

ORIGINAL ARTICLE



Golf Coaches Use Tacit Knowledge to Improve Transfer Performance: Understanding the Mediating Role of Transfer Capacity in Golf Coaching

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Submitted March 29, 2021; Accepted in final form June 10, 2021.

ABSTRACT

Background. Golf is relatively new in China, and overall playing skills are low. Although golf coaches are vital in improving golf skills, their teaching skills are underdeveloped. **Objectives.** This study aims to explore how the coach's tacit knowledge affects the transfer performance by exploring the factors that affect the teaching ability of Chinese golf coaches. It aims to improve the teaching efficiency of coaches in physical education and give reference to other sports in teaching. **Methods.** Participants (N=339) included golf coaches from Shenzhen (China) and members of an online golf instructor group. **Results.** (1) The possession of tacit knowledge allows coaches better to transmit that information, both amount and effectiveness. (2) Knowledge transferability improved knowledge transfer performance, mediating the relationship between tacit knowledge and knowledge transfer. (3) Skilled tacit knowledge had more influence on transfer capacity than cognitive tacit knowledge. (4) Absorptive capacity positively regulates transferability and knowledge transfer performance. **Conclusion.** The findings can contribute to developing a theoretical understanding of golf coaching that can improve practice in China, where golf coaching is still at an early stage of development.

KEYWORDS: *Tacit Knowledge, Knowledge Transfer Capacity, Absorptive Capacity, Knowledge Transfer Performance, Golf.*

INTRODUCTION

According to the Forward White Paper (1). Forward Management Group, China's golfing population in 2017 was between 1-1.1 million, with a core population of 380,000 to 390,000. This population is expected to grow steadily with China's accelerated urbanization and industrialization. As disseminators of golf knowledge and skills, golf coaches play a vital role in the sport's development and popularisation. At present, golf coaches in China are divided into professionals and amateurs. Judging from the coaching structure, most junior or intermediate coaches only have an essential ability to play golf. After obtaining a coaching certificate, common problems arise in the teaching of golf coaches, such as ambiguous hints or information given to trainees, lack of

professional terminology; failure to identify and correct issues in trainees' swing learning process; and lack of preparation. Teaching methods are typically old and casual, without the right incentives. These shortcomings are likely because most coaches are self-taught on the driving range and have not been trained through regular coaching courses (2). Although their ability in knowledge dissemination capacity is most likely deficient, very little relevant research is available on this topic in China.

John Wooden was a legendary college basketball coach in the United States. His secret was that 6.9% of his statements to students were compliments, and 6.6% were expressions of displeasure, while 75% were pure information, such as what to do, how to do it, and when to

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intensify an action (3). A golf coach must balance the relationships among the ‘what, how, and when’ triangle of knowledge transfer to teach effectively. What represents the swing technique and method, grip, stance, and forms of explicit knowledge that are easy to convey and learn. When refers to teaching order and rhythm, while how refers to communication between the coach and the trainee, elaborating on how to feel and whether the trainee understands the explicit knowledge imparted. When and how to represent tacit knowledge. Tacit knowledge is widely described in knowledge transfer and the most challenging component. The impartment of tacit knowledge often directly affects trainee’s learning outcomes because tacit knowledge is implicit, highly complex, and related to individual experiences and the resultant habits or ‘tricks of the trade’ (4). Tacit knowledge accounts for nearly 90% of an individual’s total knowledge (5). However, tacit knowledge can be difficult to express clearly or imitate due to its nature (4).

All aspects of golf teaching involve the coaches’ tacit knowledge, as they must attempt to share that knowledge with their students. For example, coaches can observe trainee practice, imitate them to indicate an understanding of the trainees’ game, and then demonstrate a more viable way of solving a given golf problem. Research on the mechanics of tacit knowledge transfer can help coaches convey their expertise more rapidly and effectively. Therefore, this study focused on tacit knowledge among golf coaches in-depth.

We first explored the mechanisms of coach knowledge transfer capacity. Then, we investigated how transfer success is influenced by coach transfer capacity and trainee absorptive capacity, which is the ability to value, assimilate, and apply new knowledge from a learning partner (6). Based on this, on the one hand, based on an in-depth analysis of the tacit knowledge of golf coaches, the objective of this study is to help the coach apply the tacit knowledge to improve their ability of knowledge transfer, to make the coach a qualified coach, to realize the learning and new creation of the trainees’ knowledge, and to promote the improvement of the teaching level of Chinese golf coaches (7); on the other hand, this study aims to give reference to other sports in teaching, especially those sports in the initial development stage.

Conceptualizing knowledge transfer in golf coaching

Relationship between tacit knowledge and knowledge transfer performance

Knowledge transfer is an information dissemination process (8, 9) in which the recipient successfully acquires an understanding of a given topic (10). Although it is challenging to separate explicit knowledge from tacit knowledge in golf teaching, tacit knowledge is considered more important because it comes from long-term practice and personal experience (11).

Nonaka and Konno (12) posit that tacit knowledge includes cognition and skills. Cognitive tacit knowledge combines beliefs, values, and ways of thinking. Although challenging to perceive and express, this type of knowledge strongly influences cognition (13). Cognitive tacit knowledge affects the processing and speed of information transmission and extraction, playing an essential role in understanding new information in a personally relevant way.

Skilled tacit knowledge is specialized, relatively easy to transfer, and has high situational dependence. This knowledge is accumulated through personal experience and repeated experimentation (14). Thus, the category includes skills, techniques, ‘tricks,’ experience, intuition, and inspiration from professionals in a given trade. This kind of tacit knowledge is often derived from a coach’s long-term teaching practice and involves repeated self-reflection and outcome summarisation. Moreover, skilled tacit knowledge is typically stored as specific scenes and is expressed through behaviors that reflect those scenes. When identical or similar scenarios reoccur, these educational experiences allow for rapid decision-making and response. Hence, tacit knowledge plays a decisive role in teaching efficiency and effectiveness.

A coach guides trainees in sports techniques and life skills (e.g., how to think, what to believe, and how to strategically react); these elements are taught through practice and exercises to correct errors (15). Tacit knowledge helps a coach understand individual needs, intuitively facilitating knowledge transfer success. Knowledge transfer success is measured in four ways: (1) amount of knowledge transferred in a certain period, with a high rate of transfer indicating greater effectiveness (16); (2) transfer cost and recipient satisfaction within time and

budget constraints; (3) amount of knowledge acquired by recipients; and (4) degree of internalization by the trainee, measured via possession, recognition, and satisfaction with transferred knowledge (17).

Based on the above analysis, the following hypotheses are proposed:

H1: Skilled tacit knowledge has a significant positive effect on knowledge transfer.

H2: Cognitive tacit knowledge has a significant positive effect on knowledge transfer.

Relationships between characteristics of tacit knowledge and transfer capacity

Knowledge transfer capacity refers to the ability of a teacher to transfer knowledge in an appropriate manner, which accounts for student capabilities and needs through various channels while maximizing the amount of knowledge acquired (18, 19). Further, knowledge transfer capacity is affected by the knowledge that is transferred. For example, explicit knowledge and tacit knowledge have different impacts on transferability. (9, 20, 21).

For tacit knowledge to become explicit, owners (of the knowledge) must find a way to express concepts that can be felt but not explained (22). In an analysis of teachers and students during knowledge transmission, students acquire the teacher's tacit knowledge through formal or informal communication methods while both are manipulating appropriate technical tools. In general, teaching involves conveying a coach's tacit knowledge so that the trainee can understand and apply it in their practice. Some factors that can affect transferability include the coach's amount of knowledge and how that knowledge is conveyed.

Various scholars have proposed that tacit knowledge can be manifested effectively through the communication processes (e.g., in-depth explanation and storytelling) (23), informal communication (e.g., chatting and action learning) (24), and informal mentoring systems (25). Tacit knowledge tends to be action-oriented, making it more dependent on context and experience than explicit knowledge (26).

Based on the current understanding of tacit knowledge, the following hypotheses were proposed:

H3: Skilled tacit knowledge has a significant positive effect on knowledge transfer capacity.

H4: Cognitive tacit knowledge has a significant positive effect on knowledge transfer capacity.

Relationship between tacit-knowledge transfer capacity and knowledge transfer

The most effective form of knowledge transfer occurs when a trainee can integrate newly learned material with existing knowledge (27). Hamel (28) believed that teachers' abilities are limited by their knowledge accumulation and ability to arrange that knowledge accurately. An instructor's knowledge transfer capacity plays a decisive role in the accuracy and comprehensiveness of recipient knowledge (5). Knowledge transfer capacity is also an essential factor affecting the selection of an organization's knowledge transfer mode (13). Those with solid knowledge transfer capacity can choose the most appropriate transfer mode for each situation, maximizing knowledge transfer performance. The significant positive correlation between knowledge transfer capacity and knowledge transfer performance has been empirically verified (9, 29, 30). A coach's knowledge transfer capacity is thus an essential prerequisite for smooth knowledge transfer. Therefore, we hypothesised that:

H5: Knowledge transfer capacity has a significant positive impact on knowledge transfer performance.

H6: Transfer capacity mediates the influence of skilled tacit knowledge and cognitive tacit knowledge on transfer performance.

Absorptive capacity moderates the influence of knowledge transfer capacity on knowledge transfer performance

Trainees' comprehension of their coaches' instructions directly affects transfer success, and their ability to integrate learned information will determine the quality of their performance in the acquired task.

Absorptive ability refers to the capacity of learners to initially understand the knowledge being imparted, gradually absorb it as their own, and finally apply it flexibly (31). Absorptive capacity has two primary elements: the learner's knowledge base and the degree of effort when receiving knowledge (32). The concept has also been expanded into potential and actual absorptive capacity that emphasizes the ability of learners to identify, digest, and flexibly use acquired knowledge (33, 34).

Absorptive capacity accelerates knowledge flow to learners, improving knowledge transfer efficiency and performance (5, 9, 21, 33, 35-37). Moreover, the knowledge source or knowledge creator is considered the best choice for increasing absorptive capacity in learners, with teacher transfer capacity being a major factor affecting how well students learn (6, 21).

Based on these concepts, we propose the following hypothesis:

H7: Absorptive ability increases the influence of knowledge transfer capacity on knowledge transfer performance.

MATERIALS AND METHODS

Measures. The model included five variables: skilled tacit knowledge, cognitive tacit knowledge, knowledge transfer performance, knowledge transfer capacity, and absorptive capacity. Each variable was defined and measured based on relevant research in China and abroad, combined with a survey to ascertain expert opinions. Measures used a seven-point Likert scale, ranging from strongly disagree (1). Forward Management Group, 2017 #1] strongly agree (7).

Skilled Tacit Knowledge. Skilled tacit knowledge in teaching golf was measured using four statements that coaches ranked: (1) 'I have rich experience in various types of golf competitions'; (2) 'I learned the tricks of the trade in the golf swing'; (3) 'I have acquired certain golf teaching skills; and (4) 'I have developed a more systematic philosophy of teaching golf.'

Cognitive Tacit Knowledge. Cognitive tacit knowledge for golf coaches was assessed with six items examining the mind model (goal guidance), teaching beliefs (confidence and enthusiasm), coaching attitudes (willingness to transfer knowledge), teaching concepts (normative ideas), coaching insights (ability to assess learners), and coaching mind-set (training and feedback) (4, 14).

Knowledge Transfer Performance. Indicators of knowledge transfer performance included quantity, time, effectiveness, application, and overall satisfaction (38). This variable was measured using five items: successfully learning the golf swing (number of gains), presence of mental skills required to improve golfing (attention), learning effectiveness of technical swing, overall learner satisfaction, and improved golf swing (16, 30, 32, 33, 39)

Knowledge Transfer Capability. Golf coaches' tacit-knowledge transfer capability was measured with six indicators: controlling cues, judging performance, providing information, demonstration, visual aids, correcting errors, and nurturing motivation (11, 40, 41).

Knowledge Absorptive Capacity. Trainee absorptive ability was measured using six items: understanding acquired knowledge, gaining insight, integration, assimilating their knowledge, performance, and results (6, 30-32, 34).

Ethical Considerations. The data collection process employed in this study fully respected the opinions and dignity of the participants and ensured their privacy. The participant's consent was taken, and we ensured the participants that the data collected were used only for academic research.

RESULTS

Confirmatory Factor Analysis. We verified questionnaire structural validity through factor analysis, with a criterion of factor loadings being > 0.6 for all variables. Questionnaire construct validity was high ($CR > 0.8$; Table 1), indicating that the selected variables comprised the relevant dimensions and measured the intended concepts.

Path Analysis. The model fit coefficient (Table 2) shows that all indices were within acceptable ranges, confirming that the theoretical factor model has good structural validity.

Skilled and cognitive tacit knowledge significantly influenced knowledge transfer capacity, with the former having a stronger effect ($\beta = 0.664$, $P < 0.01$) than the latter ($\beta = 0.485$, $P < 0.01$; Table 2).

Cognitive and skilled tacit knowledge increased knowledge transfer performance, with little difference between their effects (cognitive: $\beta = 0.642$, $P < 0.01$; tacit: $\beta = 0.614$, $P < 0.01$). Transfer capacity also improved knowledge transfer performance ($\beta = 0.728$, $P < 0.01$).

Mediating Effect of Transfer Capability. We analyzed path relations to verify the mediating effect of transfer capability. The total effect of cognitive tacit knowledge on transfer performance was 0.5297, and the mediating effect of transfer capacity was 0.3204. This result showed that both skilled and cognitive tacit knowledge influence knowledge transfer performance through transfer capacity.

Validation of Cross-Group Moderating Effects. Multi-group hypotheses can be used to compare two prediction models: one with

constrained parameters and one with unconstrained parameters. This technique is commonly used to regulate models in empirical research. Using multi-group hypotheses, we examined how absorptive capacity moderates the influence of transfer capacity on knowledge transfer performance (42).

Transfer capacity was compared across groups with high or low absorptive ability. We then compared constrained and unconstrained path models. Significant differences between the models would indicate that absorptive capacity played a

regulatory role, as shown by path coefficient changes in the high and low groups (42). A cross-group adjustment difference verification (Table 3) showed significant between-model differences, confirming a model adjustment effect.

The high versus low absorptive-ability groups were compared on knowledge transfer performance while adjusting for knowledge transferability (Table 4). The differences between the two paths ($\Delta CR = 3.361 > 2.56$) were significant, indicating an apparent regulating effect.

Table 1. Results of the Confirmatory Factor Analysis

Observational Variable	Latent Variable	S.E.	C.R.	P-Value	SFL (β)	SMC	CR	AVE
STK1	Skilled tacit knowledge				0.786	0.617	0.914	0.726
STK2		0.050	18.511	< 0.001	0.893	0.798		
STK3		0.053	18.190	< 0.001	0.887	0.786		
STK4		0.053	16.994	< 0.001	0.838	0.702		
CTK1	Cognitive tacit knowledge				0.781	0.609	0.898	0.594
CTK2		0.069	15.330	< 0.001	0.798	0.636		
CTK3		0.066	15.954	< 0.001	0.817	0.667		
CTK4		0.068	14.041	< 0.001	0.733	0.537		
CTK5		0.073	13.201	< 0.001	0.694	0.481		
CTK6		0.065	15.608	< 0.001	0.795	0.631		
TC1	Transfer capacity				0.890	0.792	0.923	0.706
TC2		0.052	18.449	< 0.001	0.780	0.608		
TC3		0.052	18.101	< 0.001	0.774	0.598		
TC4		0.045	23.890	< 0.001	0.895	0.801		
TC5		0.047	21.927	< 0.001	0.853	0.727		
TP1	Transfer performance				0.894	0.543	0.900	0.643
TP2		0.056	15.898	< 0.001	0.717	0.737		
TP3		0.049	18.443	< 0.001	0.789	0.622		
TP4		0.046	21.999	< 0.001	0.858	0.514		
TP5		0.055	16.465	< 0.001	0.737	0.799		
AC1	Absorptive capacity				0.714	0.509	0.845	0.523
AC2		0.094	12.229	< 0.001	0.760	0.578		
AC3		0.091	12.233	< 0.001	0.748	0.559		
AC4		0.092	11.350	< 0.001	0.691	0.477		
AC5		0.089	11.633	< 0.001	0.699	0.489		

Table 2. Correlations and Covariances. The path means correlations from one concept to another concept.

The Path		Correlation Coefficient	S.E.	C.R.	P
Transfer capacity	← Cognitive tacit knowledge	0.485	0.094	6.983	***
Transfer capacity	← Skilled tacit knowledge	0.664	0.116	8.652	***
Knowledge transfer performance	← Transfer capacity	0.728	0.109	9.696	***
Knowledge transfer performance	← Skilled tacit knowledge	0.614	0.101	8.267	***
Knowledge transfer performance	← Cognitive tacit knowledge	0.642	0.093	8.480	***

S.E., standard error; C.R., critical ratio.

Table 3. Mediating effect of knowledge transfer capacity on tacit knowledge and knowledge transfer performance

X on Y	Direct Effect	Indirect Effect	Boot SE	Boot LLCI	Boot ULCI
STK on KTP	2093	3204	0576	2138	4388
CTK on KTP	3693	2188	0493	1307	3258

Note: STK, skilled tacit knowledge; KTP, knowledge transfer performance; CTK, cognitive tacit knowledge.

Table 4. Difference validation adjusted across groups

	DF	CMIN	P
Unconstrained model	20	46.487	0.001
Completely constrained model	21	64.211	0
Comparison of models	1	17.724	0

Note: CMIN, chi-square (minimum value of the discrepancy); DF, degrees of freedom

DISCUSSION

This study demonstrated that tacit knowledge improves both knowledge transfer capacity and performance. First, possession of tacit knowledge allows coaches better to transmit that information, both amount and effectiveness. Coaches who possess tacit knowledge of technical skills (e.g., grip, aim, setup, swing plane, lever system, timing, release, impact) and tournament experience were more equipped with the necessary foundation for effective dissemination of golf skills. Similarly, a coach's cognitive tacit knowledge (e.g., temperament, attitude, belief, perception, enthusiasm) can reduce student confusion and build confidence, thus providing a core belief based on solid technical principles and allowing smoother knowledge transfer. As with skilled tacit knowledge, the amount of cognitive tacit knowledge directly affects knowledge transfer performance. For example, a very charming golf instructor will succeed in helping their students learn.

Second, knowledge transferability improved knowledge transfer performance ($\beta = 0.728$, $p < 0.01$), mediating the relationship between tacit knowledge and knowledge transfer. Thus, both skilled and cognitive tacit knowledge affect transfer performance through transfer capacity. Coaches differ in their ability to express tacit knowledge; therefore, to avoid confusion, coaches should communicate in easily comprehensible common language, avoid overly complex words or phrases, and use golf terminology to promote trainee understanding. Conveying different tacit knowledge may require different teaching methods, including visual teaching aids, such as videos, still pictures, or demonstrations. This variety of tactics can achieve clarity and maximize transfer performance.

Third, skilled tacit knowledge had more influence on transfer capacity than cognitive tacit knowledge ($0.664 > 0.485$), indicating that the transfer of skilled tacit knowledge is easier and better mastered. Not all of a coach's tacit

knowledge is systemic; some are fragmented educational wisdom conveyed casually. Therefore, golf coaches must recognize that teaching golf is much more than understanding the sport's mechanics and involves the arguably more essential elements of faith, temperament, attitude, enthusiasm, perception, and insight. A coach must clearly understand applying a paced, selective variety of media and verbalization to communicate their inner wisdom on technical aspects. Doing so allows instructors to form more apparent teaching concepts and develop norms that convey their tacit knowledge and improve the transferability of the coach, thus enhancing the transfer effect.

Fourth, student absorptive capacity positively regulates transfer capacity and knowledge transfer performance. Assessing how well trainees understood what they were taught affects knowledge transfer performance. Therefore, coaches should assess trainees' comprehension and receptiveness, identify deficiencies and shortcomings, summarise and develop their strengths, present objectives clearly, keep tasks simple, and make tasks sequential. Methods to achieve this include drills, manipulation, and learning aids to help trainees complete their training more effectively. Additionally, coaches should ask questions to determine trainees' understanding and provide feedback. Such interaction can stimulate trainee enthusiasm for learning.

Knowledge transfer performance can be improved through tacit knowledge, transfer capacity, and knowledge absorptive capacity.

First, coaches should aim to improve their skilled tacit knowledge and understand how to teach golf. A coach serves as a facilitator, motivator, and counselor but cannot be the performer. A coach's fundamental job is to simplify learning as much as possible and minimize the time required to learn. Moreover, coaches should effectively combine visual, dynamic, and language-based information to provide specific guidance based on individual aptitude. Demonstration and communication improve effective pedagogy's 'how' and 'when.'

Second, coaches need to establish a method to improve transfer performance from cognitive tacit knowledge. Based on our study, a process represented by the acronym TEDCA-‘Target’ (setting a goal), ‘Evolution’ (assessing trainees’ competencies), ‘Do’ (start teaching), ‘Correct’ (modification through assessment of trainee behavior), and ‘Action’ (practice more to promote trainee performance) can be utilized. Coaches should have clear objectives for each stage of training and establish the scientific nature of their methods, giving trainees clear objectives and action plans. Examples include swinging one’s arms with proper weight transfer, swinging a golf club with appropriate rhythm and control, swinging a club held at the neck in a two-lever action, and timing the release. To improve accuracy and fairness, coaches should correctly demonstrate skills at an average speed to retain essential timing.

Additionally, coaches must show patience, concern, compassion, and the capacity to value their students’ dignity. All golf teaching, including error correction, should lead toward improving technique. At the same time, teaching methods and content should vary according to student personality and ability. Such adjustments will significantly improve golf swing skills and knowledge transfer performance.

Third, coaches should establish the cognitive-associative-autonomous learning process according to trainee learning ability. Learning new behavior occurs through practice. Students must make consistent efforts to implement instructor-suggested changes. Students should also understand the task, goal, and meaningfulness while consistently applying their coach’s knowledge and experience to the practice. Coaches should focus on improving trainee concentration and guide them toward practicing independently. As practice is essential to acquiring skills, coaches should give trainees timely feedback to prevent the development of

incorrect habits. Appropriate practice will produce the consistent performance that can generate self-confidence and competence, thus enhancing knowledge transfer.

ACKNOWLEDGMENTS

This study was supported by Guangdong Province High-level University Foundation, Jinan University, Shenzhen, China (grant number: 88018052).

CONCLUSION

In summary, this study investigated how tacit knowledge of golf coaches can improve knowledge transfer performance. The coach should consider students’ aptitude, especially in terms of absorptive capacity, especially when efficiency is improved. This is a great inspiration for the teaching of Chinese golf coaches and can also give thought to the improvement of teaching efficiency in other sports.

APPLICABLE REMARKS

- This article provides detailed suggestions for the unpredictable situation of golf coaches. These suggestions might help guide them through training in the future effectively. The theoretical model constructed for tacit knowledge transfer can be applied to research on other sports.
- This study has some limitations. For instance, the model was constructed solely on transfer and absorption capacities, but variables such as satisfaction, loyalty, and learning burnout could also have been included. Future studies should consider including other variables contributing to knowledge transfer performance, such as coaches’ sense of well-being or self-efficacy.

CONFLICTS OF INTEREST

The authors declare no conflict of interest regarding the publication of this study.

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