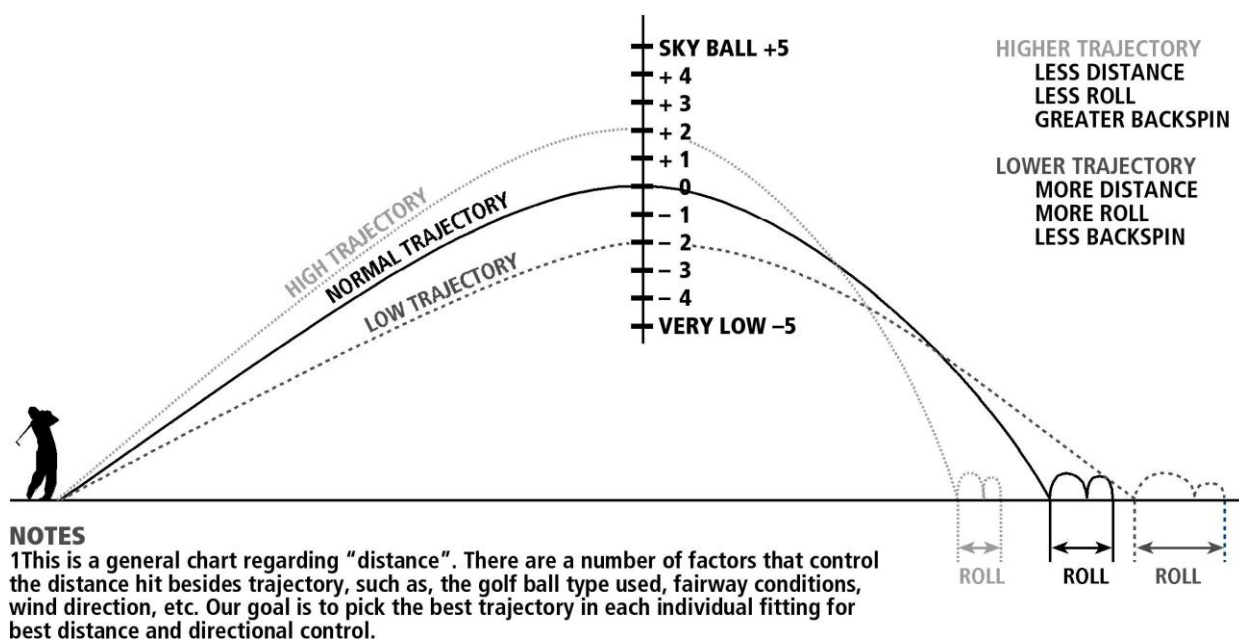
- Loft angle
- Lie angle
- Face angle (relative to the club path)
- Angle of attack
- Clubhead center of gravity relative to the ball
- Roll (on metal wood clubs)
- Clubhead speed
- Shaft stiffness and deflection point

- Total weight and swing weight
- Length

The best ball flight is obtained when the ball is struck on the horizontal center of the face (toe to heel direction) and vertically on the face where that particular clubhead's center of gravity is always below the golf ball's center of gravity. Therefore, a driver with a higher center of gravity will possibly be struck above the face's actual vertical mid-point for best results, while a lower center of gravity iron design can be struck well below the vertical face mid-point. Touring pros find this location with feel through practice, and they will create a concise wear spot on each of their clubfaces where the ball feels the most solid to hit. Everyday golfers cannot be this consistent and should lean toward higher playability clubheads (that is, those that usually have a lower center of gravity, which provides a larger margin for error). The optimum loft angle for a club is the one that provides the best combination of trajectory and direction.

To better understand the relationship between launch angle, back spin, and distance, consider the drawings in the following figure.

FIGURE 3-25: THE EFFECT OF TRAJECTORY ON DISTANCE, BACK SPIN, AND ROLL



Provided by Maltby, 2011

In making recommendations for loft angles, the professional must match the player to shaft characteristics that provide the best possible trajectory, distance, back spin, and roll. In general, the lower the loft and the longer the club, the more difficult it is to hit. Launch monitor technology can provide important data to help the professional better match the club characteristics to the player.

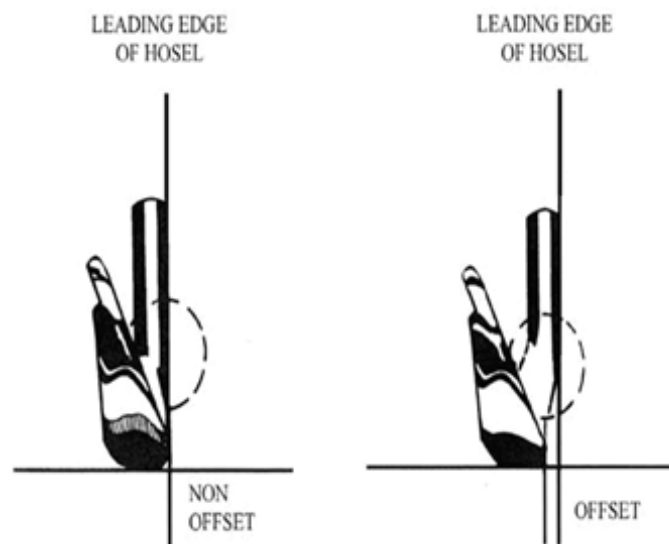
Because some players will hit a more lofted club better off the tee than a less lofted one, it pays to have the player experience a range of loft angles during a fitting. The optimum ball trajectory for a player, as well as the player's perception of that trajectory, may depend on the geographical area of the country they reside in. For example, in Texas, optimum trajectory may tend to be lower than that in the Northeast or Northwest.

HEAD DESIGN

A club's head design is the shape and style of the clubhead—offset or non-offset, deep face or shallow face, and oversized or traditional. There are also some very important mass and dimensional properties that greatly affect playability, mainly relating to the location of the clubhead's center of gravity and its moment of inertia.

Because many aspects of clubhead design are very complex, they are beyond the scope of this manual. This course is mainly concerned with the influences of offset versus non-offset heads. The physical difference between offset and non-offset is the placement of the leading edge in relation to the farthest front portion of the hosel. The main difference in the influence of these types of heads is the directional flight of the ball. Offset and non-offset heads are illustrated in the following figure.

FIGURE 3-26: OFFSET AND NON-OFFSET HEADS



Provided by Henry-Griffitts, 2011

If all golf club specifications are equal except for the head design, an offset head will send the ball to the left and possibly higher, and the non-offset head will send the ball to the right and possibly lower. During fitting, if a player is hitting the ball low and to the right, begin with an offset head to change ball flight. If the player is hitting the ball high and to the left, begin with a non-offset head.

When conducting a fitting, the head designs of the player's irons may be an indication of the face angle needed in his or her woods. Offset irons will tend to fit well with closed-faced to square

fairway woods. Intermediate irons will tend to fit well with slightly closed to slightly open-faced fairway woods, and non-offset irons will tend to fit well with square to open-faced fairway woods.

WEIGHT, SWING WEIGHT, AND FREQUENCY

The total weight is the weight of the assembled club, and the swing weight is the weight distribution relationship of the grip, shaft, and head in a given club length at a specified fulcrum point from the grip end as measured on a swing weight scale.

Both total weight and swing weight are club fitting tools. Therefore, club making tolerances should be developed to build a set of clubs that are all in a particular total weight range—that is, all components (head, shaft, and grip) are all in the light, medium, or heavy weight category. This allows the professional to obtain greater variety and range for building clubs to meet individual requirements. The set of clubs should have all component combinations matched in the same weight classification (i.e., all light, medium, or heavy weight classifications). This technique gives the professional an opportunity to match clubs to the gram prior to assembly, resulting in a set of clubs where the frequency is truly matched.

From the golfer's perspective, the feel of the club is influenced by the swing weight, total weight, and frequency. Proper club fitting should match the player with the club that provides him or her with the best chance to properly time the hit, producing the desired trajectory, directional control, carry, and roll.

The variables that affect total weight and swing weight are:

- Club length (depending on the material, changing the length by ½ inch changes the club weight by 2 grams and the swing weight by 3 points)
- Shaft stiffness
- Shaft deflection point
- Grip size
- Grip material
- Head design and material
- Lie angle (3 degrees in either direction will affect the swing weight)

Changing the shaft affects the feel of the club and the total weight. If the new shaft is made of different material, the swing weight will also change. A lighter shaft of the same length produces a lighter swing weight, which sometimes requires that weight be added to the head to increase the swing weight. Experimentation with added weight will determine if this is the correct way to go.

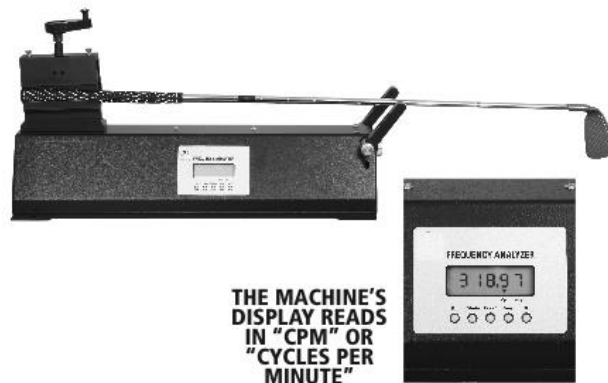
Most people do not understand swing weight. A club weighing 100 pounds could be made to have a swing weight of D-0, but in building a set of clubs, the swing feel of each club will be equivalent if the swing weights are equivalent.

Keep in mind that people will misinterpret weight during a swing, confusing a lack of squareness of hit with the club being too heavy or too light. When the ball is struck squarely, players seldom complain about heavy or light clubs. For example, many golfers complain that their drivers are too heavy, and their 9-irons are fine—because drivers are actually lighter than 9-irons, weight cannot actually be the offending specification, and the problem could be club length or loft angle.

If the clubs are properly assembled by weight, the result will be a true frequency matched set. Frequency is the measure of the assembled club's shaft oscillations over a period of time. The most accurate method of determining frequency is by measuring the cycles per minute (CPM) using a frequency analyzer. The CPM represents the overall flex feel, which is a measure of the shaft's installed flex given the length and particular head weight of a club. In measuring the frequency of a set of clubs and recording the frequency numbers on a graph, the resulting graph points should form a straight line with constant slope.

The frequency is measured by determining the natural frequency of vibration of the golf club when it is mounted on a frequency machine. There are several types of frequency machines, and each reads in its own particular way. One such machine is shown in the following figure.

FIGURE 3-27: FREQUENCY MACHINE



Provided by Maltby, 2011

A number of factors can alter or influence the frequency of a golf club. The following is a partial listing:

- The lie of the golf club
- The way the machine is anchored or not anchored
- The base where the machine sits
- The position in which the shaft or grip is held or clamped
- Changing the grip
- Adding or subtracting length or weight
- Any other alteration to the club

This partial list should make it clear that frequency is not the "answer," but rather another piece of the puzzle. Using frequency in a consistent way, weighing the components, and comparing apples to apples helps produce a more consistent product. Therefore, it is important to use the frequency machine to help produce a better fit.

GRIPS

The grip is important because it provides the golfer's only physical contact with the club, and it can also enhance or detract from how the golfer feels about a particular club. Grip type and size can help or hinder a golfer's hand movement through impact.

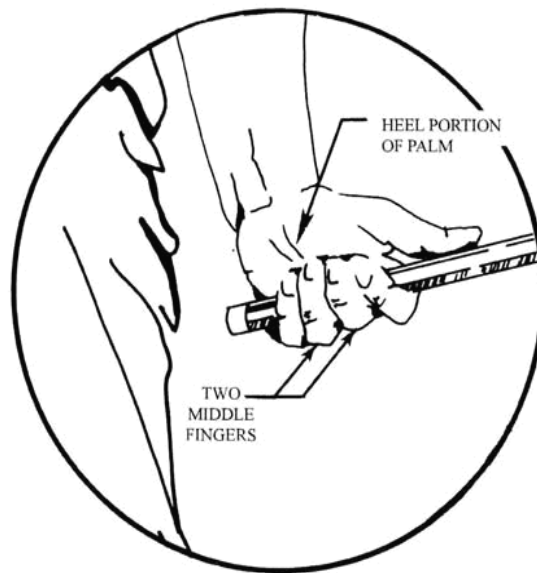
Grip material is strictly a matter of personal preference. However, based on his or her knowledge of the student's swing, the professional might recommend a particular type of grip based on factors such as proven playability or longevity. Give specific reasons for any recommendation, and also give instruction on how to properly maintain the grips (such as soft scrubbing, wet sanding, or not storing clubs in the trunk of a car).

The proper grip size should give the player a comfortable feeling at address and positive control during the swing. The correct grip size should allow for normal wrist action as the club moves to impact. A grip that is too large will inhibit wrist action and decrease clubhead feel. A grip that is too small may twist at impact or cause the player to increase grip pressure, both of which can be devastating to a good swinging action and solid ball striking. The proper grip size may influence the timing, release, and squareness of hit; therefore, the grip size should be tested for ball flight results.

Determine the basic grip size for a player as follows:

1. Have the player assume his or her normal hold of the club's handle and place the club in its playing position.
2. If the player is right-handed, have the player remove his or her right hand from the club; if the player is left-handed, he or she should remove the left hand.
3. With the left hand remaining in the grip position, bring the club up to a position perpendicular to the ground, so the fingertips of the student's gripping hand are visible.
4. Observe the relative closeness of the player's fingertips to the thumb pad, as illustrated in the following figure. If the player's fingertips lightly touch the thumb pad, the grip size is more than likely correct. If the fingertips dig into the thumb pad, the grip is probably too small; if they are separated from the thumb pad entirely, the grip is probably too large.

FIGURE 3-28: FITTING GRIPS



Provided by Henry-Griffitts, 2011

While fitting grip size, pay close attention to the player's preferences for grip material and comfort with different size grips. This is especially true for people with arthritis or other hand-related health issues. Note that different gripping philosophies (such as long thumb grip, 10 finger grip, etc.) may require a variance in the usual gripping procedure.

INDIVIDUAL CLUB FITTING TASKS

The following sections describe the tasks involved in fitting specific types of clubs. After each type of club has been described, a complete model for fitting the entire set of clubs will be presented.

SET MAKE-UP

Because *The Rules of Golf* state that the player can carry only a limited number of clubs, the clubs selected for a set should be properly fit and best suited to enhance the specific player's game. A proper set make-up includes a fit driver, putter, and set of irons that are enhanced by specialty clubs such as fairway metals, hybrids, and wedges. Some possible set make-ups include the following:

- Driver, 3-wood, 5-wood, 7-wood, 4- through 9-irons, PW, GW, SW, LW, and putter
- Driver, 3-wood, 2-hybrid, 3- through 9-irons, PW, GW, SW, LW, and putter
- Driver, 3-wood, 5-wood, 2- and 3-hybrids, 4- through 9-irons, PW, GW, SW, and putter

To make the best choices for set make-up, the professional should perform an evaluation of the player's game to determine what may be the best combination of clubs. The following are some questions that will enter into the discussion regarding set make-up:

- How well does the player hit long irons?

Because long irons are more difficult to hit due to their longer length and reduced loft angle, some players may find it advantageous to use fairway metals or hybrids that provide comparable length in their place. Choosing this option over the long iron allows for a higher trajectory shot with more ball spin and less roll, which equates to more solid, controlled shots. Some players may prefer the long irons or a combination of long irons and hybrids.

- Where does the player usually play?

The course design and conditions of the player's home course will dictate the type of shots that are required. If the course is designed with elevated greens, then the approach shots must be played at a high trajectory and the set make-up could include specialty wedges. If the rough is thick and the player tends to hit many shots from the rough, then specialty hybrids designed for play from thick rough or higher lofted fairway metals may be a necessary choice. If the bunkers are well maintained and contain very fine sand, then sand wedge loft and bounce angles must be carefully determined. The speed and smoothness of the green surface requires a putter that matches these conditions.

PUTTER FITTING

Putting accounts for as much as 35 to 40% of the total score. A properly fit putter and sound putting technique will aid in achieving consistent distance and directional control, which are the essence of good putting. A well-fit putter eliminates the golf club specification variables that could negatively influence this control and allow the player to effectively make more putts.

Matching a putter to a player requires the verification of the following five putter fitting variables:

1. **Putter length:** The length of the putter influences hand position and player setup, which directly affect the putting stroke and the ability to find a consistent impact location on the putter's face. Centeredness of hit will maximize distance control.

Putter length can be determined by having the player set up in the proper putting posture, with his or her eyes over the ball and arms hanging directly below the shoulders. Place a putter in the player's hands with the clubface behind the ball, and mark the shaft approximately $\frac{1}{2}$ inch above the player's hands. The length of the putter can then be measured.

2. **Putter lie angle:** Proper player positioning and lie angle can maximize directional control of a putt. The loft and the lie angle of the putt form a compound angle that affects the direction of the putted ball. For example, a 4 degree lofted putter that is 3 degrees too upright for the player will send the ball off line by $1\frac{5}{8}$ inches on a 28-foot putt. Therefore, it is necessary to properly fit the lie angle so the leading edge and the loft plane of the putter face are square to the target line at impact. With the correct length of the putter already set, the correct lie angle can be determined and the putter's lie angle adjusted.
3. **Putter loft:** Loft is necessary to obtain the proper amount of ball skid and roll on a putted ball. A properly fit loft angle, in conjunction with proper length and lie angle, will result in consistent skid and roll of the putt while maximizing distance control. All putts skid approximately 20% and roll 80% over the length of a putt. Loft is a key factor in minimizing

skid and maximizing roll. Loft must be determined based on the individual player's preferred putting stroke. For example, if the player pushes or presses his or her hands forward prior to or during the stroke, the putter's loft would be decreased at impact. Therefore, this player may require a higher loft putter to obtain the proper ratio of skid and roll. Keep in mind that the putter's static loft and its dynamic loft may be two different angles.

4. **Head weight/swing weight:** Properly fit head weight and swing weight provide the best feel during the putting stroke and at impact. This allows for maximum control over distance and direction. The player needs to have enough weight in the putter head to achieve proper feel and balance.
5. **Putter design:** Properly choosing the most beneficial putter head design and shaft configuration can maximize the player's ability, resulting in a reduced number of putts. Striking the ball on the exact center of the clubface is a result of putting technique, fitting, and putter design characteristics.

It is necessary to determine what head type will enhance the player's ability. The choices are numerous, but usually fall into two categories—blade or mallet. These two categories have a wide range of moments of inertia (MOI). The choice of head style should be made based on the player's putting skill level. Where there is a reduction of skill, there should be an increase in MOI.

Putter choices are based on shaft position. Is the putter's shaft attached at the center or heel, and is the putter's hosel configuration straight, off-set, or a double bend shaft? This becomes a matter of preference as to what is most effective in creating centeredness of hit for this player, and is based on the player's ability and their putting stroke.

When fitting putters, there are some common or average specifications that often occur. These specifications are shown in the following figure.

FIGURE 3-29: COMMON PUTTER SPECIFICATIONS

Specification	Player Gender	Value
Length	Men	32 ½ to 33 inches
Length	Women	30 ½ to 32 inches
Lie Angle	Men and Women	70 to 72 degrees
Loft Angle	Men and Women	3 to 4 ½ degrees
Head Weight	Men and Women	315 to 401 grams
Swing Weight	Men and Women	C-8 to D-2
Head Design	Men and Women	Greater MOI characteristics
Provided by Maltby, 2011		

WEDGE FITTING

For the most part, wedges are fit in the same manner as the other irons in the set. The variable that must be taken into account with wedge fitting that is not included in iron fitting is the effective bounce angle based on the manipulation of the face angle at impact. Most all properly

executed wedge shots require that the sole of the club contact either the sand or turf. Therefore, sole design is a key factor regarding wedge playability. Keep in mind that the other fitting variables must also be properly fit, especially the lie angle.

There are four basic factors of sole design that determine effective bounce: sole bounce angle, width of sole, sole radius, and leading edge grind. These four factors work together to determine the effective bounce and how the sole will play for the individual player. Given the variety of wedges available (such as pitching wedge, gap wedge, sand wedge, and lob wedge) and the different possible values for the four previously mentioned factors, a large number of wedge choices are available.

The sole bounce is when the trailing edge of the sole is lower than the leading edge of the sole in a square hitting position. Bounce is most noticeable in the sand wedge, but also exists in all wedges and in other irons. Bounce is a golf club performance angle that keeps the leading edge from digging into the sand or turf.

The effective bounce is the increase of bounce angle when the clubface is rotated to an open position. This rotation engages the sole radius and sole width as part of the effective bounce equation. Therefore, as the width of the sole increases, the amount of effective bounce that is created when the club is rotated open increases as well.

Wedge soles are classified as conventional, wider, very wide, or extremely wide. If a set of wedges have the same performance specifications except for the sole width, the extremely wide soled wedge need only be opened a few degrees to create a greater effective bounce angle, while the conventional sole needs to be opened a great amount to create an equivalent amount of effective bounce. Understanding this concept will help with choosing the best wedges for the individual player.

Therefore, the most skilled players can be successful wedge players using the conventional sole bounce angle, radius, width, and leading edge grind. Conversely, less skilled players will be more successful utilizing a wider sole with less sole radius, because these wedges are designed to be played in a square position rather than opened a number of degrees. Opening a wedge with a wider sole and smaller sole radius will raise the leading edge a significant amount. This could cause the ball to be struck with this leading edge, providing an undesirable ball flight result.

Another factor is the clubface leading edge grind, or the amount of radius that has been provided for the leading edge. This does not affect the height of the leading edge; however, it does affect the digging of the leading edge, and works efficiently in reducing fat shots.

DRIVER FITTING

The purpose of a driver fitting is to find the best combination of head weight, shaft weight, shaft flex, shaft flex point, shaft length, face angle, and head design (including loft and center of gravity) to create the total weight and swing weight that allows the player to generate the maximum clubhead speed. These elements combine to produce the maximum launch angle with minimum ball spin, resulting in the best possible distance.

Prior to the fitting, the professional must determine the exact club length, grip size, frequency, swing weight, total weight, face angle, and loft of the test drivers. This information is necessary for the selection of the next test club, and allows the professional to know why one club performs the way it does, especially when comparing one driver to another. It is also important to know the specifications of the player's present driver in order to allow accurate comparisons between the player's driver and the test drivers. Apply the information gathered from fitting the other clubs in the set (such as fairway metals, hybrids, irons, and wedges) to the driver specifications. This data can be helpful in finding an initial starting point for the driver fitting, and then fit the same golf club performance variables as with the other clubs in the set.

Proper driver fitting is important to maximize distance, maintain good directional control, and create a solid-feeling hit. Maximizing distance control and feel relies on the golf ball launch angle and the golf ball's back spin rate. Because there is no perfect number for everyone, the professional can only know what generally works best in most cases to obtain greater distance. Without experimenting, it is very difficult to determine the launch angle a player will get with a certain driver. However, when this launch angle has been established, the fitting becomes a matter of following various rules to guide the process of determining a launch angle that maximizes launch and minimizes the back spin. The following is a listing of these rules:

- Increasing the actual clubhead loft angle will usually increase the back spin rate.
- Using a softer tip shaft will usually increase the back spin rate.
- To impact the ball higher on the clubface, increasing the teeing height. This may or may not increase back spin due to vertical gear effect.
- Choose a driver with greater vertical face roll, and impact the ball above the vertical face center. This may or may not increase back spin due to vertical face roll.
- Having the player hit more up on the ball rather than a horizontal or downward hit may reduce back spin.
- Using a driver with a lower vertical center of gravity may or may not increase spin rate. Usually, a lower center of gravity increases the vertical gear effect.

These rules can best be determined by using a launch monitor, which (when set up properly) provides fairly accurate data regarding ball and clubhead impact parameters such as clubhead speed, ball speed, launch angle, ball back spin rate, ball side spin rate (if any), clubhead face angle, clubhead path, and ball carry distance.

When using the launch monitor technology, do not use any face impact decals or face coverings to protect the club during demo hits, as these coverings will modify the launch monitor data output. Use a grade of golf ball that the player will be using on the course. Range balls and similar quality golf balls will not provide accurate launch monitor data. Choosing a golf ball that enhances the player's performance is just as important as fitting clubs—using the launch monitor could be a good opportunity to introduce ball fitting to the player. The goal of a ball fitting is to determine the ball that provides the highest launch and the lowest spin rate. This can be determined using the launch monitor.

Consider the following important points during a driver fitting:

- Make sure the player does not turn the fitting into a long drive contest. The emphasis should be on normal swings that would be made on the course during regular play, not hitting the ball as hard or as far as possible.
- Instruct the player to warm up prior to the fitting with his or her current driver. This gives the professional the opportunity to collect launch monitor data to use as a comparison.
- In the absence of a launch monitor, there must be a way to calculate ball flight distance and roll.

THE CLUB FITTING MODEL

The following sections describe an overall fitting procedure that the professional can use to fit a set of golf clubs for a specific player. It should be noted that this procedure is only a guideline to facilitate learning—it is entirely possible to perform an accurate fitting in a different order.

It is necessary to record the observed results, the player's subjective feedback, and all data collected at each step in the club fitting model. Keeping accurate data and records is very professional and provides the foundation for making fitting recommendations. These records further provide a basis for continued golf club service, teaching, and any follow-up evaluations to determine the effectiveness of the fitting session.

STEP 1: CONDUCT A PERSONAL INTERVIEW

Even before picking up a club, it is important to gather personal information from the player who will be fitted. This information includes name, height, weight, age, number of years playing the game, current handicap or average score, and time devoted to playing and practicing. It is also necessary to gather information regarding the player's physical limitations, normal playing characteristics, and shot patterns. Finally, ask the player for his or her beliefs or opinions about his or her own clubs, swing issues, and goals to be accomplished in the fitting session.

STEP 2: EVALUATE THE PLAYER'S CLUBS AND DETERMINE THE APPROPRIATE LIE ANGLE

Evaluate the set make-up and playability of the player's current set of clubs. Combined with the personal data collected previously, the professional can use this information to obtain better results throughout the fitting.

Identify the shaft characteristics and specifications of the player's current 6-iron, and use a lie board to check the club's lie angle, as described in "Lie Angle." Evaluate the club's sole for any unusual bounce or radius that may affect the lie angle impact readings. Next, from among the fitting clubs, choose a 6-iron with a similar head design and shaft specifications, and proceed to dynamically establish an accurate, effective lie angle using the lie board and sole impact tape. This lie angle may be different than the player's own 6-iron and will demonstrate to the player the gap that exists between the player's present 6-iron and the accurate lie angle of the fitted 6-iron. This is a good time to connect teaching to fitting by reminding the player of necessary golf swing fundamentals, including swing balance.

STEP 3: EVALUATE THE GOLF CLUB SPECIFICATIONS FOR THE ENTIRE SET

After establishing the lie angle, determine an effective clubhead design that will provide the desired ball flight and range of playability factors for the player. Find a head design in irons that is aesthetically appealing and effective in producing the desired ball flight results. Using this head design and the accurate lie angle, determine the appropriate shaft length dynamically by using face impact tape and checking for centeredness of impact.

Next, determine the appropriate shaft stiffness, shaft weight, and shaft flex point. Shaft evaluation is done dynamically by exchanging shafts of different stiffness, weights, and flex points while maintaining the selected clubhead design. Launch monitor technology is also helpful at this stage.

Establish the proper lofts, especially with regard to drivers, fairway metals, hybrids, and wedges. This may also require the aid of launch monitor technology to find an accurate, effective shaft fit and loft combination for optimum ball flight. Remember to also determine the correct face angle for drivers, fairway metals, and hybrids for ball flight trajectory and directional control. Remember that face angle in woods and hybrids affects the golf shot in much the same way that lie angle affects directional control for irons. Use adequate loft when evaluating this directional control.

When checking drivers, fairway woods, and hybrids, it is equally important to check the same club specifications as were checked for irons, especially feel, trajectory, flex, centeredness of hit, and swing balance. Use the specifications fitted in the irons as a starting point. If there are differences between the iron specifications and metal woods findings, change the component that appears to be promoting the inaccurate shots. Test the loft in metal woods and the driver by having the player hit all possible lofts to arrive at the ideal combination of carry, roll, and desired trajectory. Start with greater loft and have the player work his or her way toward less loft. Centeredness of hit and balance are critical in this step.

Finally, establish the proper grip size and grip material. Determining the grip size is necessary to the player's feel and the proper release of the golf club. The combination of grip size, shaft flex characteristics, and clubhead design produces the desired ball flight. These three components also combine to make up the total weight of the golf club, and the distribution of that weight represents the swing weight of the club.

By establishing these golf club specifications, a set of clubs can be produced that will allow the player to consistently execute a balanced swing and produce optimum ball flight.

STEP 4: FIT THE PUTTER

Fit the putter as previously described in "Putter Fitting." Fit for the same variables as the other clubs in the set. The key specifications for putters are length, lie angle, loft, swing weight, total weight, head design, and grip size.

STEP 5: RECHECK THE LIE ANGLE, FIT THE WEDGES, AND MAKE SET RECOMMENDATIONS

After establishing all other golf club specifications, recheck the lie angle using a lie board. If the lie angle does not match the effective lie angle established earlier in the fitting process, adjust according to the current reading, and review the results of the hitting evaluations for further specification alteration.

Armed with this data, the professional can best make golf club recommendations for the following:

- Clubhead design
- Loft
- Lie
- Club length
- Face angle
- Swing weight
- Total weight
- Grip size and material
- Shaft flex
- Shaft material

Additionally, determine the wedge specifications (especially the wedge lengths, lofts, bounce angle, sole width, and radius).

Discuss all fitting findings and club specifications with the player. This is the point at which the player views the overall fitting information, which should show what has been done to improve the ball flight and influence changes in the player's swing.

Finally, connect the club with the swing and emphasize the benefits derived through the fitting process. Connect the fitting information to the results of the interview at the beginning of the fitting process, showing how the new golf club specifications fulfill the needs and desires of the player.

STEP 6: PERFORM A FOLLOW-UP EVALUATION

As a PGA Professional and teacher, it is important to follow up on the initial fitting session. Establish a future date and time (approximately four to six weeks after the original fitting) to review the specifications and re-evaluate each specification for accuracy.

During the follow-up evaluation, if a gap exists between player performance and club performance, determine if the gap is caused by the club or the swing. If it is related to the club, a simple adjustment may be required to close the gap; if it is related to the swing, schedule a golf lesson with the player to address the problem.

If the original fitting proves to be accurate, an evaluation of the player's performance should be performed. Include questions about whether or not the player's scores improved, and whether or not the player is having more fun than he or she was before the initial fitting.

CONCLUSION

This lesson provides an understanding of how to effectively conduct a golf club fitting based on ball flight evaluations, and how to make equipment recommendations, alterations, and performance upgrades that optimize player performance and learning. At this point, the apprentice should be able to demonstrate the art of dynamically fitting clubs and properly using the tools necessary to accurately determine the best-fit clubs for a player.

One of the goals of the PGA PGM program is to leave the apprentice with the certainty that golf clubs can and do have a significant influence on ball flight and that the player's reaction to that ball flight has an effect on the player's swinging motion. Therefore, to be completely effective in the teaching and learning of golf, the equipment must be taken into account to get the desired result from both the teacher and the player. The desired result is a player being rewarded with optimum ball flight after making an optimum golf swing with a properly fitted golf club.

In general, swing issues caused by golf clubs that do not fit can only be alleviated by fixing the cause of the problem—in other words, the clubs. Removing the cause of the swing issue can allow for accurate ball flight feedback (that is, the ball goes where the club says it should at impact). Swing corrections are simpler when this happens, and the result of a club fitting session should provide a better golf swing, lower scores, and more fun for the player.

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PGA PROFESSIONAL GOLF MANAGEMENT

ADVANCED TEACHING AND GOLF CLUB FITTING

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