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CHAPTER 21

Why Does Traditional Training Fail to Optimize Playing Performance?

Robert W. Christina, University of North Carolina, Greensboro
Eric Alpenfels, Pinehurst Golf Institute, North Carolina

ABSTRACT

This is a position paper in which we argue that traditional training (instruction and practice) often fails to optimize playing performance on the course mainly because it does not encourage students to learn to perform golf skills within a playing context as does transfer training. With traditional training, students are taught and practice golf skills in ways and under conditions that are somewhat different than what they experience during play. Thus, many of the ways in which and conditions under which golf skills have to be performed on the course are not practiced and learned. Consequently, essential physical and cognitive skills, pertinent cognitive processing and knowledge applications that are needed to optimize performance during play are not learned during traditional training. We argue that the resulting effect is less than optimum transfer of performance from the practice range to play on the course because students cannot transfer what they have not learned. However, the concern is not with the value of traditional training, but that it is used exclusively or too much and often when transfer training is more appropriate.

Key words

Training, Practice, Transfer, Performance

INTRODUCTION

This is a position paper that addresses what we think is one of the most important unanswered questions golf, which is "why does traditional training (i.e., instruction and practice) often fail to optimize playing performance?" Why is it that players seem to be unable to transfer much of the good performance they experience on the practice range to their play on the golf course? If we turn to the available research literature for the answer, we find some bad news and some good news. The bad news is that there is a limited amount of research on training in golf. Most of what is known about golf training comes from expert players, teachers and coaches who over the years have reported on how they or their students have trained to become successful (e.g., Ericsson, 2001). Indeed, the ways in which players are taught and practice have largely emanated from the arts of practice and although some of the traditional ways of training appear to benefit playing performance, others seem to be somewhat questionable. Clearly, the effectiveness of traditional ways of training as well as new training concepts and methods that emerge should be validated by research if golf training is to become more scientifically based. Unfortunately, that will take time and teachers, coaches, and players can't wait (nor should they) for this to happen. So, what should they do? The good news is that there is an abundance of basic research (e.g., Hall and Magill, 1995; Shea and Kohl, 1991; Shea *et al*., 2000; Shea and Morgan, 1979; Wright, *et al*., 1992) on training involving motor skills from which they can draw to make generalizations about training in golf (for reviews see e.g., Adams, 1987; Christina, 1997; Christina and Bjork, 1991; Christina and Shea, 1993; Lee, *et al*., 1994; Magill and Hall, 1990; Magill, 1992, 1994; Schmidt and Bjork, 1992; Schmidt and Lee, 1999, pp . 285-321, 385-408; Wright and Shea, 1994).

We anticipate and there is some evidence (e.g., L. Marriott, personal communication, March 13, 2001; Martino, 2001) that as more and more players, teachers and coaches become aware of the findings generated from training research (especially in motor skills), the more likely it is that they will attempt to apply these findings to improve their golf performance. The danger, of course, is that direct application of findings and predictions from basic research on motor skills often will not work, which is why more applied research on training in golf is needed (Christina, 1987; 1989). You see, to determine scientifically if basic research findings and predictions about training actually hold in golf, applied research such as the study conducted by Damarjian (1997) that directly tests the appropriateness of these findings and predictions in golf settings will have to be conducted. Often it is simply not possible to move from basic research findings or predictions directly to practical application without at least one or more intervening steps of applied research being conducted. We think there are at least three major questions that need to be addressed by this applied research. First, do the findings and predictions about training using laboratory and non-golf tasks that emanate from the existing research literature actually hold for golf? Second, how effective are the traditional training methods currently

being used that have been handed down to us over the years from expert players, teachers and coaches? And third, are there new alternative methods or ways to structure training that are more effective than the traditional ones? The answers to these questions should put us well on our way to developing a scientific basis for golf training.

We deliberately take a position in this paper when addressing the question of why traditional training often fails to optimize playing performance. The reason for taking a position was not only to systematically interpret the literature to address the question, but also to stimulate and provide some direction for future research on golf training. Although we think that the position taken, including our generalizations, arguments, explanations and predictions are correct, we acknowledge that (a) they must be validated by research that directly tests their appropriateness for optimizing playing performance in golf, and (b) alternative interpretations and positions are possible.

A basic assumption underlying this paper is that the ultimate goal of training is to promote the learning of golf knowledge and skills so that people can optimize their chance of consistently playing their very best (i.e., to their full potential) on the golf course. How well golfers perform when they play partly depends on how well they retain the prerequisite knowledge and skills of the game that were taught, practiced and learned on the range and how well they transfer them to their play on the course. Retention, especially long-term retention, may be thought of as the durability of what was learned. It refers to the extent to which training conditions yielded a level or completeness of learning that supports golfers' performance under essentially the same conditions after a period of time in which no training has taken place. Transfer may be thought of as the flexibility of what learned. It refers to the extent to which training conditions yield a level or completeness of learning that prepares golfers to perform on the course under conditions that may range from being very similar to somewhat different from the training conditions. Clearly golfers must retain what they have learned in training in order to transfer it to their play on the course. However, retention is no guarantee that transfer will occur, especially when playing conditions differ somewhat from training conditions and players do not perceive the similarities between the two conditions that are essential for transfer to occur (e.g., Gick and Holyoak, 1987).

Central to this paper is understanding that what is learned, retained and transferred is greatly influenced by the structure of training (e.g., Christina, 1996a, 1996b; Christina and Bjork, 1991; Druckman and Bjork, 1994, pp. 25-56; Lee *et al*., 1994; Schmidt and Bjork, 1992; Schmidt and Young, 1987; Shea *et al*., 2000). The implication for golf is that the ways in which and the conditions under which players are taught and practice can have a major impact on whether or not the essential golf skills and playing components are learned and also on how well they are retained and transfer to play on the course. One major limitation of traditional training is that it is not designed to encourage players to learn to perform golf skills within a playing context. Thus, many cognitive and physical skills (including the ways in which and the

conditions under which they are used), cognitive processing and knowledge applications that are needed during play are not taught, practiced and learned, which means that they cannot be retained and hence, transferred to play on the course. Let's compare traditional training with an alternative approach that we refer to as "transfer training" in an effort to explain in more detail why we think traditional training often fails to optimize playing performance.

TRADITIONAL TRAINING VERSUS TRANSFER TRAINING

There have been some very interesting basic research findings emanating from studies (e.g., Hall and Magill, 1995; Shea and Kohl, 1991; Shea and Morgan, 1979; Wright *et al.*, 1992) on motor learning over the past 25 years which suggest that some of the traditional ways in which we have trained to acquire golf skills may be less than optimum for enhancing learning and performance in the long term, and for enhancing their transfer from the practice range to the golf course (for similar arguments see e.g., Christina and Bjork, 1991; Farr, 1987; Lee *et al.*, 1994; Schmidt and Bjork, 1992; Schmidt and Lee, 1999, pp. 285-321, 385-408). The traditional training conditions in question are those that not only make it easier for students to perform golf skills on the practice range or putting green, but at the same time encourage them to be more passively involved in the learning process and therefore, less cognitively involved. With traditional training (a) students are given immediate feedback or instruction after each swing, (b) they hit balls repeatedly the same distance with the same club from good and level lies, (c) they stroke putts repeatedly from the same distance (d) they do not rehearse their pre-shot routine, and (e) they do not simulate competitive conditions to practice like they play. We argue that such conditions are likely to produce a level of learning that will enhance performance on the practice range or putting green, but not a level of learning that will enhance its transfer from the practice range to the golf course. Indeed, if the latter prediction is correct, future research also may find that traditional training conditions promote a false sense of confidence in golfers by deceiving them into thinking that the enhanced performance experienced on the practice range will transfer to the golf course when they play the game. A recent study (Simon and Bjork, 2001) suggests that this may be a likely possibility.

Traditional training may be viewed as more of a part-practice method that is useful for learning and enhancing the retention of fundamental or advanced golf skills, and for correcting or refining previously learned skills. It is especially useful when skills or corrections are complex and difficult to perform or when more emphasis needs to be placed on them in terms of repetitive practice. Traditional training appears to be well suited for enhancing the transfer of performance of the specific skills rehearsed on the practice range back to the practice range, or to play on the course when the conditions are highly similar to those on the range. However, we argue that traditional training is not the most appropriate way of optimizing the transfer of performance from

the practice range or putting green to play on the golf course because it does not encourage students to learn on all of the essential skills (cognitive and motor), pertinent cognitive processing and knowledge applications that will be needed when they play the game. Essentially, it does not encourage students to practice the skills that are learned during training under the same conditions and in the same ways they will have to be used during play.

An alternative approach that does adequately simulate playing conditions and encourage students to practice as they play is what we refer to as transfer training. Transfer training encourages students to practice all of the golf and cognitive skills, cognitive processing, and knowledge applications that are needed during play. Also, it encourages students to practice these essential skills and playing components in the same ways they will have to be used during play on the golf course and under similar conditions. Conversely, traditional training encourages students to neglect the practice of some essential skills and playing components and to perform the skills that are practiced in ways and under conditions that are somewhat different than the ways in which and conditions under which they will have to be performed during play on the course. Thus, transfer training encourages the instruction and practice of golf skills more within a simulated playing context, whereas traditional training encourages the instruction and practice of golf skills more independent of the playing context. In other words, transfer training encourages more specificity in learning that traditional training because instruction and practice take place in more of a simulated playing context. We propose that this specificity is essential to optimize transfer of learning and performance from the practice range to play on the course and there is some evidence that suggests that this proposal may be correct (e.g., Schmidt and Lee, 1999, pp. 318-321, 402-408; Wright and Shea, 1994). However, further research is needed before the validity of this proposal can be ascertained.

Augmented Feedback and Instruction During Traditional Training

Let's examine the manipulation of augmented feedback and instruction to provide an example of how they are used during traditional training. How often do teachers and coaches inadvertently make practice easier and less like actual playing conditions for their students by habitually giving immediate feedback and instruction after each swing or putt they perform; telling and showing them everything they need to know and do before they perform their next swing? We know this approach can be useful for learning fundamental skills, correcting or refining previously learned skills, and enhancing retention, but we argue that it is less than optimum for facilitating transfer of performance from the practice range to play on the golf course.

We predict that teachers and coaches who habitually give immediate and frequent feedback or instruction to students during training are likely to produce a level of learning that can enhance performance at that time on the practice range, but not a

level of learning in their students that can support the transfer of performance from the practice range to the golf course. One possible explanation for this prediction is that giving immediate and frequent feedback or instruction encourages students to become more dependent on the teacher and coach to do their thinking for them and thus, they are less cognitively engaged in the learning and performing process. The less cognitively engaged they are, the lower or less complete the of level learning and there is considerable amount of evidence to suggest that the lower or less complete the level of learning, the less the long-term retention (e.g., Christina and Bjork, 1991; Farr, 1987; Hurlock and Montague, 1982; Lee *et al*., 1994). Although this prediction appears to be reasonable, further research is needed to determine its validity in golf settings.

Further, we argue that making a habit of providing immediate and frequent instructional feedback encourages students to be less cognitively engaged and think less for themselves about such things as their swing or putting technique and any adjustments that should be made before playing the next shot. This is very different than what students must do when they play. They are not training how to evaluate their performance and then make the necessary corrections in their next shot when needed. Thus, they are not training how to become their own teacher or coach. Indeed, they are training in a way that is very different than the way in which they will have to play, which is unlikely to facilitate transfer of their performance from the practice range to their play on the golf course. Of course, the validity of this argument within a golf context remains to be determined by future research.

Augmented Feedback and Instruction During Transfer Training

Now let's examine the manipulation of augmented feedback and instruction during transfer training. Giving delayed and less frequent feedback or instruction (i.e., summary feedback and instruction) during practice tends to produce a level of learning that will impair performance at that time on the practice range, but enhance performance in the long term and its transfer from the practice range to the golf course. This prediction is grounded in basic research evidence (e.g., Lee *et al*., 1994; Schmidt and Bjork, 1992; Wright and Shea, 1994). One possible explanation underlying this prediction is that giving delayed and less frequent feedback or instruction during practice encourages students to think more for themselves and become less dependent on the teacher or coach to do their thinking. Thus, students are more cognitively engaged in the learning and performing process and the more cognitively engaged they are, the higher or more complete the level of learning, which should increase the chance of transferring performance from the practice range to the golf course. As intuitively appealing as this prediction may seem, it has yet to be validated by golf research.

Encouraging students to be more cognitively engaged and to think for

themselves about things such as their technique in relation to the last shot and any adjustments that have to be made before playing their next shot is quite similar to what they must do when they play. Indeed, they are training how to analyze and evaluate their own performance and then make corrections in their next shot if needed. In effect, they are learning to be their own teacher or coach. Thus, they are training more like they will have to play, which we hypothesize is likely to facilitate transfer of their performance from the practice range to their play on the golf course.

How often do teachers and coaches make practice more like play and encourage their students to be more cognitively involved in the learning and performing process by letting them perform several swings before they provide some form of relevant summary feedback or instruction? How often do they let their students alone after several or more swings and encourage them to evaluate their own technique and try to make corrections for themselves? How often do they engage their students in analyzing and correcting their own swing or putting technique? For instance, after several swings or when showing them a videotape of their swing, or their swing relative to an expert's swing, how often do teachers and coaches ask students questions that help guide them to discover how to analyze and correct their own technique? When such approaches are used, students are actually being encouraged to train more like they play at least in the sense that they have to evaluate and correct their own swing or putting technique when they play. They are also encouraging their students to be more cognitively involved in the learning and performing process and to take more responsibility for their own learning and performance. These are some of the feedback and instructional features inherent in transfer training that are not present in traditional training.

There is an old Chinese proverb that goes something like this, "We hear and we forget. We see and we remember. We do and we learn." And by "do" and "learn" we mean to do and learn cognitively as well as physically. In golf, we usually can count on the physical skills being practiced, but the relevant cognitive skills, knowledge applications and thought processes such as those involved in a pre-shot routine are often neglected. For training to be effective, argue that students must not only use traditional training to learn fundamental or advanced skills, correct and refine previously learned skills and enhance retention, but also transfer training to learn all of the knowledge and skills (cognitive and physical) that will be needed when they play. We also think that much of the art of teaching and coaching during transfer training should be the art of assisting discovery and rather than directly telling and showing students everything they need to know or do as is often done in traditional training. We think it is more the pedagogical method during transfer training than the content that is the message; more the drawing out, than the pumping in of information to students that will ultimately enhance transfer of performance from the practice range to their play on the course. Michael Hebron, PGA Master Professional, has been a long and strong advocate of learning golf through self-discovery and his recent book (Hebron, 2001) captures the essence of this pedagogical approach. Of course, what we have proposed

in this section has yet to be validated and hence, should be a target of future golf research.

Level of Learning and Practice

It has been known for some time that increasing the amount of quality practice can increase the level of learning, which is likely to enhance long-term retention and transfer (e.g., Christina and Bjork, 1991). Taking the lead from Hurlock and Montague (1982) and Farr (1987), we propose that, in addition to increasing the amount of quality practice, any variable (e.g., manipulation of practice variability, augmented feedback, and contextual interference) that can help students achieve a higher or more complete level of original learning or mastery of the task is capable of enhancing its long-term retention and transfer. For instance, delaying or giving less frequent feedback or instruction during practice, or using more variable practice within and among motor skills, or increasing the amount of contextual interference during practice by simulating playing conditions may be conceptualized as being functionally equivalent to increasing the amount of quality practice.

In other words, the level of learning during practice is being indirectly increased by appropriately manipulating such variables and hence, may be conceived as an analog to directly increasing the level of learning by increasing the amount of practice. In golf, appropriate manipulation of these variables would actually create transfer-training conditions that would make practice more like we play and learning more specific to the way we play. The resulting effect would be that golf skills would be more difficult to perform in transfer practice than in traditional practice. Appropriate manipulation of these variables also would encourage students to be more cognitively engaged in the learning and performing process, which should produce a higher or more complete level of learning and hence, facilitate positive transfer. What we have just proposed may be intuitively appealing, but it is based on a limited amount of research from fields other than golf. Thus, further research is needed within a golf context before the validity of what we proposed can be ascertained.

PRACTICE THE WAY YOU PLAY TO OPTIMIZE TRANSFER

The best way to increase your chance of playing better on the golf course is to practice the way you will have to play on the golf course. When you practice under simulated playing conditions you are actually using what we have referred to as transfer training. One prediction emanating from existing research evidence involving cognitive and motor learning is that the greater the similarity between the knowledge applications, cognitive processing, and skills (cognitive and physical) practiced on the range and those that will have to be used during play, the greater the chance of positive transfer

occurring (e.g., Christina and Bjork, 1991; Druckman and Bjork, 1994, pp. 25-56; Schmidt and Lee, 1999, pp. 285-321, 385-408). Another prediction is that knowledge and skills should not only be the same in both practice and play, but the ways in which and the conditions under which they are practiced and used or applied should be the same or quite similar to ensure learning of appropriate cognitive processing, which can enhance the chance of transfer taking place. The similarity of goals and cognitive processing between practice and play is important for transfer of learning (e.g., Christina and Bjork, 1991; Schmidt and Lee, 1999, pp. 285-321). We propose that the chance of obtaining positive transfer is more likely when the goals are similar in both practice and play and when performers cognitively process skills in practice and play in a similar way so that compatible responses in both practice and play are developed.

How Did Hogan and Nicklaus Practice?

Ben Hogan (1948, p. 172) knew this in 1948 when he wrote, "While I am practicing I am also trying to develop my powers of concentration. I never just walk up and hit the ball. I decide in advance how I want to hit and where I want it to go. Adopt the habit of concentrating to the exclusion of everything else while you are at the practice tee, and you will find that you are automatically following the same routine while playing a round in competition." Jack Nicklaus (1974, p.197) knew it too and shared it with us when he said, "All my life I've tried to hit practice shots with great care. I try to have a clear-cut purpose in mind on every swing. I always practice as I intend to play. And I learned long ago that there is a limit to the number of shots you can hit effectively before losing your concentration on your basic objectives." It appears that Hogan and Nicklaus attempted to practice as they played. They seem to have practiced the same knowledge, skills (physical and cognitive) in the same ways they would have to be used when they played. In other words, they seem to attempt to simulate playing conditions as much as possible during their practice.

Based on this evidence from two expert players and from the arguments presented earlier that are largely grounded in basic research, it seems reasonable to argue that the knowledge and skills practiced on the range should not only be the same as those used during play on the course, but they also should be used in the same ways and under similar conditions. Only when this is done will we overcome some of the limitations of traditional training and increase the chance of positively transferring what is practiced and learned on the range to play on the golf course.

How Do Many Others Practice?

All too often physical golf skills and related cognitive skills and processing as well as

the knowledge that needs to be applied are not learned together when traditional training methods are used. When students use traditional practice, for instance, they are actually learning only part of all that they need to learn to perform well when playing on the golf course. That is, they are learning some of the physical golf skills and little or none of the related cognitive skills and processing or knowledge applications that will be needed to perform successfully when playing on the course. The resulting effect, which should be of no surprise, is that students do not perform as well on the golf course as they did on the practice range because they cannot transfer to their play on the course what they have not learned to use on the practice range. Thus, we argue that to develop a level or completeness of learning that is capable of supporting golf performance when playing the game, the knowledge and skills should not only be the same in both practice and play, but the ways in which and the conditions under which they are used or applied should be the same or very similar to ensure transfer of appropriate processing.

These skills to which we refer include not only the physical ones such as the shots students must learn to play with different clubs, but the cognitive ones as well such as those involved in planning or visualizing a shot or putt. Often when students are taught to practice in traditional ways, important knowledge, cognitive skill components as well as processing, and even some physical skill components are neglected. For instance, suppose students rarely if ever practice the pre-shot routine they use when they play. When practicing on the range, they take their stance and grip on a club, and then proceed to hit balls repeatedly and at a rapid pace with little or no change in their stance or grip. In effect, they are practicing mainly how to execute the physical swing component that produces the shot, but not practicing some highly related cognitive and physical skill components as well as cognitive processing that are not only a very important part of playing the shot on the course, but that also actually help set up the repeatability and effectiveness of the physical swing itself. With such a traditional approach they are not practicing certain essential skill components and they are not practicing them in the same ways and under the similar conditions that they will have to be used during play to ensure transfer of appropriate processing. The skill components and processing to which we refer include how to (a) decide and plan the best shot to play; (b) visualize the shot; (c) take aim at the target and select an intermediate target, if used; (d) activate any pre-swing thoughts that help establish stance, grip, and set up; (e) the assume the their grip on the club; (f) take their stance; (g) position the ball; (h) align their body in relation to the target or some intermediate target and to the particular swing they are planning to execute and (i) activate the appropriate swing thought(s) before executing the swing.

Another thing players do when they play is hit successive shots with different clubs rather than the same club, except when they take more than one putt or when they have missed a shot or hit it out of bounds. For example, on a four-par hole players might hit a driver, five iron, and putter for one or two putts. However, how often do teachers and coaches have their students practice hitting successive shots with different

clubs to simulate the way they will have to play holes on the golf course? Moreover, even though their students may stroke successive putts with their putter when they practice, how often do they stroke these putts from different distances to simulate the distances they are likely to encounter when they play? If their students only practice hitting successive shots the one distance with the same club, we predict that they will get better at hitting successive shots the one distance with the same club. However, if they also practice hitting successive shots with different clubs, we predict that they will get better at hitting successive shots with different clubs, which is what they must do when they play. Moreover, if they also practice hitting successive shots different distances with the same club, they should get better at hitting successive shots different distances with the same club, which is what they must do when they play.

How often do players simulate finishing the hole by continuing until the putt is holed out? Some iron shots will hit greens in regulation and some will not. When a green is missed, they must "get up and down" which means that they will have to chip, pitch, lob or play a sand shot to get the ball on the green so that they can putt. How often do you see players practicing the different ways they will have to "get up and down" on the golf course when they play? For example, how often do you see players practice either chipping to the hole or hitting a sand shot and then putting until the ball is holed out? If players practice finishing the hole, we predict that they will get better at finishing the hole.

How often do players try to simulate the competitive pressure of playing the game when practicing? For instance, how often do they try to imagine that the next shot they practice is a crucial one to execute successfully so that they can be positioned to shoot their lowest score to win a competition? Or, how often do they to compete with other players on the practice range to see who hit successive shots with different clubs more accurately or in various ways? How often do they compete with other players on the practice range to see who can more accurately hit successive shots different distances with one club such as a wedge? How often do they compete with other players around the putting green to see who can "get up and down" in the fewest number of strokes? If they always practice performing those shots and putts in the absence of competitive pressure, we predict that they will get better at performing those shots and putts in the absence of competitive pressure. However, if players practice performing those shots under competitive pressure, we predict that they will get better at performing those shots under competitive pressure, which is what they must do when they play.

How often do players practice hitting shots on the range under conditions that are similar to the conditions are likely to encounter when they play on the course? For example, how often do players practice hitting iron shots from poor lies in the fairway, rough and sand? How often do they practice hitting iron shots from uneven lies that are uphill, downhill and side-hill? If they do not practice under these conditions, they will not learn the special techniques that are necessary for them to play these shots successfully on the course. If they only practice hitting shots from good and level lies,

we predict that they will get better at hitting shots from good and level lies. However, if they hit shots from all types of lies, we predict that they will get better at hitting shots from all types of lies, which is what they must do when they play.

Actually, the neglect of certain skill components and related cognitive processing while practicing others, is more a form of part practice and less a form of whole practice. Part practice on the range is likely to produce a level of learning that supports transfer of performance of the component parts practiced more to the range than to play on the course. Indeed, it is possible that the level of learning produced by part practice does not even transfer easily to support performance of the whole skill when parts practiced are combined with the unpracticed parts that make up the whole skill. Eventually, all of the component parts of the whole skill should be practiced together in order to enhance the chance of positive transfer taking place. There is nothing wrong with part practice and certainly there are times when it is appropriate to use such as when learning fundamental or advanced skills or skill corrections that are too complex and difficult to practice as a whole. However, eventually all the parts of the whole skill should be practiced together to enhance the chance of positive transfer taking place.

CONCLUDING REMARKS

As noted at the outset of this paper, we have taken a definite position and some liberty when interpreting the research literature to make a number of generalizations about why traditional training often fails to optimize performance in golf. It was our hope that taking such a position would not only address the main question of this paper, but also stimulate and provide some direction for future research on training to optimize playing performance in golf. As intuitively appealing as our interpretations and position may be, however, we acknowledge that (a) they need to be validated by the scientific rigor of research that directly tests their appropriateness for optimizing playing performance in golf, and (b) alternative interpretations and positions are possible. Having said that, we now turn to the main question addressed in this paper.

So, why does traditional training often fail to optimize playing performance in golf? Essentially, we argue that traditional training does not sufficiently encourage students to learn to perform golf skills within a playing context. Consequently, if students train only in traditional ways, it is unlikely that they will learn to perform all of the golf and cognitive skills, cognitive processing and knowledge applications that they will need to optimize their play on the course. If they train only in traditional ways, it is unlikely that they will learn to perform the golf skills that are practiced in ways that are similar to the ways that will be needed and under conditions that will be experienced when they play on the course. In fact, when only traditional training is used, students practice and learn to play shots on the range in ways that are largely different than the ways in which they must play shots on the course.

We are not saying there is no place for traditional training in which students are told and shown what to do and then asked to hit repeated shots the same distance with the same club or putter. Certainly there is and it should be used when the goal of training calls for it. Examples include learning a new swing or putting stroke, or learning a swing or putting stroke change, or learning to refine, maintain or strengthen a swing or putting stroke. Anytime fundamental or advanced golf skills or changes in them need to be learned and strengthened, especially when they are complex and difficult to perform, or when extra emphasis needs to be placed on them in the form of practice repetition, traditional training is appropriate to use. Our concern is not with the value, importance or benefits of traditional training, but that it is currently used exclusively or too much and often when transfer training is more appropriate to use. The training methods used should be a function of what we are trying to accomplish, that is, the purpose of our instruction and practice. If we are trying to acquire, refine, maintain or strengthen fundamental or advanced golf skills, then traditional training is certainly appropriate. However, if we are trying to enhance the transfer of those fundamental or advanced skills from the practice range to play on the golf course then transfer training is preferred, largely because it provides an opportunity to learn to perform these skills under simulated playing conditions.

There is no question that both traditional and transfer training should be used because of the unique benefits each approach can contribute to playing performance. How much or when one approach should be used relative to the other so that they compliment each other to help students optimize their playing performance is an important unanswered question that should be a target of future research. For now, however, teachers and coaches will have to rely on their good judgment and common sense to determine how and when to use these two training approaches to best serve the learning and playing performance needs of their students.

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