**Models Based Practice in Chinese College Physical Education**

by

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## Abstract

Research has supported that Sport Education (Siedentop, 1994; Siedentop, Hastie, Van der Mars, 2020) and Play Practice (Launder, 2001, 2013) in physical education can efficiently promote teaching and learning for both teachers and students. The majority of Sport Education and Play Practice studies have been designed and reported in Western countries, such as Europe (Reid, 2003), Australia (Alexander &Luckman, 2001), New Zealand, and the United States of America (Hastie, 1998). Limited research has been completed regarding the use of Sport Education (Chen, Sinelnikov, & Hastie, 2013; Kao, 2019) and Play Practice to develop students' self-determination, skills, tactical competencies, and pre-service teacher's content knowledge in Asia. There is a cultural difference between Western countries and the continent of Asia. Whereas, to implement and validate Sport Education and Play Practice in Asia warrants examination.

This research adopted two physical education models, Sport Education and Play Practice in Chinese college physical education, to investigate (1) if Sport Education can integrate into a physical education club (the sports club is a physical education that provides more flexibility and choice in terms of multiple attendance options), (2) what extent Play Practice can develop college students' skill and tactical competencies, (3) if Play Practice can expand Chinese pre-service teacher's content knowledge development in badminton. The participants in this study attended from a normal university located in central China. This dissertation consists of three independent studies. The participants in the first and the second studies were non-physical education majors. For the class structure, the first study included one intact college physical education club in basketball. Moreover, the participants of the second study contained one

Chinese cohort consisting of 36 university students. They were evenly and randomly assigned to Play Practice (n = 18) or Skill Instruction (n = 18). The third study participants were 36 pre-service teachers (31 males, 5 females, age 21 ± 1.0) who were majoring in physical education at this university.

Results indicated (1) Sport Education significantly increased students' attendance and class engagement in the basketball club. Integrating Sport Education to a physical education club within a Chinese university was particularly promising. (2) Play Practice can effectively develop college students' fundamental skills and game play aspects simultaneously without negatively influencing the transfer effect from practice to games. (3) Play-Practice can improve Chinese physical education pre-service teachers' skills, tactical understanding, and specialized content knowledge (SCK) in badminton except for the game performance. With the positive results, Sport Education can improve Chinese in-service teacher's teaching and enhance Chinese college students' learning as well. In terms of Play Practice, both Chinese college students and physical education pre-service teachers could benefit from skills, tactical understanding, and game competencies. Furthermore, Play Practice also facilitated pre-service teachers' content knowledge development in badminton. We suggest the Physical Education Teacher Education program considering apply Play Practice to their program training for physical education pre-service teacher content knowledge development.

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*Learning by doing – John Dewey*

*I hear and I forget, I see and I remember, I do and I understand – Confucius*

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# Chapter 1

## Introduction

In most countries across the globe, there are either legal requirements for physical education, or it is a matter of general practice for both boys and girls at least at some age/stage or phase of compulsory schooling years (Hardman, Routen, & Tones, 2014). With respect to opportunities for physical education in post-compulsory education however, it is only in the United States and China where the subject is available for all university students, irrespective of their degree (Cardinal & Kim, 2017; Ding & Chen, 2019; Preus, 2007). Although the education systems of both countries are different, there are many similarities with respect to physical education. In the U.S., physical education in universities or colleges commonly follows sport-based or fitness-based classes (Cardinal & Kim, 2017), with basketball, volleyball, tennis, badminton, jogging, yoga, and weightlifting being the most popular (Cardinal, Sorensen, & Cardinal, 2012). In China, activity options include those which are popular culturally, including sports such as table tennis and basketball, and leisure/performance activities such as martial arts, dance and rhythmic gymnastics (Ding & Chen, 2019).

Requirements and goals for physical education also differ between the U.S. and China. In the U.S., some institutions include physical education credits as requirements for graduation, while in others, participation in these courses is purely elective (Cardinal & Kim, 2017). In China, physical education is a compulsory curriculum requirement for graduation that applies to students of all majors. The goals for students in college physical education are also different between the U.S. and China. In the U.S., health and fitness goals are the most popular reason for enrolment (Cardinal & Kim, 2017; Leenders, Sheman, & Ward, 2003), with students wanting to stay active by playing sports or participating in fitness classes. In addition, participation in

physical education helps promote socializing goals. In China, the compulsory nature of physical education is designed for students to benefit in health outcomes from regular physical activity participation (Wang, 2005). And the results (Wu, Ma, Shi, & Li, 2019; Li, Wang, You, & Wu, 2019) showed that physical education is a promising subject to promote health lifestyles by facilitating physical activity engagement. Furthermore, research (Zhang, Ma, Zhao, & Shen, 2019) also indicated that physical education could strengthen academic achievement in secondary students.

In recent years, there have been attempts within both the U.S. and Chinese systems to make physical education courses more attractive to students. In the U.S., there has been a significant shift towards individually focused health and fitness courses, with many nontraditional classes such as like indoor cycling, rock climbing, disc golf, or geocaching being offered (Cardinal & Kim, 2017). In China, there has been the advent of the "Sports Club" which provides more flexibility and choice in terms of multiple attendance options compare to the traditional physical education class (Hastie, Hu, Liu, & Zhou, 2020).

**Sport Education**

In addition to innovative course offerings, there has also been a growth in the use of the Sport Education model in both countries as a way of promoting both behavioral and motivational engagement in classes (Hastie, Sinelnikov, Wallhead, & Layne, 2014). Sport Education is one of the most prominent educational models in physical education (Siedentop, Hastie, & van der Mars, 2020). The model stems from Siedentop's "play education" theory, and aims to develop competent, literate, and enthusiastic sportspersons (Siedentop, Hastie, & van der Mars, 2020).

There are six basic features of Sport Education: seasons, affiliation, formal competition, culminating events, record keeping, and festivity, all of which distinguish Sport Education from

other physical education models (Siedentop, Hastie, & van der Mars, 2020). Seasons consist of a more extended period of physical education (a typical of 20 sessions) to cover a greater depth of knowledge than a shorter unit. Affiliation indicates students maintain membership with the same team throughout the entire season. This association to the team elicits the social meaning derived from a more authentic sport experience. Formal competitions provide students time to practice and apply skills in a meaningful way, and the culminating event is a celebration in which the top performers, team spirit, and sportsmanship were recognized. The record-keeping function of Sport Education serves to provide students with feedback not only in skill development, fair play, but team spirit as well, and the festive nature of the season aims to celebrate all learning improvement, fair play, team spirit, leadership, and effort for everyone contributed to their physical education.

Research on Sport Education in China first appeared in 2005 (Gao & Wu, 2005). The earliest articles focused on history of Sport Education (Gao & Wu, 2005) and implications for Chinese physical education curriculum reform (Chen, 2005). Other papers described the model's framework (Gao, Zhang, Gao, & Li, 2007), and aims (Yang, Guo, & Sun, 2009). Later, research examined the sociological impact of the model (Liu, Ji, & Dong, 2016), and with this, description of how it might be modified to better suit the Chinese physical education setting (Li, 2017).

It should be noted that none of these publications included data on model implementation. Rather, they were descriptions of the model's basic concepts, features, and potential influence on Chinese physical education. Nonetheless, evidence-based research also has begun to appear in the literature on Chinese college physical education. Examples include studies using aerobic dance (Wang, 2005; Sun & Zhang, 2017), soccer (Gao, Zhang, & Gao, 2005),

basketball (Wang, 2006; Yang, Dai, & Gao, 2006), badminton (Wu, 2008), and physical activity in physical education (Xiong, Ma, & Sun, 2015). These studies support western evidence that Sport Education can promote students' motivation (Wang, 2005), engagement (Yang, Dai, & Gao, 2006), fitness (Wang, 2006), skills (Wu, 2008), and game performance (Gao, Zhang, & Gao, 2005).

Although research on Sport Education in China is a burgeoning field, studies to date have been either theoretical or focus on physical education outcomes (e.g. sport performance or fitness). There is a gap in the literature with respect to the voices of the participants in these seasons. This is relevant given the organizational structure of Sport Education, when done well, takes the instructor off centre stage, and changes their role to more of facilitator than the director of all class events (Kinchin, 2006). It also provides students with considerably more autonomy in making decisions and to become more self-directed in their learning (Hastie & Buchanan, 2000). With this in mind, the purpose of the first study is to apply Sport Education in a Chinese college physical education (basketball club) to examine the responses of stakeholders (students and teacher) concerning the essential elements of Sport Education within an elective physical education basketball sports club.

## Play Practice

### Play Practice for Regular Physical Education

A typical lesson sequence in a physical education unit follows a skill-focused instructional approach (SI) consists of an introductory activity, skill/drill practices aimed at developing or improving techniques, followed by game play. This model places technical proficiency as central to instruction, while tactical knowledge and game sense are considered subservient until skills are fully established (Oslin & Mitchell, 2006).

The skill-focused instruction approach is the most common method in Chinese physical education, whether in K-12 or college settings (Wang, 2005; Xiong & Ma, 2013). This approach, while often producing students with considerable technical skills, has been criticized for ignoring the development of students' game play competency (Blomqvist, Luhtanen, & Laakso, 2001; Kirk, 2010).

Tactics in sport are the skills required in any game that allows a player or team to effectively use their talent and skill to the best possible advantage (Harvey & Jarrett, 2014; Hastie, 1998; Siedentop, 2002). The key criticisms of a technique focused methodology emanated from Bunker and Thorpe (1982) who suggested that skill-driven teaching could not guarantee an effective tactical knowledge transfer from skill to game play. This hypothetical notion was supported by research demonstrating that in order to be competent games players, learners need to receive tactical knowledge or game sense within game like conditions (French et al., 1991; Harrison, Fellingham, Buck, & Pellett, 1995; Lee & Ward, 2009). By consequence, several instructional models have been developed where a key goal has been the teaching of tactics in sport. These include Teaching Games for Understanding (TGfU) (Bunker & Thorpe, 1982), Game Sense (Den Duyn, 1997), Tactical Games (Griffin, Mitchell, & Oslin, 1997), and Play Practice (Launder, 2001). As an executive summary, Harvey and Jarrett (2014) noted substantial evidence for the use of game-centered approaches in supporting skill development, particularly in the area of off-the-ball movements. However, these authors also provided the caveat that further assessment of tactical awareness development associated with these interventions is warranted and recommended more research into newer approaches such as Play Practice. Notably, Harvey and Jarrett (2014) suggested future studies report evidence of game-play performance. Given these recommendations, the second purpose of this dissertation

was to investigate the development of skill and tactical competence, as well as game performance in Chinese college-level badminton by incorporating the key elements of the Play Practice model.

Play Practice was first proposed by Launder in 2001, with the specific aim of creating skilled and motivated games players. In Launder's description, two key elements make up the skillful play. One of these is "game sense," which includes the ability to use an understanding of the rules, tactics, strategy, and problem solving during the sport play. The second element is having the required technical ability that corresponds with the fundamental skills of a sport.

There are three typical pedagogies in Play Practice, shaping, focusing, and enhancing play (Launder, 2001, 2013). Shaping is defined as modifying practice variables to correspond to the demanding elements of skillful play. Typical shaping includes simplified games or challenges to help shape not only game sense but also technique. Modifications, for example, can be to the number of players, the size of the court, or the attacker-to-defender ratio. Focusing emphasizes the teaching of specific aspects of game play. For example, in tennis, a player practices how to play a diagonal angle with a forehand stroke to deal with a flat groundstroke from their opponent. The task would involve specifically marked areas close to the sidelines which would act as targets for the players. Enhancing play involves promoting or reducing the challenge and difficulty of the play to stimulate motivation. This can be achieved by changing the learning environment, such as reducing the time of a game, establishing challenges to be accomplished in unique scenarios, or assigning various roles (coach and referee) to increase motivation within the learning process.

Within the sport pedagogy literature, only two experimental studies have examined the effectiveness of Play Practice. Holt, Ward, and Wallhead (2006) published the first experimental

study that examined the effectiveness of Play Practice in promoting the transfer between soccer practice and game play within a cohort of college students. The result indicated that students' learning of tactical responses was consistent with their game play after the Play Practice intervention. In the Play Practice of soccer, the 3 *vs*. 2 attacking practice seemed to be the most promising task to transfer tactics to a 4 vs. 4 game. While useful as a first study, there are limitations to the study's small sample (six participants). Furthermore, the study focused only on the tactical responses of players rather than integrating both techniques and tactics to assess the students' abilities during game play. The second Play Practice study comes from table tennis, Zhang, Ward, Li, Sutherland, and Goodway (2012) examined the transfer of learning from Play Practice to table tennis skill performance in college students. Using a nonequivalent control/comparison group experimental design with pre- and post-measures, three table tennis skills (forehand drive, attack, and serve) were assessed during Play Practice and Skill-focused Instruction (SI) units. Results indicated that all participants' skills, forehand drive, attack, and serve, whether in Play Practice or Skill-focused Instruction, were improved after the interventions. In terms of differences between Play Practice and Skill-focused Instruction, however, Play Practice appeared to be more efficient in improving the students' forehand attack and serving than Skill-focused Instruction.

The research of Zhang et al. (2012) provides substantial evidence to support the Play Practice advantages found in the study of Holt et al. (2006). In addition, Zhang's research involved 56 participants resulting in the greater power of the design. Nevertheless, a missing element in this study was a measure of game performance measure. By consequence, it is difficult to assess whether skill learning was effectively transferred to game situations.

The positive findings from these two prior Play Practice studies certainly warrant further investigation. In the first instance, a replication of the Zhang et al. (2012) study is justified. As Makel and Plucker (2014) comment, replication is a powerful avenue to accumulate understanding, which in this case is necessary given the research on Play Practice is in its infancy. Makel and Plucker also suggest that replication is important because it helps check the validity of knowledge from previous research and enables questions concerning generalization across populations or contexts to be discussed. In designing replications, however, Schmidt (2009) recommends that in many cases, "constructive" replications are warranted as these tests the targeted construction (in contrast to operational replications that test the veracity of the original data). The purpose of the first Play Practice study, then, was to extend our understanding of the effectiveness of Play Practice by following the experimental design of the Zhang et al. (2012) study but expanding that design to examine multiple outcomes related to skillful game play. In this dissertation, those outcomes included the performance of technical skills, tactical understanding, as well as game performance.

Specifically, the research question in the first Play Practice study was to investigate the differences between Play Practice and direct skill instruction on students' badminton performance with respect to skill execution, tactical knowledge, and competence in game play following a semester-long (16 weeks) intervention.

**Play Practice for Physical Education Pre-Service Teacher**

A teacher's content knowledge (the facts, concepts, theories, and principles that are taught and learned in specific academic courses) is considered to be essential for quality instruction (Ball, Thames, & Phelps, 2008; Shulman, 1987; Siedentop, 2002), particularly as it informs pedagogical content knowledge (PCK) (Ward, 2009). Indeed, Ingersoll et al. (2014)

reported that teachers without well prepared content knowledge include minimal skill refinements in their instruction, struggle to identify or correct students' performances, and a lack of understanding relative to the purpose of the lesson.

Since its first introduction to the educational literature, content knowledge has been differentiated to include common content knowledge (CCK) and specialized content knowledge (SCK) (Ball, 2008; Ward, 2009). CCK is knowledge of the rules and etiquette, and knowledge of techniques and tactics of a specific content area (e.g. knowing how to play a clear in badminton). SCK is knowledge of the sub-domains of instructional tasks (e.g., the task sequence for teaching the badminton clear), representations (e.g., descriptions of the tasks) and errors that are likely with the content (e.g., using the arm to hit the shuttlecock rather than a pullback swing) in teaching CCK.

Previous research in physical education (Ward, 2009) has suggested that CCK can be acquired by simply playing the sport, while SCK must be taught specifically due to its unique in pedagogy. Tsuda's (2019) study which examined the relationship between CCK, SCK and performance supported Ward's assertion. In that study, both non-PE majors and PE majors increased their CCK of various sports (volleyball, basketball, badminton, and tennis). However, only PE majors showed significant improvement in SCK given they were the only cohort who received specific SCK training. The evidence from Tsuda (2019) implied that a well-organized Physical Education Teacher Education program can provide sufficient SCK training for pre-service teachers. Despite this important finding, it is important to note that content knowledge instruction accounts for approximately only 10% of the total credit hours in many Physical Education Teacher Education programs across the world (Kim, Lee, Ward, & Li, 2015; Ward, 2012, 2013). Further, CCK occupied a larger portion than SCK (Kim, Lee, Ward, & Li, 2015;

Ward, 2012, 2013) in the programs studied, resulting in potential deficiencies in pre-service teachers' SCK during their professional training.

The teaching of physical education in Chinese universities, like many programs across the globe, has an emphasis on learning discrete skills and technical mastery (Guoyong, Wang, Zhai, & Wang, 2015; Zuo & Zhou, 2005). In China, pre-service teachers are required to participate in a variety of sports during their first and second years of study, including track and field, basketball, football, volleyball, badminton, dance, and martial arts. Following the second year, students select one major and one minor sport in which to specialize during their third and fourth years of study (Wang, 2014). In these latter years, the instructional focus follows a direction instructional style in which the focus is on the development of in-depth CCK via knowing and performing sports (Wang, 2014; Zhao, Li, & Zhou, 2017). Tactical content is typically neglected during this direct instruction model (Wang, 2014; Zhao, Li, & Zhou, 2017). As noted, this disconnect between the technical and tactical components will neither help the pre-service teachers to build an authentic capability in game performance nor to develop their content knowledge (Ward, 2018). Indeed, Ward's (2018) study of 384 Chinese secondary in-service teachers demonstrated low levels of SCK in soccer. The study also found that a teacher's teaching experience was negatively associated with their SCK scores. According to Ward's (2018) results, teachers with a 1st-grade rank scored marginally better than those with a 3rd-grade rank. However, the senior physical education teacher who had more years of teaching experience scored less on the content map test (SCK) than their fellow teachers (2nd and 3rd-grade). Ward (2018) posited that the physical education teacher education provided minimal SCK training. Another possible explanation to support Chinese in-service teachers lacking SCK comes from their minimal use of sequential development of skills and tactics in their content

map. Ward (2018) suggested that either they did not use incremental progression as a teaching strategy or did not have knowledge of SCK.

While a number of game-centered approaches have been developed to address the issue of the separation of technics and tactics in physical education (e.g. Teaching Games for Understanding, Game Sense and Play Practice), to date there have been no efforts to examine their efficacy in promoting students' SCK. By consequence, the purpose of the second Play Practice study was to examine Chinese pre-service physical education teachers' badminton content knowledge following a semester-long course that incorporated Play Practice instruction.

Play Practice was first proposed by Launder (Launder, 2001), with the specific aim of creating skilled and motivated games players. In Launder's description, two key elements make up skillful play. One is "game sense," which includes the ability to use an understanding of the rules, tactics, strategy, and problem solving during the sport play. The second element is having the required technical ability that corresponds with the fundamental skills of a sport. To achieve the aims in Play Practice, three pedagogies are incorporated: focusing, shaping, and enhancing play. Shaping involves modifying practice variables to match the demanding elements of skillful play (e.g. 2 vs. 1 play, size of the court). Focusing play emphasizes instructional specific aspects of game play (play vary angles to open space). Enhancing includes decreasing or increasing the difficulty of the play to promote motivation (adapted racket, balls, or rules in tennis).

The three pedagogies of Play Practice share similarities with Rink's (Rink, 1979) initial content development categories, namely informing (i.e., the initial task), refining (e.g., improving quality of performance), extending (e.g., increasing/decreasing the complexity), and applying (i.e., assessment or games) tasks. Ward et al. (2017) expanded these original categories of extending and refining tasks by noting where these occurred in a game context. These tasks were

labeled extending-applying tasks (e.g., making the defense active in a 3 vs. 1 game) and refining-applying tasks (e.g., putting specific targets for passing accuracy in a 4 vs. 4 game). Ward et al. (2017) also distinguished between the features in Rink's (1979) original applying tasks by applying nongame tasks that refer to assessing students' performance and applying game tasks where the content of the lesson is used without any particular focus. By consequence, seven content categories can now be used to describe a preservice teachers' use of instructional tasks: informing (I), extending (E), refining (R), extending-applying (EA), refining-applying (RA), applying task-game (AG), and applying nongame (AN) tasks. All of the task categories have been validated in terms of content and concurrent validity by Ward et al. (2017).

With respect to the information addressed above, the second Play Practice study was to investigate whether the inclusion of Play Practice instruction would positively impact Chinese physical education pre-service teachers' content knowledge in badminton.

## Chapter 2

## Incorporating Sport Education within a Physical Education Sports Club in China

Abstract

The goal of China's new guidelines for physical education within universities is to promote greater levels of active engagement and an emphasis on the development and cultivation of students' individual abilities. This study follows an engagement perspective to examine the responses of stakeholders to the incorporation of the essential elements of Sport Education within an elective physical education basketball sports club. Participants were 152 students who after five weeks of term could elect to participate in a Sport Education season or continue to practice individually. Dependent measures included club attendance, students' perceptions of competence, knowledge/understanding and enjoyment of basketball. In addition, the teacher kept a reflective log across the season and participated in a formal interview at season's end. The students who participated in the Sport Education option had significantly greater attendance than their skill practice classmates. Further, they reported significant improvements in competence, as well as a higher level of enjoyment over their previous college physical education experience. These results demonstrate that highly autonomous format of the basketball club is conducive in supporting students' engagement in physical education.

Keywords: engagement, autonomy, relatedness, competence, basketball, innovative curriculum

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## Introduction

In most European and Commonwealth countries, participation in university physical education classes is limited to those students who are majoring in sport and exercise science degrees. On the other hand, Chinese students from all academic majors have the opportunity to earn credit towards graduation. Nonetheless, while the foundational goals for Chinese university physical education lie in enhancing students' physique and improving health, research has demonstrated that almost half of all students believe that the curriculum does not meet their needs.

In recent years however, and consistent with reforms in higher education, a new form of physical education has appeared in Chinese universities. Dubbed the "physical education sports club," this format is designed to offer students more choice, differentiated instruction and provide a more social environment (Tan, 2018). While still designed to fulfill the *National Guidelines for the Teaching of Physical Education Courses in General Colleges and Universities* (improving students' health and sports literacy), there is a greater emphasis on the development and cultivation of students' individual abilities. As Zhang (2019) comments, the club system can adopt multi-level and multi-type organizational forms to meet students' exercise needs to the maximum extent possible, so that students can change from passive learning to active participation. Examples include the choice of attendance times (clubs are offered multiple times per week), possibilities for online learning of content, and attendance at off-campus sporting events for credit.

Research on Chinese physical education courses operating as "clubs" is still in its initial stages, with most papers having focused solely on fitness/physique outcomes such as exercise intensity (Xiong & Hongyi, 2015) or body composition (Li, Feng, & Wei, 2018; Yin, 2010). To

date there has been no research on the extent to which students enjoy or value the increasing opportunities for choice and independence which are embedded in these clubs. Also missing are any data on the extent to which students who select this option for physical education are motivated to pursue a physically active lifestyle.

While the introduction of the club-based structure has been one initiative to address this issue of lack of motivation, a number of papers in Chinese journals have also espoused the possibilities of a good fit between the goals of the Sport Education pedagogical model and those of Chinese curriculum reform (e.g., Cheng, 2005; Jiang & Tan, 2010). The argument has been that Sport Education involves an authentic sport experience and focuses on independent and cooperative student learning, whereas traditional physical education is more whole group health focused with significantly less opportunity for social engagement (Cheng, 2005).

Sport Education is a pedagogical model that aims to provide authentic, educationally rich sport experiences for young people in the context of physical education (Siedentop, Hastie, & van der Mars, 2020). Sport Education in grounded by the inclusion of six key features which derive from how sport is conducted in community and interschool contexts, namely seasons, affiliation, formal competition, culminating events, record keeping, and festivity. Sport Education is not, however, a direct simulation of institutionalized sport, but modifies certain pedagogies in three distinct ways: participation requirements, developmentally appropriate competition, and diverse roles. In terms of participation, small-sided teams are standard, with an ethic that all players participate all the time. Developmentally appropriate competition sees age appropriate modified rules, spaces, and equipment. In terms of roles, during a Sport Education season students take upon responsibilities such as coach, manager, trainer, statistician, publicity officer, or sports board member in addition to the role of player.

US-based research on Sport Education in university physical activity courses has produced very positive responses from students. One consistent theme is that Sport Education provides a more complimentary (in contrast to adversarial) link between the students' quest for good grades and their socializing strategies (Sinelnikov & Hastie, 2012). Indeed, the idea of being a member of a persisting team has been the most attractive aspect of courses using Sport Education. The feeling of "relatedness," (the innate psychological need to interact, be connected to, and experience caring for others; Deci & Ryan, 2000) that is so pervasive within the Sport Education experience seems to be a critical factor in students reporting that they engage at higher rates than in previous activity courses (Bennett & Hastie, 1977), and in believing they make significant progress in acquiring skills (Mohr, Sibley, & Townsend, 2012).

In China, a number of data-based studies have begun to examine the motivational effects of incorporating Sport Education within university physical education courses. For example, in aerobic fitness courses, Xiong and Ma (2013) described increases in students' intrinsic motivation and task orientation which led to increases in exercise intensity during instruction. Similarly, Wu (2018) reported enhanced student enthusiasm and initiative, and well as improved interest in learning and participation during seasons of badminton. Within basketball classes, Liu (2015) showed increases in enthusiasm and motor skills, while Yang, Dai, and Gao (2006) suggested that classes conducted through Sport Education were more beneficial to the development of students' sports attitudes and participation.

Given the positive findings with respect to Sport Education in Chinese university physical education, and the goal of providing more engaging physical education environments for Chinese university students through sports clubs, it would seem worthwhile to examine a course in which these innovative formats developed some form of coalition. By consequence, the

purpose of this study was to examine the responses of stakeholders (students and teacher) to the incorporation of the essential elements of Sport Education within an elective physical education basketball sports club. Student response measures included attendance and engagement, their appreciation of nature of their sport experience, and perceptions of their physical education outcomes. For the teacher, the goal was to examine his responses to the incorporation of Sport Education within the club, both from a pragmatic perspective as well as a pedagogical one.

## Method

### Participants

The participants in this study were 152 second-year students who enrolled in the "Basketball Club" option of a required physical education program of a university in central China. The teacher responsible for the club was a faculty member in the physical education department who had been involved with this club system for the previous 3 years. He was assisted by another faculty member whose main responsibilities included providing instruction to beginning players, and by physical education majors who assisted in officiating duties. No data were collected from these assistants in this study.

During the first class, students were asked to complete a brief survey that included questions about: (i) their basketball experience, (ii) their perceived skill level at basketball, and (iii) why they selected basketball as their sport of choice. Table 1 provides the summary details of these data for these students.

Table 1

Participant Demographics

| Sport Education | | | | |
|---|---|---|---|---|
| Gender (*n*) | Age | Experience (%) | Skill (%) | Why basketball (%) |
| Female (47) | 19.3 | Regular (33)<br>Some (54)<br>None (13) | Novice (10)<br>Entry level (64)<br>Medium (26) | Interest (59)<br>Love (13)<br>Fitness (10)<br>Learn (18) |
| Male (55) | 19.4 | Regular (71)<br>Some (17)<br>None (11) | Novice (20)<br>Entry level (34)<br>Medium (40)<br>Advanced (6) | Interest (74)<br>Love (0)<br>Fitness (11)<br>Learn (15) |
| Individual practice | | | | |
| Gender (*n*) | Age | Experience (%) | Skill (%) | Why basketball (%) |
| Female (21) | 19.4 | Regular (30)<br>Some (45)<br>None (25) | Novice (37)<br>Entry level (47)<br>Medium (16) | Interest (63)<br>Love (0)<br>Fitness (19)<br>Learn (19) |
| Male (29) | 19.4 | Regular (26)<br>Some (59)<br>None (15) | Novice (13)<br>Entry level (83)<br>Medium (4) | Interest (67)<br>Love (0)<br>Fitness (21)<br>Learn (12) |

**The Context of the "Club"**

The traditional organization of physical education classes in Chinese universities sees all enrolled students (usually about 50 students) attending at the same time once a week for 90 minutes. During these classes the format of instruction follows a direct style over 16 weeks.

In contrast, in a sports "club" a number of sessions are scheduled throughout the week, providing students considerably more flexibility with respect to attendance. In this study, the basketball club was scheduled for five, 90-minute sessions a week (Tuesday, Thursday and Friday: 7.00 – 8.30pm, and Sunday 2.30 – 4.00pm and 4.00 – 5.30pm) for all 16 weeks of the semester. Attendance on any specific day was not mandatory. Rather, the only formal

requirement was that students would accumulate 16 sessions across the semester. That is, students could choose on which days and even in which weeks they would attend. While this number of 16 was the minimum, there was no maximum attendance limit, although students did not gain extra credit towards their grade for these extra attendances. Attendance counted for 70% of a student's grade, with the remaining 30% being derived from dribbling and free throw shooting skills tests. In the two years leading up to this intervention, the average number of sessions attended by students was 15.4.

Prior to this study, a typical 90-minute session would consist of 15-20 minutes of warm up and fitness activities, 40-50 minutes of formal instruction in basketball skills and associated challenges (e.g., a dribbling obstacle course), followed by 30 minutes choice of either free play or continued instruction. Typically, the higher-skilled students would form ad hoc teams and play pickup games while those who were lower-skilled would remain practicing in order to pass the final skills test. In this second part, the teacher's role was to monitor the session as a whole, while three or four physical education basketball majors either refereed pick-up games or provided specific instruction to students engaged in individual skill practice.

**The Introduction of a Sport Education Option within the Club**

In the 2018-2019 academic year, all club attendees with given the opportunity to participate in a season of Sport Education within the basketball club. While the first five weeks followed the same organization as the previous years, at the end of week five the teacher gave all students the opportunity to form of a team of three to four players who would then participate in team practices followed by a formal competition in the final weeks of the semester. The students who chose not to take this option were still able to continue to practice skills or participate in ad hoc games (or a combination of both) as they had up to this point. It is important to note that

with respect to the students' grades, the Sport Education option did not come with any advantages with respect to attendance. The only difference was that these students could substitute the formal skills test for a score of their game play as assessed by the teacher.

One hundred and four students opted to follow the Sport Education option, resulting in the formation of 28 teams of three or four players. Fifteen teams had male players, while 13 were female player teams. For the next five weeks, club sessions for these students involved team practices in the time typically allocated to direct teacher instruction, as well as formal referee training. Teams were expected to create a name and some form of identity (colors, uniform etc.) by the end of week seven. Within teams, students also decided on which members would take the roles of captain, coach, equipment manager and strength and conditioning coach. Informal competitions were held between teams during this time, some with officials and others without.

A formal league created by the teacher was scheduled for nine club sessions during the final five weeks of the semester, with each team playing against each of the others (i.e., 14 or 12 games for male and female teams respectively). Students were advised of designated game times, courts, and playing teams. Games were 10 minutes long, with the winning teams awarded two points towards the league championship. Teams were also allocated fair play points on the basis of a +1, 0, -1 system which represented overtly positive, neutral, or negative behaviors. Table 2 shows the out of the 16-week club plan. A ceremony was held during week 16 where individual and team awards were presented.

Table 2

*Basketball Club Semester Outline*

| Week | Club organization | Student choice | SE season specifics |
|---|---|---|---|
| 1 | • Basic technical exercises: dribbling, passing and shooting practice<br>• Introduce some basketball rules: referee learning and guidance. | None | |
| 2-5 | • Teacher directed skill practices (dribble, pass, shoot)<br>• Basketball rules and elementary officiating<br>• Opportunities for ad hoc game play (3 *vs* 3) | • First part – no choice<br>• Speed dribble challenge in Week 5<br>• Second part – continue to practice individual skills or participate in games | Students report to the teacher in Week 5 if they wish to form a team to play the game season |
| 6 | Teacher directed skill practices<br><br>OR<br><br>Team practices and 2 *vs* 2 preseason games | Students could choose between skill practice with the TA/teacher or participation in the Sport Education Season | • Formation of teams<br>• Development of team identity (names, colors)<br>• Decide team roles<br>• Shooting competition<br>• 2 *vs* 2 preseason games |
| 7-10 | Teacher directed skill practices or Sport Education preseason | Skill instruction<br>or<br>Sport Education | Team training<br>2 *vs* 2 then 3 *vs* 3 practice games (including officiating) |
| 11-15 | Teacher directed skill practices or Sport Education preseason | Skill instruction<br>or<br>Sport Education | Round robin 3 *vs* 3 competition with all teams playing each other across 4 or 5 weeks. |
| 16 | Skills tests<br>Final exam<br><br>Sport Education ceremony | All students complete the tests and exam<br><br>Sport Education students attend ceremony | Playoff games<br><br>Presentation of team awards including Best Fair Play team, Most Affiliated Team, Champion team, and individual awards including MVP, scoring leader, rebounding leader, 3-point leader, assists leader. |

**Fidelity of the Sport Education Elements**

Hastie and Casey (2014) suggest that to establish the fidelity of a model's implementation it is necessary to offer: (a) a rich description of the curricular elements of the unit, (b) a detailed validation of model implementation, and (c) a detailed description of the program context. With respect to the curricular elements, Table 2 lists the Sport Education elements that were included in the course outline. An examination of this table shows evidence of those aspects which need to be incorporated if one is to correctly describe a particular unit within physical education as Sport Education (teams, festivity, etc.). In terms of validation, videotapes and photos of students participating in the season were used to identify the presence of specific Sport Education features such as team practices, student officiating, elements of fair play, and record keeping. These digital records were cross-referenced with the Sport Education benchmark observational instrument (Ko, Wallhead, & Ward, 2006; Sinelnikov, 2009) resulting in evidence of greater than 95% of the pedagogical behaviors considered benchmark elements of the Sport Education model. Finally, in order to account for constraints which may have resulted in possible misapplication of the model, the teacher sent a weekly review of events in which any problems or misunderstandings were outlined. The teacher received a response within 24 hours. All these strategies served to confirm that these Chinese students did in fact receive a well-founded version of Sport Education as intended by its creators.

**Data Collection**

Data for this study came from two sources: the teacher and the students. The teacher kept an ongoing record of club attendance as part of the formal accountability mechanism for the students in the class. At the end of the semester, these data were used make comparisons with students from previous basketball club courses (also provided by the teacher), as well as between

those students who participated in the Sport Education format and those who elected to participate in independent practice.

The teacher also wrote a weekly journal which was emailed to the research team. Here the teacher was asked to describe the students' responses to lessons and those features he perceived as enhancing or limiting the Sport Education program. At the conclusion of the semester the teacher participated in an hour-long interview in which he was asked to comment upon various aspects of the basketball club. Focus topics included students' participation and engagement levels, differences between how he expected the Sport Education season to operate and what actually occurred, as well as the most satisfying, frustrating, and interesting aspects of the club.

**Student surveys.** Aside from the demographic data provided at the commencement of the semester, the students who participated in the Sport Education element of the club students completed the 12 item "Sport Education Season Survey" developed by Hastie and Sinelnikov (2006). The survey was translated into Chinese in accordance to Vallerand's (1989) recommendations for translating instruments into a foreign language. Questions 1 to 6 asked students to comment upon their perceptions of the six key components of a season of Sport Education using a Likert-type scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). In addition, students are asked to provide the reason why they gave that particular score. Questions 7 to 12) asked students to give themselves a score from 1 (*very poor*) to 10 (*excellent*) on their perceptions of competence (Questions 7 and 8), literacy (Questions 9 and 10), and enthusiastic engagement (Questions 11 and 12) prior to and on completion of the season.

**Data Analysis**

**Attendance data.** Independent samples *t*-tests were used to make comparisons between the current cohort's attendance and those from previous versions of the club, as well as any differences between those students who participated in the Sport Education option and those who chose to follow the traditional format. Cohen's *d* was used to report effect sizes.

**Teacher perceptions.** Data from the teacher's journal and interview were subject to a deductive analysis (Gilgun, 2011). Whereas an inductive analytic approach aims to generate new theory that emerges from the data, a deductive thematic analysis uses a structure or predetermined framework. In this particular case, the tenets of engagement together with our understanding of student motivation within Sport Education served as that initial theory. The journal and interview data were subjected to the five-phase model outlined by Braun, Clarke, and Weate (2016) starting with familiarization and coding, then moving to theme development, refinement and naming. The results from this analysis were examined in terms of whether they confirmed, added to, or provided negative cases of the original theory (Elo & Kyngäs 2008; Gilgun 2011). Data analysis was undertaken on the original text (in Chinese) and the resulting themes were later translated into English for the purposes of reporting.

**Students' survey data**. For the students who participated in the Sport Education option, descriptive statistics (mean and standard deviation) were calculated for their "perceptions of the elements of Sport Education" section of the survey (Questions 1-6). The extended response data from the surveys was analyzed using inductive analytic methods. Initially, the "why did you give this score" responses were read and then sorted into thoughts and perceptions (statements considered to be conceptually consistent). From these readings, quotes considered to be representative of the voices of the majority of students were selected.

With respect to their "perceptions of achievement of Sport Education goals" (Questions 7-12), paired-samples t-tests were used to compare the students' perceptions of their achievement of the competency, literacy and enthusiasm goals prior to, and at the completion of the course.

## Results

### Attendance

Overall attendance at the 2019 version of the basketball club was greater ($M$ = 19.66 sessions, $SD$ = 4.25) than the average attendance of the two years leading up to this study ($M$ = 15.44, $SD$ = 5.20), a statistically significant mean increase of 4.22 sessions, $t(268) = 7.34$, $p < .001$, $d = .89$. Most of this difference was due to the increased attendance of the 104 students who participated in the Sport Education season, ($M$ = 22 sessions). Indeed, the majority of teams attended two sessions per week during the season, with two or three who came each day to practice together. Alternately, the 48 students who chose only to practice skills participated in a similar way to those of previous years (15.65 vs 15.44, $t = 0.25$, $p = .803$, $d = .05$).

### Teacher's Response to the Inclusion of Sport Education

Analysis of the teacher's weekly logs and interview identified both positives and challenges. These related to both the structure of the club as well as the students' responses.

#### Positive outcomes

**Overall investment.** From an overall viewpoint, the teacher believed there was a "clear difference" between the classes when run under the Sport Education format than when it followed the traditional set up. In particular, he noticed more students attending class sessions, as well as "significant improvements in attitudes" in terms of participation within sessions. His reference here was that "in the traditional basketball club, you can often find students sitting around, even playing on their phones. This was rare in the Sport Education version because the

students had specific tasks for each class in terms of taking opportunities to participate in either games or individual practice sessions" (interview).

During his interview, the teacher supported his assertion of greater overall investment by noting that all available spaces for the basketball club for the upcoming semester had been filled on the first day of registration. His rationale in this case was that the students in the current semester must have considered the curriculum structure being sufficiently positive that they encouraged their friends and classmates to enroll.

**Higher intensity of engagement.** Not only did he see an increase in attendance, participation and overall investment, the teacher also witnessed a higher *intensity* of engagement (log record). He justified this assertion by stating that "the enthusiasm of the students participating in the competition option is high, the exercise volume and exercise effect are obviously better; basically the amount of sweating after the game is greatly increased, and the effect is rarely seen previously" (log record). As a particular case in point, the teacher noted within his log that when he asked a group of female students from the Sport Education cohort to record their heart rates after a particular game, those heart rates were significantly greater than the levels achieved during traditional club activities.

**Improvement in skills.** The teacher also believed that the new club format was more effective in improving student basketball skills, which he put down to two reasons. First, he believed that using the Sport Education model provided a detailed overall curriculum structure with clear requirements for what students were expected to do when they attended class – be it team practice, learning how to officiate or participating in games.

The second piece of evidence supporting this idea of "better skills" related to the presence of formal game play instruction. Whereas previous iterations of the basketball club saw

students playing only pickup games on ad hoc teams, the teacher noted "our former club never *taught* students to play games. Now we have preseason games followed by competitions, and so we must teach students how to play games." As a result of this formal instruction and opportunity to practice and participate in matches, the teacher felt that students had developed greater levels of competence. This assertion was supported from a number of log records. Importantly, the teacher believed this competence was more authentic, as the competition was "more reflective of the students' true basketball ability" whereas "we all know that dribbling in place and shooting does not reflect the true level of the students."

**More complete players.** Not only were the students seen to improve their skill levels, the teacher saw them as being more "complete" basketball players. The presence of team practices which were important for team success in meaningful matches was seen as particularly helpful in the learning of tactics. The teacher was convinced that the additional roles of referee and scorekeeper meant that the students had to "learn and practice these tasks to allow the club to actually function." From a more affective dimension, the teacher believed that participating in games of consequence meant that "having to deal with winning and losing now enabled students to have a better understanding of the notion of competition, one in which the impetus is to enjoy oneself and strive for improvement" (log record).

**The importance of teams.** The teacher was of the opinion that the permanent teams promoted opportunities for "self-training and a requirement for inter student communication" (log record). He suggested that not only helped to "cultivate students' team spirit, collaboration and self-discipline," but also promoted the students' understanding of basketball. To reinforce this belief, the teacher put forward the hypothesis that the students' approach to class shifted

from “I don’t really want to practice,” to a case where “I want to participate because the club is a really enjoyable place to be” (log record).

**Student peer support from teams**. The teacher strongly believed that “being part of a team and receiving significant peer support from their teammates was critical to the development of skillful and more rounded basketball players.” He also commented that in the past, the only source of basketball communication was the teacher and that he saw “no significant instances of students learning from each other.” This was supported by log entries that referenced “because of the teaching between teammates, students were more able to accept the opinions and suggestions of their classmates, whereas when the teacher teaches the students, the students may be nervous.”

### Challenges

**Schedule issues.** The very feature of a sports club that makes it attractive to students, irrespective of whether it involves Sport Education or not, is its flexible schedule. Clubs are deliberately offered multiple times a week to allow students expanded opportunities for participation. While this feature is a positive attribute at the individual level, in this particular season (as are all Sport Education seasons), the team is the central unit. This led to some teams being disrupted due to conflicts with activities scheduled by the students’ individual colleges that prevented them coming to class or coming to a scheduled match.

While the teacher allowed individual teams to coordinate and change their competitions times, he suggested that a lack of communication *within* teams often meant that while games were played, not all players participated (interview). Time conflicts leading to absences also had an impact on team practices. In his log entries, the teacher noted that a number of student coaches found it difficult to organize a practice with less than a full cohort of team members.

The teacher identified two strategies he believed would be helpful in future editions of the basketball club to deal with these potential disruptions. The first and most simple was to expand team rosters from four to six players to allow for more flexibility. Given that games were 3 *vs* 3, the absence of only two players left them short, whereas a team of six would still have a quorum if half the students had other commitments on a particular night.

The second strategy was trialed but not formally instigated by the teacher in this season. Where conflicts were identified, he encouraged students to organize extra-curricular team trainings. He allowed them to take videos or photos of these practices and send them to him for extra points on the league table. While believing this opportunity would also strengthen teamwork and collaboration, he found the incentive of extra points was not sufficient to generate a lot of enthusiasm for out of class practices.

**Inexperienced student coaches.** The second challenge faced by the teacher revolved around the quality of student coaching. For some teams, the issue was a limited technical ability of the person taking the coaching role, whereas in others it was a lack of self-confidence. Alternately, while some coaches had great content knowledge, their training sessions were not well organized. The teacher's response in cases where a large number of teams were struggling was to introduce skill challenges (log entries). This provided some baseline content while still allowing students to practice with their teams, but. The student coaches and the players were still able to organize how they would complete the challenges within their own teams.

Even with these challenges in place, the teacher recognized during the interview that in future iterations of the sport club he would "put greater emphasis on effective team organization and training" in the middle weeks of the semester prior to the formal competition, with the "major goal [being] to increase the confidence of the coaches of each team."

**Students' Responses to the Inclusion of Sport Education**

As important stakeholders in the basketball club, it was seen as imperative to get some insight into the experiences of the students. Data in Table 3 suggest that students showed strong agreement that they enjoyed and valued each of the Sport Education elements. These are supported by the inclusion of statements considered to be representative of the majority of students.

Table 3

*Students' Perceptions of the Elements of Sport Education*

| Element | Ave. rating *M (SD)* | Representative statements |
|---|---|---|
| Season concept | 1.45 (.57) | This class is new, fresh, and fun.<br>This class is meaningful and engaging – I was highly motivated. |
| Persisting teams | 1.45 (.59) | We can better cooperate and cultivate team organization skills.<br>I have sense of belonging in my team. |
| Formal competition | 1.45 (.66) | Urges you to train better in team practice.<br>The games are more formal and official, and so you learn more. |
| Culminating event | 1.53 (.66) | Watching the good teams can inspire me to learn much more.<br>The finals are wonderful. The final game is amazing. |
| Record keeping | 1.47 (.60) | Our team ranking is not high, but I like to compete with other teams. |
| Festivity | 1.48 (.60) | I loved the team ID; it is based on team discussion and reflects the team's values. |

Table 4 shows that for the competency, literacy, and enthusiastic participation goals of Sport Education, students in all cases reported higher perceived levels following the season than before. This provides evidence that the season was able to achieve (at least in students' minds) significant improvements in knowledge and skill and a preference for Sport Education over previous forms of physical education.

Table 4

*Students' Perceptions of Achievement of Sport Education Goals*

| Element | Sex | Pre-club *M* *(SD)* | Post-club *M* *(SD)* | *t* (55) | *p* | *d* |
|---|---|---|---|---|---|---|
| Competency | All | 5.73 (2.21) | 7.31 (1.76) | 7.07 | <.001 | .79 |
| | Female | 5.67 (1.97) | 7.06 (1.70) | | | |
| | Male | 5.76 (2.34) | 7.45 (1.80) | | | |
| Literacy | All | 7.46 (2.13) | 8.46 (1.28) | 3.58 | .001 | .57 |
| | Female | 7.28 (1.78) | 8.44 (1.38) | | | |
| | Male | 7.55 (2.30) | 8.47 (1.25) | | | |
| Enthusiasm | All | 6.77 (2.09) | 8.39 (1.34) | 5.52 | <.001 | .92 |
| | Female | 6.33 (2.03) | 8.44 (1.10) | | | |
| | Male | 6.97 (2.11) | 8.37 (1.46) | | | |

## Discussion

The purpose of this study was to examine the responses of stakeholders to the incorporation of the essential elements of Sport Education within an elective physical education basketball sports club. The findings would suggest that this new format was effective in creating a particularly engaging sports-based form of physical education. Engagement in this sense refers to both the behavioral intensity and the emotional quality of a person's active involvement during a task (Reeve et al., 2004). Evidence for the claim that students who participated in the Sport Education option showed substantive behavioral engagement lies in their significantly greater attendance at the sports club than those in previous years when this opportunity was not available. The fidelity of the students' perceptions of the extent of their engagement was supported by the commentary of the teacher. His notions of greater enthusiasm, engagement and high levels of peer support were consistent with the student data. These notions of "better than before" are consistent with previous studies where students have experienced Sport Education for the first time in university physical education courses (Bennett & Hastie, 1997; Mohr, Sibley, & Townsend, 2012).

**Autonomy support and engagement**

Research has demonstrated that the more teachers use autonomy-supportive instructional behaviors, the more engagement their students show (Reeve et al., 2004). Within in educational settings, those supportive behaviors are most easily available by giving students choices or providing them with a sense of control. In this basketball club, the flexible schedule allowed students to attend at any time provided they accumulate the 15 sessions. Further, the opportunity for students to opt into the Sport Education league or remain involved with free practice and ad hoc games was an added element of autonomy within the system.

Further supporting the students' autonomy within the Sport Education season specifically was the opportunity to select their own teams with friends, and to create their own identity. This was different from all school-based forms of Sport Education or team formation in Sport Education where the goal is to create teams that are as even as possible in terms of skill, as well as maximizing potential for diversity, distribution of leadership – all in order to make the competitions as even as possible (Siedentop, Hastie, & van der Mars, 2020).

The difference here was that the students first had to commit to the season, whereas in school settings this is not an option. Secondly, the formation of teams was dependent on students who would willingly commit to play together, meet to practice at dedicated times, and agree to participate in the extra attendance opportunities that the league competition provided. By consequence, while autonomy was supported by independent team formation, it also came with maybe a slightly more autonomy restrictive requirement that students would commit to team functions. Nevertheless, this did not seem to be a significant deterrent, because over 102 (of 152) chose to participate in the Sport Education leagues.

The students who chose not to participate in the Sport Education season were still afforded the autonomy supporting options that were previous included in the club. That is, they could attend when they wished across any time or date, and they could choose to participate in individual practice or nonconsequential scrimmages. The teacher noted in his logs that despite these students being typically lower skilled, there were still times when they would choose to allocate a certain portion of the time at the club by playing pickup games in teams that were created solely for that day.

**Perceptions of competence and engagement**

Students' perceived competence has been found to play a critical role in predicting engagement in physical education classes (Bevans et al., 2010). From their reports at the end of the semester, the students reported that their skill levels had improved significantly since the beginning of the basketball club. Previous studies in Sport Education have posited that the extra time that is available for practice due to the idea of an extended season central to the notion of a Sport Education season is often presented as a critical factor in skill improvement (Hastie, Sinelnikov & Guarino, 2009). It should be noted that the Sport Education students in this study did attend more than what was required (by as many as seven sessions), thereby extending the length of their involvement season, and perhaps benefitting from the extra opportunities to practice (in this case up to 600 minutes). It must be mentioned however, that due to a lack of data, definitive statements about actual competence cannot be made between the test scores of this cohort and those from previous basketball clubs. This is because the Sport Education students in this season were assessed on their game play versus the traditional skills tests of their predecessors.

Other common suggestion present in the Sport Education literature concerning skill and game play improvement relates to the idea of formal competition. As Hastie (2000) notes, much of the accountability for student performance is embedded within the nature of the model. Because games "count" within the Sport Education season, they tend to be treated more seriously, a factor from accountability research known to be critical. It has been repeatedly reported by students that because Sport Education is "more serious" than regular physical education, that they treat their practice sessions with more diligence and work towards higher levels of individual achievement. This was supported in the current study by students' comments suggesting that the competition "urges you to train better in team practice."

**Relatedness and engagement**

Research in physical education has shown that when students feel connected with their teachers and peers they exhibit greater levels of behavioral, cognitive, and emotional engagement (Xiang et al., 2017). More specifically, there is a prevalence of the positive reports by students of increases in relatedness following seasons of Sport Education. As examples, Perlman and Goc Karp (2010) assert that the primary driver for supporting student's relatedness seemed to be grounded within team affiliation, a statement supported by empirical data in later studies (Perlman, 2011; Sinelnikov & Hastie, 2012). What is particularly relevant with respect to team affiliation is that teams in Sport Education remain intact for the entire length of a season. As Wallhead, Hagger and Smith (2010) point out, within such an arrangement, teammates can provide alternative forms of perceived autonomy support.

It is our contention that the major contributor to the difference in attendance between the Sport Education cohort and those who participated solely in individual practice was indeed the possibility for higher levels of relatedness presented by team membership. As Wallhead (2012)

notes, persisting teams and their associated affiliation allow students to gain a sense of social connection, with these in turn contributing to students' enjoyment. Certainly, while this study did not collect data concerning the students' basic needs satisfaction, it would be reasonable to hypothesize that positive changes may indeed predict higher levels of participation and engagement in the sports club.

## Future possibilities

It was not the intent of this study to collect extensive data from students concerning their perceived autonomy support from teachers and classmates, their autonomous motivation, or even intentions to participate beyond the requirements of the sports club. Rather, the goal was to assess whether indeed the inclusion of a Sport Education option within the sport club would result in greater levels of attendance and engagement than in previous iterations. In addition, the students' and teacher's responses to the opportunity to participate in teams within a formal competition were sought after.

Given there was a significant increase in attendance by those who chose the Sport Education option over previous club attendance, and over those who preferred to practice independently, it would seem this arrangement of physical education within Chinese universities has particular promise. Indeed, it is one example of a more innovative approaches to teaching physical education in higher education which have been encouraged by authors such as Stapleton, Taliaferro, and Bulger (2017).

What is needed is further investigation with respect to those elements of which best predict changes in autonomous motivation leading to enhanced engagement. An interesting twist in this case however, is that the model most commonly used to identify these elements (the trans-contextual model) has as its dependent measure participation in a context *other* than physical

education. In the sports club setup within Chinese physical education, the dependent measure is attendance in the *same* context over and above what is required in an already highly autonomy supportive environment.

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# Chapter 3

## College Students' Development of Badminton Skill and Tactical Competencies Following Play Practice


Abstract

Purpose: The purpose of this study was to examine the effects of Play Practice instruction on the performance of badminton in college students. Method: A total of 66 students from the U.S. and China participated in units following either the principles of Play Practice or Skill-focused Instruction (SI). A nonequivalent control/comparison group experimental design with pre- and post- measures was used in this study. Separate ANOVAs with repeated measures (time x group) were conducted to examine the effects of Play Practice and SI for each of four dependent variables: (a) forehand clear, (b) wall volley, (c) game performance, and (d) tactical understanding. Results: Both Play Practice and SI conditions were effective in improving participants' skills from pre- to post-test. However, Play Practice was also effective in improving participants' game performance. Conclusion: Play Practice effectively developed both fundamental skills and tactical aspects of badminton without diminishing the transfer effect from practice to games.



Keywords: physical education, instructional methods, US, China

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## Introduction

A typical lesson sequence in a physical education unit following a skill-focused instructional approach (SI) consists of an introductory activity, skill/drill practices aimed at developing or improving techniques, followed by game play (either small- or full-sided). This model places technical proficiency as central to instruction, while tactical knowledge and game sense are considered subservient until skills are fully established (Oslin & Mitchell, 2006). This approach, while often producing students with considerable technical skills, has been criticized for ignoring the development of students' game play competency (Blomqvist, Luhtanen, & Laakso, 2000; Kirk, 2010).

The key criticisms of a technique focused methodology emanated from Bunker and Thorpe (1982) who suggested that skill-driven teaching could not guarantee an effective tactical knowledge transfer from skill to game play. This hypothetical notion was supported by research demonstrating that in order to be competent games *players*, learners need to receive tactical knowledge or game sense *within* game like conditions (French et al., 1991; Harrison, Fellingham, Buck, & Pellett, 1995; Lee & Ward, 2009). By consequence, several instructional models have been developed where a key goal has been the teaching of tactics in sport. These include Teaching Games for Understanding (TGfU; Bunker & Thorpe, 1982), Game Sense (Den Duyn, 1997), Tactical Games (Griffin, Mitchell, & Oslin, 1997), and Play Practice (Launder, 2001).

Miller (2015) suggests that the weight of evidence provided by studies of these game centered approaches identifies different degrees of association between them and various student outcomes. While declarative knowledge and affective outcomes (e.g., perceived competence, interest/enjoyment, or effort/importance) are seen as strengths of these approaches, support for

the development of decision making or skill execution during game play remains inconsistent or uncertain. Together with the review of Harvey and Jarrett (2014), these authors recommend further assessment of tactical awareness development associated with games centered interventions and suggest more research into newer approaches such as Play Practice is warranted. Notably, both reviews also suggested future studies report evidence of game play process measures. Given these recommendations, the purpose of this study was to investigate the development of skill and tactical competence, as well as game performance in college level badminton through the incorporation of the key elements of the Play Practice model.

Play Practice was first proposed by Launder in 2001, with the specific aim of creating skilled and motivated games players. In Launder's description, two key elements make up skillful play. One of these is "game sense," which includes the ability to use an understanding of the rules, tactics, strategy, and problem solving during the sport play. The second element is having the required technical ability that corresponds with the fundamental skills of a sport.

While Play Practice is associated with other understanding approaches to game teaching in physical education, Lauder and Piltz (2013) assert they are not one and the same. While they claim that TGfU is concerned mainly with game play as a context for learning tactics, Play Practice begins with determining which aspects of skilled play are most important for a particular group of learners. In order to promote this skillfulness, three pedagogies form the core of Play Practice: shaping, focusing, and enhancing play (Launder & Piltz, 2013). Shaping is defined as modifying practice variables to correspond to the demanding elements of skillful play. Typical shaping includes simplified games or challenges to help shape not only game sense, but technique as well. Modifications for example, can be to the number of players, the size of the court, or the attacker-to-defender ratio.

Focusing emphasizes the teaching of specific aspects of game play. For example, in tennis, a player practices how to play a diagonal angle with a forehand stroke to deal with a flat groundstroke from their opponent. The task would involve specific marked areas close to the sidelines which would act as targets for the players.

Enhancing play involves promoting or reducing the challenge and difficulty of the play to stimulate motivation. This can be achieved by changing the learning environment, such as reducing the time of a game, establishing challenges to be accomplished in unique scenarios, or assigning various roles (coach and referee) to increase motivation within the learning process.

Within the sport pedagogy literature, however, only two experimental studies have examined the effectiveness of Play Practice. Holt, Ward, and Wallhead (2006) published the first experimental study that examined the effectiveness of Play Practice in promoting the transfer between soccer practice and game play within a cohort of college students. The result indicated that students' learning of tactical responses was consistent with their game play after the Play Practice intervention. In the Play Practice of soccer, the 3 *vs*. 2 attacking practice seemed to be the most promising task to transfer tactics to a 4 *vs*. 4 game. While useful as a first study, there are limitations with the small sample (six participants) within the study. Furthermore, the study focused only on the tactical responses of players rather than integrating both techniques and tactics to assess the students' abilities during game play.

In table tennis, Zhang, Ward, Li, Sutherland, and Goodway (2012) examined the transfer of learning from Play Practice to table tennis skill performance in college students. Using a nonequivalent control/comparison group experimental design with pre- and post-measures, three table tennis skills (forehand drive, attack, and serve) were assessed during Play Practice and Skill-focused Instruction (SI) units. Results indicated that all participants' skills, whether in Play

Practice or SI improved. In terms of differences between Play Practice and SI, however, Play Practice appeared to be more efficient in improving the students' forehand attack and serving than SI.

The research of Zhang et al. (2012) provides substantial evidence to support the Play Practice advantages found in the study of Holt et al. (2006). In addition, Zhang's research involved 56 participants resulting in greater power of the design. Nevertheless, a missing element in this study was a measure of game performance. By consequence, it is difficult to assess whether skill learning was effectively transferred to game situations.

The positive findings from these two prior Play Practice studies certainly warrant further investigation. In the first instance, a replication of the Zhang et al. (2012) study is justified. As Makel and Plucker (2014) comment, replication is a powerful avenue to accumulate understanding. This is particularly relevant in the case of this study given the research on Play Practice is in its infancy. Makel and Plucker also suggest that replication is important because it helps check the validity of knowledge from previous research, and enables questions concerning generalization across populations or contexts to be discussed. In designing replications, however, Schmidt (2009) suggests there are two possible forms of replication. The first are "operational" replications that test the veracity of the original data. The second, and the form used in this study, are "constructive" replications which attempt to replicate a research finding with a different procedure and is therefore linked to the wider notion of replication. Given Schmidt's recommendation that it may be more appropriate to include replication elements in a study that also contains some new elements, the purpose of this study was to extend our understanding of the effectiveness of Play Practice by following the experimental *design* of the Zhang et al. (2012) study, but expanding that design to examine multiple outcomes related to skillful game play. In

this study, those outcomes included the performance of technical skills, tactical understanding, as well as game performance. Specifically, the research question for this study was as follows: are there significant differences between Play Practice and direct skill instruction on students' badminton performance with respect skill execution, tactical knowledge, and competence in game play following a semester-long (16 weeks) intervention?

## Method

### Design

A nonequivalent control/comparison group experimental design with pre- and post-measures was used to assess two experimental conditions: Play Practice and SI. As with the design of Zhang et al. (2012), this design lacks random assignment of participants to treatment groups and therefore has a potential selection threat. However, as noted by these authors, a positive aspect of the design is its ability to "ensure strong control of threats to internal validity due to history, maturation, testing, instrumentation, and regression" (p.75).

The sport of badminton was chosen for three reasons. First, the instructors had significant experience with the sport. Second, all participants reported having no prior formal instruction in badminton at the university level. Finally, the choice of the university physical education setting allowed for a better comparison with the outcomes of the two previous studies of the effectiveness of Play Practice. In this way, Schmidt's (2009) goals of replication as enhancing generalization to different/larger populations while assessing the general hypothesis of a previous study can be achieved.

### Participants

The participants in this study were from two locations, one in central China and the other in the southeastern U.S. The Chinese cohort consisted of 36 university students (non-physical

education majors; mean age 19.9 ± 0.72) from two intact classes of a state university. The Play Practice condition consisted of 18 students (5 males and 13 females), while 18 students participated in the SI class (9 males and 9 females). The American cohort consisted of 30 students (non-physical education majors; mean age 20.3 ± 1.31) from two intact general physical education classes at a land grant institution. Sixteen students experienced Play Practice (12 males and 4 females), while 14 students completed the SI condition (11 males and 3 females).

The teachers of the units had extensive experience teaching badminton. The instructor in China had taught badminton for more than 10 years to both physical education majors, as well as students from the general population. The instructor in the U.S. had been a professional athlete and major in physical education during his studies in China. He had played badminton for two years as a member of a professional team and had taught badminton for more than five years. Both instructors had received noteworthy performance evaluations in their previous annual reviews of teaching, providing testament to their instructional abilities. In addition, the instructor in the U.S. had received high teaching evaluations from students in previous physical education classes in general, and badminton classes in particular. The institutional review board for human subjects' research of the authors' universities approved the research protocol, and all participants provided informed consent with respect to their participation in the study.

**Interventions**

The students in China participated in one 90-minute lesson per week over 16 weeks, while the U.S. students participated in three 50-minute lessons per week (Monday, Wednesday, and Friday) over 16 weeks. Both instructors shared common primary learning objectives across both the SI and Play Practice interventions. These included: (a) demonstrating the appropriate level of competence in grip and racket control, forehand and backhand clear, serves, drop short,

drive, and smash; (b) badminton specific footwork; (c) knowledge of basic tactics and strategies to play singles games; and (d) the ability to apply basic skills and tactics in singles games. Table 5 provides an outline of the progressions of technical skills covered for both interventions.

Table 5

*Lesson Content*

| Week | China | U.S. |
|---|---|---|
| 1 | Introduction of the syllabus, basic knowledge, grip | Introduction of the syllabus, grip, fundamental skills and techniques (forehand, overhead, backhand, lob, drop, smash, and serve) |
| 2 | Introduce basic theory, rules, forehand serve | Introduction of forehand clear;<br>Gripping the racket;<br>Familiarity with the shuttlecock |
| 3 | Underhand long/short serve<br>*Challenge:* serve placement | Basic skill of badminton strokes (forehand clear & overhead clear);<br>Footwork on the Court (step close step; shuffle step – badminton lunge, three-step returns to midcourt).<br>*Challenge:* forehand clear |
| 4 | Forehand clear play straight/diagonal,<br>*Challenge:* clear placement | Forehand strokes practice;<br>Overhead strokes practice;<br>Footwork practice;<br>*Challenge:* footwork |
| 5 | Forehand drive/lob,<br>serve-drive-lob rally *Challenge:* serve-drive-lob | Introduce and demonstrate serves: long and short serves;<br>Footwork practice;<br>*Challenge:* serve placement challenge. |
| 6 | Flat clear, backward footwork (cross steps)<br>*Challenge:* flat clear-drive-lob connection challenge | Introduction of drive and lob;<br>*Challenge:* serve-drive-lob rally |
| 7 | Forehand/backhand drive, net shot,<br>*Challenge:* drive-net shot-lob rally | Skill combination: forehand clear, drive & lob in half court;<br>*Challenge:* forehand clear-drive-lob |

| | | |
|---|---|---|
| 8 | Backcourt footwork, smash,<br>*Challenge:* smash challenge | Introduce and demonstrate forehand drive (overhead and underhand) and backhand drive (overhead and underhand).<br>Drop Shot Drill 1, Underhand Drop Shot at Net;<br>Drop Shot Drill 2, Crosscourt Drop Shot at Net;<br>*Challenge:* forehand clear-drop short |
| 9 | Midcourt footwork, block,<br>*Challenge:* footwork | Class competition – practice games |
| 10 | Forehand/backhand hook cross corner,<br>*Challenge:* hook cross corner | Class competition – practice games |
| 11 | Backhand drive, clear, backhand backcourt footwork,<br>*Challenge:* backhand clear-drive | Class competition – official games |
| 12 | Skill combination, full-court footwork<br>*Challenge:* half-court single game | Class competition – official games |
| 13 | Class competition 1 | Class competition – official games |
| 14 | Class competition 2 | Class competition – official games |
| 15 | Class competition 3 | Final Exam |
| 16 | Class competition 4 | Final Exam |

Note: *Challenges* were only present in the Play Practice lessons.

For the SI group, however, the focus was exclusively on learning these fundamental technical skills and then applying them in games. Lessons consisted of 10 minutes of a conditioning warmup, followed 60 minutes of teacher demonstration, individual skill practice and partner rallying, and ending with 15-20 minutes of free play (either singles or doubles).

The Play Practice class followed a similar introduction, with the warmup and technical skill development. However, the pedagogies of shaping, focusing, and enhancing play were

incorporated in the Play Practice lessons during the instruction of many of these skills (particularly in the partner rallying sections). In addition, the final 25 minutes of each Chinese lesson, and the last 15 minutes of each U.S. lesson were allocated to the application of selected technical skills into competitive challenges. These challenges were game-based (either singles or doubles), were designed to develop the students' ability to read play, make decisions, and execute appropriate responses and are shown in Table 5. Each lesson challenge was designed by the research team in consultation with the instructors. At the end of each week, the instructors would contact the research team and identify which specific aspects of badminton game sense and technique they wanted the students to focus on during challenges.

**Instructor Training and Support**

The professional development program designed to train the instructors in the content and pedagogy of Play Practice before this study followed a similar three step approach developed by Sinelnikov (2009). The program took place over six months prior to the commencement of the study. First, the instructors were provided with the Play Practice text (Launder & Piltz, 2013) and other materials describing the main features of the model, as well as detailed explanations on how to implement Play Practice lessons. Second, they participated in a series of meetings in China with the author team where they jointly designed their units and created a Play Practice-based lesson plan. During these meetings, the goal was to have both instructors understand and explore the pedagogies of Play Practice, including possibilities for shaping, focusing, and enhancing play. Following the meetings in China, both instructors taught physical education classes using the Play Practice model in the semester prior to this study.

Weekly debriefing sessions were held throughout the 16-week study. Advice was given with respect to issues or concerns that may have compromised the fidelity of the implementation

of the two pedagogical models (interventions). Examples included dealing with reduced practice space due to a venue conflict, student absences, and in particular, offering advice about a specific challenge in cases where the teacher believed the students were not progressing at the rate expected for a specific skill (e.g., backhand clear). It should be noted that none of the research team's responses to these issues resulted in any deviation from authentic model implementation.

### Fidelity of Interventions

Similar to the study of Zhang et al. (2012), the fidelity of the Play Practice and SI classes was rated using a checklist for the cohorts in both China and the U.S. The checklist was organized to determine the extent of match between the content of lesson plans and the delivery of the lesson events (i.e., the use of pedagogies specific to each intervention). For Play Practice, the four items included (a) the planned duration of activities, (b) the presence and duration of challenges, (c) the presence of the stated play practice pedagogies, and (d) the progression sequence of the lesson plans. The four item SI checklist also examined activity duration and progression sequence, the absence of game modifications that would serve to shape or focus play, and a preponderance of direct technical skill instruction. The checklists were used to examine the videos of 10 lessons (five SI and five Play Practice) from the Chinese instructor, and to live code 10 lessons (five SI and five Play Practice) from the U.S. instructor. The overall fidelity level was 92% for the Chinese instructor and 94% for the US instructor. SI and Play Practice fidelity reached 98% and 98% respectively.

### Measures

The following data were collected for this study: (a) students' performance on two badminton skills tests, (b) students' badminton tactical knowledge, and (c) students' competence in game play. The skill and tactical knowledge tests were administered at pre- and post-

intervention. In terms of game play competence, each student was videotaped twice during singles play over the first three days of the units and twice again during the final three days of the course.

**Skills tests.** The French Clear Test (Scott, Carpenter, French, & Kuhl, 1941) involves participants' receiving a serve, and then attempting to hit the shuttle back from across the net to the deepest part of the court. The court is divided into zones, with scores ranging from 0 to 5 depending upon where the shuttlecock lands. Ten trials are given. Due to the requirement for a consistent serve, the test was administered by a faculty member and expert badminton player for both the pre- and post-tests. The French clear test has a reported reliability of 0.96 using an odd/even correlation (Scott et al., 1941). This test was selected for two reasons. First, it is easy to administer; second, and more importantly, it replicates a critical skill strongly associated with success in badminton gameplay. As Rink and colleagues (Rink, French, & Graham, 1996) have noted, the ability to exert force on a badminton shuttle is necessary for students before they can incorporate tactics into their play.

The wall volley test (Miller, 1951) was used to assess the participants' skill levels in terms of object control. The object control skill in sports reflects a feature critical to successful gameplay. The wall volley task requires participants to continuously hit a shuttle to a wall for 30s to score as many successes as possible. A successful hit is defined as one that lands above a line that is net height from the floor and five feet from the wall. Each student has two opportunities to complete the wall volley test with the best score counting. The reported reliability of this test is .94, with validity in relation to total playing ability having a coefficient of .83.

**Tactical understanding.** The video-based game understanding test procedure developed by Blomqvist, Luhtanen, Laakso, and Keskinen (2000) was used to determine changes in the students' ability to solve tactical problems by selecting solutions and arguments for their decisions. In this procedure, students watch a series of badminton rallies and then determine the most appropriate response by one player, as he or she is getting ready to play a stroke. Students were asked to select the appropriate action out of three alternatives (selected stroke options; SSO) and to choose two arguments from a set of 10 as to why they chose that option (selected argument options; SAO). All participants in the study completed this test prior to the first lessons in both interventions and after the final lessons. Test-retest reliability of this instrument was reported at .81.

**Competency in game play.** Performance during badminton game play was assessed using the Game Performance Assessment Instrument (GPAI; Oslin, Mitchell, & Griffin, 1998). All matches were captured on videotape from an elevated platform behind the baseline of each court. In this study, the elements of decision-making and skill exertion were used. The decision-making index (DMI) was scored as the number of appropriate decisions made divided by the number of appropriate and inappropriate decisions made. An appropriate decision was defined as a shot that made the opponent move forwards, backwards or sideways i.e., to take them away from their home or recover position, or one that gave the opponent little time to react to the oncoming shuttlecock (e.g., smash). The GPAI identified the skill execution index (SEI) as the number of successful skill executions divided by the number of successful and unsuccessful skill executions. A successful skill execution was defined as a shot that crossed the net and would have landed in court. Game performance was calculated using the formula [DMI + SEI]/2.

Stability reliability for the GPAI is reported as being between .85 and .97 depending upon the sport.

Prior to formal data collection, two observers independently coded videos of six games from previous badminton units (three from a Chinese class for physical education majors, and three from a U.S. general physical education class) using the GPAI. The two observers then discussed the results of these coding sessions to identify inconsistencies in order to determine the specific parameters of both decision and execution components for future coding. This process of collaborative coding followed by independent coding continued until the coders reached an 80% agreement criterion across three consecutive games. During the study, reliability was determined by independent coding videos of three randomly selected lessons from each cohort, which included samples of nine badminton games and 18 participants. Both skill-execution and decision-making agreement scores exceeded 90%.

During formal data collection, all students participated in two, five-minute singles matches at both pre- and post-intervention. While the reliability recommendations for the GPAI are set at 80%, skill-execution agreement was 95%, while decision-making reached 90% agreement between the two coders.

**Data Analysis**

Pearson-product correlations were conducted to examine the relationships among the four dependent measures French clear, wall volley, tactical understanding, and game performance. Scatter plots among the four dependent variables were plotted to identify any potential outliers visually. Normality and homogenous variances were also checked before further analysis.

For each cohort (Chinese and U.S.), two separate repeated measures analyses of variance (ANOVA; time x conditions) were conducted to examine the effects of Play Practice and SI for

each of the four dependent variables. An alpha level of 0.0125 was used based on a Bonferroni adjustment. For any significant interaction effects between the four pre- and post-measures and the two interventions, scatter plots were used to interpret the results. The rationale for the separate analyses lies in the differences in the schedules (and subsequent length of the intervention) between the two cohorts. The Chinese students met once a week for 90 minutes while those in the U.S. met three times per week for a total of 150. Also different was the number of challenge opportunities for students (one versus three per week).

## Results

### Descriptive Statistics and Assumptions

Means and standard deviations for the four dependent measures are presented in Tables 6 (Chinese cohort) and 7 (American cohort). Visual inspection of the scatter plots did not find any outliers in the dataset, and the homogeneous variances test of all pre- and post-tests show no violations of assumptions. All data met normality and normal distribution assumptions without statistical violations.

Table 6

*Chinese Performance Scores*

| Variables | Conditions | Pre-intervention *M (SD)* | Post-intervention *M (SD)* |
|---|---|---|---|
| French Clear | SI | 14.06 (14.43) | 20.44 (8.23) |
| | PP | 16.39 (13.90) | 28.39 (10.26) |
| Wall Volley | SI | 19.11 (7.53) | 28.17 (4.53) |
| | PP | 12.50 (7.88) | 20.67 (8.37) |
| Tactical Knowledge | SI | 57.00 (11.92) | 57.28 (7.61) |
| | PP | 53.22 (11.44) | 56.39 (8.56) |
| SSO | SI | 27.44 (4.69) | 27.61 (3.15) |

| | | | |
|---|---|---|---|
| | PP | 26.61 (4.64) | 28.39 (3.70) |
| SAO | SI | 29.56 (7.85) | 29.67 (5.68) |
| | PP | 28.28 (6.89) | 28.00 (5.47) |
| Game Performance | SI | 4.47 (3.77) | 4.07 (1.47) |
| | PP | 3.07 (1.64) | 4.97 (2.17) |
| DMI | SI | 4.89 (6.75) | 3.81 (2.93) |
| | PP | 3.20 (2.96) | 6.08 (4.68) |
| SEI | SI | 4.04 (2.25) | 4.33 (2.24) |
| | PP | 2.94 (2.22) | 3.86 (1.68) |

Table 7

*American Performance Scores*

| Variables | Conditions | Pre-intervention *M (SD)* | Post-intervention *M (SD)* |
|---|---|---|---|
| French Clear | SI | 18.64 (7.90) | 29.71 (11.18) |
| | PP | 16.13 (10.67) | 38.13 (9.24) |
| Wall Volley | SI | 14.5 (5.73) | 22.00 (4.21) |
| | PP | 10.94 (5.63) | 27.90 (4.21) |
| Tactical Knowledge | SI | 55.00 (12.87) | 60.93 (7.95) |
| | PP | 59.19 (5.86) | 67.44 (6.98) |
| SSO | SI | 28.00 (3.51 | 29.21 (3.12) |
| | PP | 29.31 (3.05) | 30.25 (2.46) |
| SAO | SI | 27.00 (6.05) | 31.71 (5.94) |
| | PP | 29.88 (5.61) | 37.19 (4.97) |
| Game Performance | SI | 3.57 (0.77) | 3.94 (0.82) |
| | PP | 2.26 (0.77) | 6.27 (2.11) |
| DMI | SI | 2.13 (1.21) | 3.22 (1.51) |
| | PP | 1.12 (0.71) | 7.78 (3.81) |
| SEI | SI | 4.04 (2.25) | 4.65 (1.71) |
| | PP | 3.40 (1.48) | 4.75 (1.78) |

**Correlational Analysis**

The Pearson-product correlations between the dependent measures are presented in Table 8. These results show indicated a positive mutual correlation between the two skill tests, indicating that the concept of "technical performance" used in subsequent discussion could apply to either of both of these measures.

Table 8

*Pearson Correlation Matrix for all Variables*

| | | China | | |
|---|---|---|---|---|
| Variables | Wall Volley | French Clear | Tactical Knowledge | Game Performance |
| Wall Volley | 1 | 0.625** | -0.176 | 0.24 |
| French Clear | | 1 | 0.057 | 0.344 |
| Tactical Knowledge | | | 1 | 0.036 |
| Game Performance | | | | 1 |
| | | US | | |
| Variables | Wall Volley | French Clear | Tactical Knowledge | Game Performance |
| Wall Volley | 1 | 0.55** | 0.24 | 0.38* |
| French Clear | | 1 | 0.22 | 0.51** |
| Tactical Knowledge | | | 1 | 0.32 |
| Game Performance | | | | 1 |

** Correlation is significant at the 0.01 level; * Correlation is significant at the 0.05 level.

### ANOVAs - Chinese cohort

**Skill tests.** The ANOVA with the French clear as a dependent variable indicated no significant interaction effect between time and conditions, $F(1, 34) = 2.44$, $p = 0.13$. There was no significant main effect for conditions, $F(1, 34) = 2.07$, $p = 0.16$, but a significant main effect for time, $F(1, 34) = 26.23$, $p < 0.001$, $\eta^2 = 0.436$, was found. The results showed that participants in both Play Practice and SI conditions significantly increased their French clear from pre- to post-intervention. However, there was no significant difference in the French clear between the Play Practice and SI conditions.

The ANOVA with the wall volley as a dependent variable indicated no significant interaction effect between time and conditions, $F(1, 34) = 2.44$, $p = 0.13$. However, there were

significant main effects for time, $F(1, 34) = 61.18$, $p = <.001$, $\eta^2 = 0.643$, and for conditions, $F(1, 34) = 10.82$, $p = 0.002$, $\eta^2 = 0.241$. The results showed that participants in both the Play Practice and SI conditions significantly increased their wall volley from pre- to post-intervention, with those students in the SI condition improving to a greater extent.

**Tactical understanding.** The ANOVA with tactical understanding as a dependent variable indicated no significant interaction effect between time and conditions, $F(1, 34) = 0.44$, $p = 0.51$. There were also no significant main effects for time, $F(1, 34) = 0.63$, $p = 0.43$, or conditions, $F(1, 34) = 0.84$, $p = 0.37$.

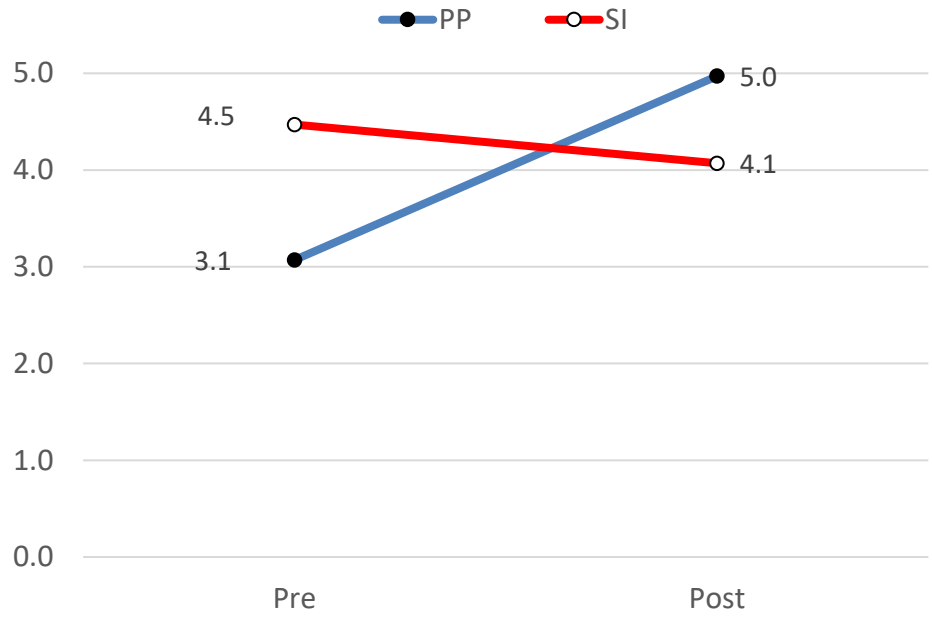


*Figure 1.* Time x Group Effect on Game Performance of Chinese Students

**Game performance**. The ANOVA with game performance as a dependent variable indicated a significant interaction effect between time and conditions, $F(1, 34) = 7.45$, $p = 0.01$, $\eta^2 = 0.181$ (see Figure 1). There was no significant main effect for conditions, $F(1, 34) = 0.13$, $p = 0.73$, but a main effect for time was found, $F(1, 34) = 3.20$, $p = 0.08$, $\eta^2 = 0.086$. The results

indicated that participants in the Play Practice condition had significantly greater improvements in game performance from pre- to post-intervention compared with those in the SI condition.

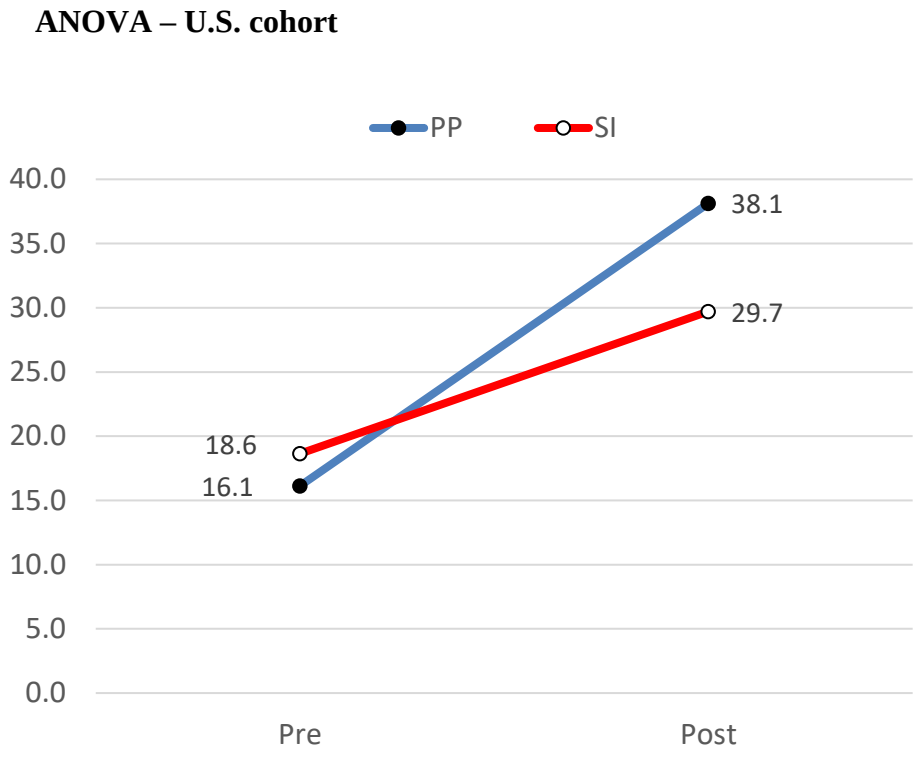


*Figure 2.* Time x Group Effect on French Clear of U.S. Students

**Skill tests.** The ANOVA with the French clear as a dependent variable indicated a significant interaction effect between time and conditions, $F(1, 28) = 6.70$, $p = 0.02$, $\eta^2 = 0.193$ (see Figure 2), and a significant main effect for time, $F(1, 28) = 61.39$, $p < 0.001$, $\eta^2 = 0.687$. There was no significant main effect for conditions, $F(1, 28) = 1.02$, $p = 0.32$. The results showed that participants in both Play Practice and SI conditions significantly improved their French clear skill from pre- to post-intervention. However, participants in the Play Practice condition had significantly greater improvements in the French clear from pre- to post-intervention compared with those in the SI condition.

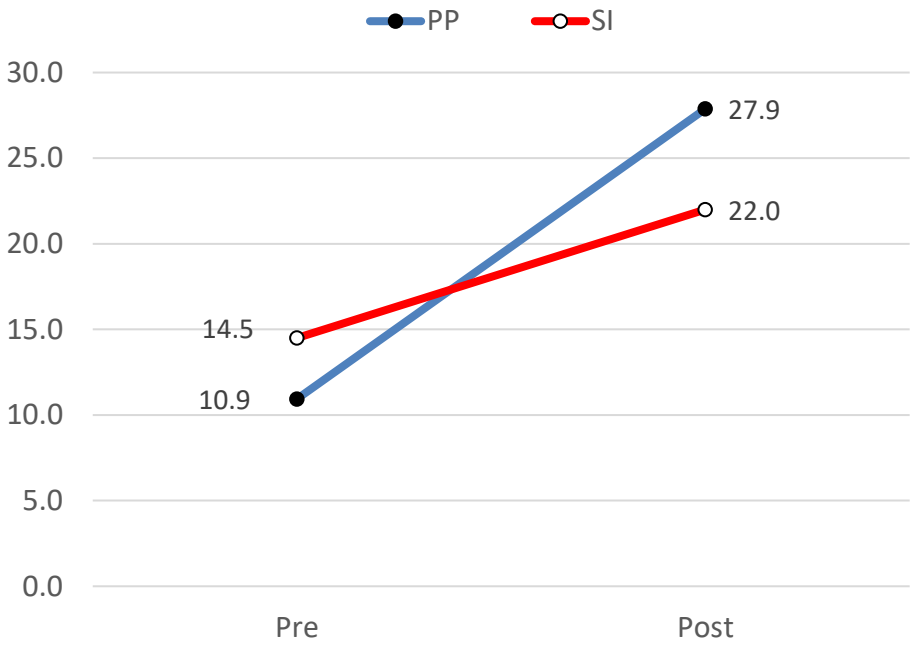


*Figure 3*. Time x Group Effect on Wall Volley of U.S. Students

The ANOVA with the wall volley as a dependent variable indicated a significant interaction effect between time and conditions, $F(1, 28) = 34.70$, $p < 0.001$, $\eta^2 = 0.553$ (see Figure 3), and a significant main effect for time, $F(1, 28) = 174.95$, $p < 0.001$, $\eta^2 = 0.862$. There was no significant main effect for conditions, $F(1, 28) = 0.81$, $p = 0.38$. The results showed that participants in both PP and SI conditions significantly improved their wall volley skills from pre- to post-test.

**Tactical understanding.** The ANOVA with tactical understanding as a dependent variable indicated no significant interaction effect between time and conditions, $F(1,28) = 0.43$, $p = 0.52$. There was no significant main effect for conditions, $F(1,28) = 4.12$, $p = 0.05$, but a significant main effect for time was found, $F(1,28) = 15.95$, $p < 0.001$, $\eta^2 = 0.363$. The results showed that participants in both Play Practice and SI conditions significantly improved their tactical understanding from pre- to post-intervention. However, there was no significant difference in the tactical understanding of participants between conditions.

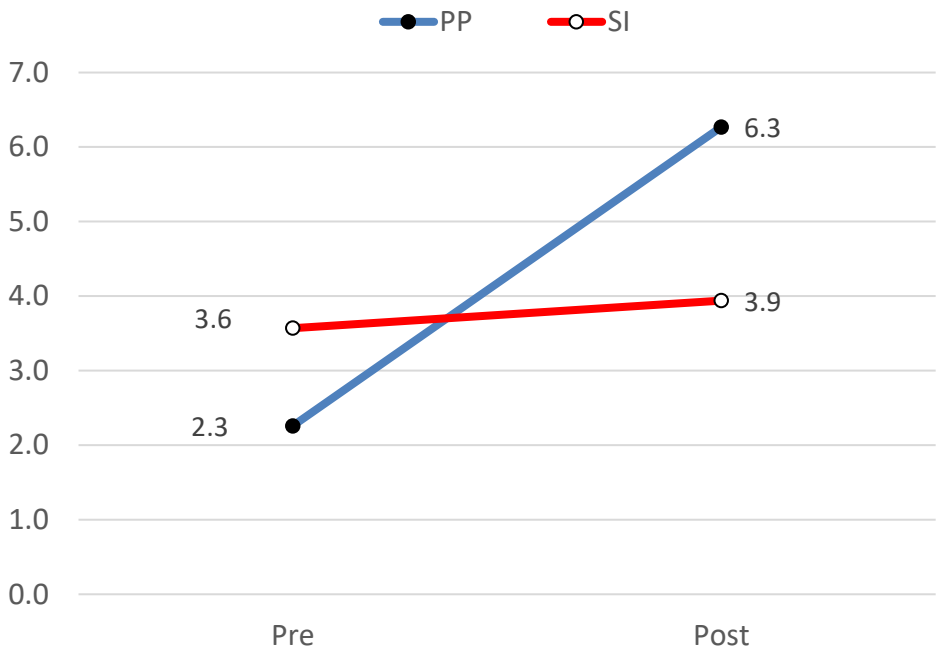


*Figure 4.* Time x Group Effect on Game Performance of U.S. Students

**Game performance.** The ANOVA with game performance as a dependent variable indicated a significant interaction effect between time and conditions, $F(1,28) = 31.71$, $p < 0.001$, $\eta^2 = 0.531$ (see Figure 4), and a significant main effect for time, $F(1,28) = 48.82$, $p < 0.001$, $\eta^2 = 0.621$. There was no significant main effect for conditions, $F(1,28) = 2.24$, $p = 0.15$. The results showed that participants in both Play Practice and SI conditions significantly improved their game performance from pre- to post- intervention.

## Discussion

The purpose of this study was to extend our understanding of the Play Practice model by following the experimental design of Zhang et al. (2012) while also expanding that design to include outcomes that are important in games teaching such as tactical awareness and game performance. Another purpose of the study was to investigate the veracity of Play Practice in different physical educational contexts and with different time periods of instruction.

With respect to the research question: “are there significant differences between Play Practice and direct skill instruction on students’ badminton performance with respect skill execution, tactical knowledge, and competence in game play following a semester long intervention?”, from a global perspective, the findings mirror those of the Zhang et al. (2012) study in table tennis. Students in both the SI and Play Practice interventions improved in their ability to execute discreet sport skills, with some of these skills being explicitly advantaged under the conditions of Play Practice. Differences were found, however, in the outcomes of tactical awareness development across the Chinese and American contexts. That being said, in both China and the U.S., students who participated in Play Practice experienced significantly greater gains in their game play across the length of their courses.

Put together, these results serve to further legitimize Play Practice as an instructional model to promote skill development and game performance in at least net sports at the college level, and as such contribute in a small way to Zhang et al.’s (2012, p. 84) that “clearly, more research needs to be conducted using Play Practice instruction.” In particular, the addition of game play variables was encouraged by the previous authors investigating Play Practice, and the consistent findings from the U.S. and China serve to strengthen the claims made above.

The findings of the current study support Holt et al.’s (2006) Play Practice study which demonstrated a solid transfer learning effect in college students from practices to games in soccer. Holt and colleagues suggested that that the tactical response in soccer practice can be effectively transferred to the game after a total of 14 sessions of Play Practice intervention, especially in the attacking scenarios, such as 3 vs. 2 attacking and defensing simulations. The same claim could be made about the current study, particularly with respect to the gains made in decision making during badminton games. However, this assertion needs to be treated with

caution as this improvement, while substantive from an observational perspective, did not reach statistical significance.

### Implications for Technical Development

In earlier studies involving badminton instruction in high school settings, French, Rink and colleagues (French, Werner, Rink, Taylor & Hussey, 1996; French, Werner, Taylor, Hussey, & Jones,1996; Rink et al., 1996) as well as Hastie, Sinelnikov and Guarino (2009) asserted that students need time to develop basic skills, for example, minimum objects control, to be self-competent in their sports ability. In this study, given the students were practicing these technical skills over extended periods of time also allowed for significant gains in their technical competence. In addition, and consistent with the results from Zhang et al. (2002, p. 83), "the conditions of (a) knowledgeable instructors who develop object control skills in their students and (b) daily small-sided games, may explain the significant pre-post gain in both conditions."

Zhang et al. (2012) suggest that the greater effectiveness of Play Practice (in terms of skill development) lies in the "challenges" which are central to Play Practice. While significant main effects for time were present in both the U.S. and Chinese cohorts, the main effect for conditions was evident only for U.S. students. The most plausible explanation here is that the study participants in the U.S. were exposed to three lessons per week, albeit shorter in time (50m compared to 90m), while their counterparts in China were exposed to one lesson per week. That is, while the dose of practice in China was sufficient to promote skill, it may not have been sufficient to allow the students in Play Practice to outperform their SI peers.

### Implications for Tactical Understanding

One of the most intriguing results from this study lies in the differences between the two cohorts in terms of tactical understanding. While the U.S. students in both classes improved

significantly from pre- to post-intervention (though neither of the conditions demonstrated superiority), there were no observable gains in the Chinese students. The American results were consistent with those of Hastie et al. (2009), who in a Sport Education season showed significant improvement in Russian high school students' ability to solve tactical problems using the same testing protocol. In that study, the authors attribute these gains to three features: (a) that the game of badminton itself presents reasonably simple tactical solutions for students to solve, (b) there was significant game play throughout the Sport Education season, and (c) the inclusion of the umpiring role in Sport Education meant that the students were active observers during games, and this watching other students in a focused way may help promote tactical awareness. While the first two conditions identified by Hastie et al. are plausible explanations in this study, and are consistent with the U.S. outcomes, they do not help account for the lack of gain scores in the Chinese students. One possible explanation for this difference is that badminton is a popular participant and spectator sport in China, and that the students may have some inherent tactical understanding from their acquaintance knowledge. However, even this hypothesis is dubious when one considers the pre-test scores of the U.S. students were equal to their Chinese counterparts. What is perhaps most plausible is that the repeated weekly doses of Play Practice in the U.S. (3 *vs.* 1 exposure per week) provided a higher probability of tactical solutions being transferred to working memory. Again, this is purely speculative but warrants further consideration.

**Implications for Game Performance**

While the students from both cohorts showed contrasting results in terms of tactical understanding, their results for game performance were almost identical. In both countries, students from SI and Play Practice conditions improved significantly from pre- to post-

intervention, with the students experiencing Play Practice showing superior gains. These findings are consistent with other game-based instructional approaches both within Play Practice (see Holt et al., 2006), and using other curriculum models (see Harvey & Jarrett, 2014), where the common tenet is that skill-driven teaching approaches cannot produce tactical knowledge and strategies simultaneously (Mitchell & Oslin, 1999; Rink et al., 1996). This assertion is supported when one considers the vast improvements in the students' decision-making component of their game play analysis, where the Chinese students improved their scores from 3.20 to 6.08, and the U.S. students from 1.12 to 7.78. It could therefore be hypothesized that Play Practice was effective in connecting techniques and tactical understanding.

### Implications for Teacher Education and Professional Development

As Launder and Piltz (2013, p. 13) note, "the primary objective of Play Practice has always been to find ways to engage and motivate youngsters." For students in Physical Education Teacher Education programs, the idea of game play fits comfortably within their occupational socialization, value orientations, and beliefs about what teaching physical education should entail (Curtner-Smith, Hastie, & Kinchin, 2008). As such, it should not be a difficult model to attract pre-service teachers. However, as has been outlined by Miller (2015) and others (e.g., Stolz & Pill, 2014), the design of appropriate learning experiences using games centered approaches is not easy. For beginning teachers, the pedagogies of shaping, focusing, and enhancing play may be new processes that need specific curriculum time, especially given our understanding of the limits of these teachers' specialized content knowledge (Ward, Tsuda, Dervent, & Devrilmez, 2018). Having increased abilities to plan learning experiences using these pedagogies would be a viable starting point towards full adoption of Play Practice units.

For practicing teachers in schools, professional development endeavors that introduce Play Practice might first allow them to see the value of the model, but must also equip them with the skills necessary to effectively implement a new instructional model within the school setting (see Ko, Wallhead & Ward, 2006). At a minimum, instruction on shaping challenges and application of games (Ward & Lehwald, 2017) should be included, together with the collaborative planning of "practices and games that show a developmental progression in the similarities between the practice situation and the read game" (Launder & Piltz, 2013, p. 6). These activities would be strengthened by collaborative strategies and support between the instructors and teachers in terms of preparing them to deliver these new pedagogical strategies within their unique school settings.

**Conclusions**

Our findings provide further evidence in support of Launder and Piltz (2013), Holt et al. (2006), and Zhang et al.'s (2012) conclusion that Play Practice can effectively develop both fundamental skills and game play aspects simultaneously without negatively influencing the transfer effect from practice to games. The results of this study have practical implications for physical education, especially in colleges. It is clear that skill-driven instruction cannot directly transfer the skills into authentic game situations to produce a badminton player with tactical knowledge, strategies, and abilities in problem-solving. Students situated in Play Practice could benefit from comprehensive learning opportunities without sacrificing skill and tactics development. However, this recommendation comes with the caveat provided by Zhang et al. (2012) who note that for effective Play Practice outcomes to be achieved, teachers must have sufficient content knowledge of the selected activity in order to select the critical sport skills for effective game play.

### Limitations and Directions for Future Research

As per the parent paper on which this study was based (Zhang et al., 2012), this study is limited in terms of its ecological validity (convenience sample and unit of analysis). However, it did corroborate the findings of previous studies using Play Practice. The challenge for future research in this regard would be larger samples using nested models and randomization into treatments, as well as addressing the seven criterion questions presented by Miller (2015) that would qualify as high quality investigations. However, it is our belief that we may be better served to conduct these types of projects within public school settings, with the intent of extending the knowledge base beyond collegiate physical education. Commensurate with those studies on game process outcomes, researcher might also investigate students' responses to Play Practice units, particularly as they relate to long term physical activity outcomes such as engagement in games outside of scheduled physical education classes.

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# Chapter 4

## The Impact of Play Practice on Chinese Physical Education Pre-Service Teachers' Badminton Content Knowledge


Abstract

Objectives: This study examined the development of Chinese pre-service physical education teachers' technical skill, tactical understanding, game performance (common content knowledge - CCK), and specialized content knowledge (SCK) during a badminton course incorporating Play Practice instruction. Methods: Participants were 36 pre-service teachers (31 males, 5 females: age 21 ± 1.0) majoring in physical education at a university in central China. The students completed a 24 lesson course after a 16 week semester. A typical lesson (90 minutes) included a 10-minute warm-up, followed by instruction in two or three technical skills or tactics for 50-55 minutes. The final 25-minutes included the Play Practice aspect of the lesson - a specific game-based challenge to reinforce a technical or tactical aspect of badminton play. The challenge included the three typical pedagogies of Play Practice: focusing, shaping, and enhancing. The French clear test, tactical understanding in badminton, Game Performance Assessment Instrument (GPAI), and student-generated content maps were used to respectively monitor changes in technical skills, tactical understanding, game performance, and specialized content knowledge before and after the course. Parametric statistics were used to compare student outcomes. Results: Statistically significant differences were found on all measures from pre- to post-test, with all showing large effect sizes. In particular, over 75% of students achieved the benchmark depth of SCK following the course. Conclusions: The inclusion of Play Practice within a sport instruction course can contribute to various elements that are needed to promote the CCK and SCK of pre-service physical education students.



Keywords: content knowledge, badminton, Play Practice

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## Introduction

A teacher's content knowledge (the facts, concepts, theories, and principles that are taught and learned in specific academic courses) is considered to be essential for quality instruction (Ball, Thames, & Phelps, 2008; Shulman, 1987; Siedentop, 2002), particularly as it informs pedagogical content knowledge (PCK) (Ward, 2009). Indeed, Ingersoll et al. (2014) reported that teachers without well prepared content knowledge include minimal skill refinements in their instruction, struggle to identify or correct students' performances, and a lack of understanding relative to the purpose of the lesson.

Since its first introduction to the educational literature, content knowledge has been differentiated to include common content knowledge (CCK) and specialized content knowledge (SCK) (Ball, 2008; Ward, 2009). CCK is knowledge of the rules and etiquette, and knowledge of techniques and tactics of a specific content area (e.g. knowing how to play a clear in badminton). SCK is knowledge of the sub-domains of instructional tasks (e.g., the task sequence for teaching the badminton clear), representations (e.g., descriptions of the tasks) and errors that are likely with the content (e.g., using the arm to hit the shuttlecock rather than a pullback swing) in teaching CCK.

Previous research in physical education (Ward, 2009) has suggested that CCK can be acquired by simply playing the sport, while SCK must be taught specifically due to its unique in pedagogy. Tsuda's (2019) study which examined the relationship between CCK, SCK and performance supported Ward's assertion. In that study, both non-PE majors and PE majors increased their CCK of various sports (volleyball, basketball, badminton, and tennis). However,

only PE majors showed significant improvement in SCK given they were the only cohort who received specific SCK training. The evidence from Tsuda (2019) implied that a well-organized PETE program can provide sufficient SCK training for pre-service teachers. Despite this important finding, it is important to note that CK instruction accounts for approximately only 10% of the total credit hours in many PETE programs across the world (Kim, Lee, Ward, & Li, 2015; Ward, 2012, 2013). Further, CCK occupied a larger portion than SCK (Kim, Lee, Ward, & Li, 2015; Ward, 2012, 2013) in the programs studied, resulting in potential deficiencies in pre-service teachers' SCK during their professional training.

The teaching of physical education in Chinese universities, like many programs across the globe, has an emphasis on learning discrete skills and technical mastery (Guoyong, Wang, Zhai, & Wang, 2015; Zuo & Zhou, 2005). In China, pre-service teachers are required to participate in a variety of sports during their first and second years of study, including track and field, basketball, football, volleyball, badminton, dance, and martial arts. Following the second year, students select one major and one minor sport in which to specialize during their third and fourth years of study (Wang, 2014). In these latter years, the instructional focus follows a direction instructional style in which the focus is on the development of in-depth CCK via knowing and performing sports (Wang, 2014; Zhao, Li, & Zhou, 2017). Tactical content is typically neglected during this direct instruction model (Wang, 2014; Zhao, Li, & Zhou, 2017). As noted, this disconnect between the technical and tactical components will neither help the pre-service teachers to build an authentic capability in game performance nor to develop their content knowledge (Ward, 2018). Indeed, Ward's (2018) study of 384 Chinese secondary in-service teachers demonstrated low levels of SCK in soccer. The study also found that a teacher's teaching experience was negatively associated with their SCK scores. According to Ward's

(2018) results, teachers with a 1st-grade rank scored marginally better than those with a 3rd-grade rank. However, the senior physical education teacher who had more years of teaching experience scored less on the content map test than their fellow teachers (2nd and 3rd-grade). Ward (2018) posited that the physical education teacher education provided minimal SCK training. Another possible explanation to support Chinese in-service teachers lacking SCK comes from their minimal use of sequential development of skills and tactics in their content map. Ward (2018) suggested that either they did not use incremental progression as a teaching strategy or did not have knowledge of SCK.

While a number of game-centered approaches have been developed to address the issue of the separation of technics and tactics in physical education (e.g. Teaching Games for Understanding, Game Sense and Play Practice), to date there have been no efforts to examine their efficacy in promoting students' SCK. By consequence, the purpose of this study was to examine Chinese pre-service physical education teachers' badminton content knowledge following a semester-long course that incorporated Play Practice instruction.

Play Practice was first proposed by Launder (Launder, 2001), with the specific aim of creating skilled and motivated games players. In Launder's description, two key elements make up skillful play. One is "game sense," which includes the ability to use an understanding of the rules, tactics, strategy, and problem solving during the sport play. The second element is having the required technical ability that corresponds with the fundamental skills of a sport. To achieve the aims in Play Practice, three pedagogies are incorporated: focusing, shaping, and enhancing play. Shaping involves modifying practice variables to match the demanding elements of skillful play (e.g. 2 vs. 1 play, size of the court). Focusing play emphasizes instructional specific aspects

of game play (play vary angles to open space). Enhancing includes decreasing or increasing the difficulty of the play to promote motivation (adapted racket, balls, or rules in tennis).

The three pedagogies of Play Practice share similarities with Rink's (Rink, 1979) initial content development categories, namely informing (i.e., the initial task), refining (e.g., improving quality of performance), extending (e.g., increasing/decreasing the complexity), and applying (i.e., assessment or games) tasks. Ward et al. (2017) expanded these original categories of extending and refining tasks by noting where these occurred in a game context. These tasks were labeled extending-applying tasks (e.g., making the defense active in a 3 vs. 1 game) and refining-applying tasks (e.g., putting specific targets for passing accuracy in a 4 vs. 4 game). Ward et al. (2017) also distinguished between the features in Rink's (1979) original applying tasks by applying nongame tasks that refer to assessing students' performance and applying game tasks where the content of the lesson is used without any particular focus. By consequence, seven content categories can now be used to describe a preservice teachers' use of instructional tasks: informing (I), extending (E), refining (R), extending-applying (EA), refining-applying (RA), applying task-game (AG), and applying nongame (AN) tasks. All of the task categories have been validated in terms of content and concurrent validity by Ward et al. (2017).

## Methods

### Participants

The participants in this study were 36 pre-service teachers (31 males, 5 females: age 21 ± 1.0) who were majoring in physical education at a university in central China. This study was approved by the Institutional Review Board for Research Involving Human Subjects at Hubei Normal University, China (2018001), and all participants provided informed consent.

### Instruction

The badminton course consisted of 24, 90-minute lessons over 16 weeks. Each class began with a 10-minute warm-up, followed by instruction in two or three technical skills or tactics for 50-55 minutes. The final 25-minutes included the Play Practice aspect of the lesson. In the first five weeks of the semester, the teacher selected a specific game-based challenge to reinforce a technical or tactical aspect of badminton play. The challenge included the three typical pedagogies of Play Practice: focusing, shaping, and enhancing. In the remaining weeks of the course, the teacher selected a small group of three or four students to plan, prepare, and introduce a specific challenge. After completing the challenge, the remaining students provided feedback concerning the extent to which the challenge was pedagogically sound in developing badminton skill and recommended potential modifications.

**Instructor Training and Support**

The badminton teacher has been placed in a professional development program to learn the content and pedagogy of Play Practice and implementation before this study (Sinelnikov, 2009). Moreover, he successfully taught a badminton physical education in college that featured three pedagogies in Play Practice, shaping, focusing, and enhancing (Launder & Piltz, 2013).

With professional development and teaching experience, he was also using GoPro to record and share every lesson with the research team after each Wednesday. The research team will check the lesson plan according to the recorded video to monitor the progression of this badminton class. Weekly debriefing sessions will be scheduled if necessary, throughout the 16-week semester. The advice was given with respect to issues or concerns that may have compromised the fidelity of the implementation of Play Practice intervention. Examples included dealing with reduced practice space due to a venue conflict, student absences, and in particular,

offering advice about a specific challenge in cases where the teacher believed the students were not progressing at the rate expected for a specific skill (e.g., backhand clear).

### Fidelity of Interventions

Similar to the study of Zhang, Ward, Li, and Sutherland (2012), the fidelity of the Play Practice was rated using a checklist for this badminton study. The checklist was organized to determine the extent of the match between the content of lesson plans and the delivery of the lesson events (i.e., the use of pedagogies specific to each intervention). Four items included (a) the planned duration of activities, (b) the presence and duration of challenges, (c) the presence of the stated play practice pedagogies, and (d) the progression sequence of the lesson plans. The checklists were used to examine the videos of six lessons, and to live code six lessons from the first and the third author. The overall fidelity level was 94% for this badminton Play Practice implementation.

### Measures

Three measures were used to assess CCK, while SCK was measured through the creation of content maps by students.

**Skill execution**. The French Clear Test (Scott, 1941) was used to assess students' skill execution in badminton. The process of French clear begins with the participant receiving a serve and then attempting to hit the shuttle back from across the net to the deepest part of the court. The court is divided into zones, with scores ranging from 0 to 5 depending upon where the shuttlecock lands. Each assessment consists of 10 trials. The French clear test has approved reliable in the previous research and replicates a critical skill strongly associated with success in actual badminton play (Rink, French, & Graham, 1996).

**Tactical understanding in badminton**. The video-based game understanding test procedure (Blomqvist, Luhtanen, Laakso, & Keskinen, 2000) was used to determine changes in the students' ability to analyze tactical problems by selecting solutions and arguments for their decisions. In this assessment, students watch a series of badminton rallies and then determine the most appropriate response by one player as he or she is getting ready to play a stroke. Students were asked to select the appropriate action out of three alternatives (selected stroke options, SSO) and chose two arguments from a set of ten as to why they chose that option (selected argument options, SAO). This test was administered to all participants prior to the first day of instruction and one day after the final lesson.

**Game performance**. Performance during badminton game play was assessed using the Game Performance Assessment Instrument (GPAI) (Oslin, Mitchell, & Griffin, 1998). In this paper, the elements of decision-making and skill exertion were used. The decision-making index (DMI) was scored as the number of appropriate decisions made divided by the number of appropriate and inappropriate decisions made. An appropriate decision was defined as a shot that made the opponent move forwards, backwards or sideways (that is, to take them away from their home or recover position), or one that gave the opponent the shortest time to react to the oncoming shuttlecock (e.g. a smash). The GPAI identified the skill execution index (SEI) as the number of successful skill executions divided by the number of successful and unsuccessful skill executions. A successful skill execution was defined as a shot that crossed the net and would have landed in court. Game performance was calculated using the formula [DMI + SEI]/2.

Consistent with the recommendations for reliability with the GPAI, only data for which the percentage of agreement between two coders exceeded 80% were included in the analysis. This reliability was determined through a two-step process. First, four games were randomly

selected from the pre- and post-test, which included samples of eight badminton games and 16 participants. From these games, two observers discussed the parameters of both decision and execution components to determine consistency in interpretation. Second, the observers practiced collaborative and independent coding to a point where they reached a greater than 80% agreement criterion across all nine games. For this study, the final skill-execution and decision-making consensus coding all reached 95% agreement between the two coders.

**Content map design**. Prior to, and on completion of the study, each participant designed a badminton content map suitable for a 20-day instructional unit to secondary physical education (Ward, 2017). A content map is a graphic organizer that defines the content that is to be taught and illustrates the flow and connectedness of the tasks used to develop skillful performance with beginners and ending with what would be considered more advanced skill (Ward, Lehwald, & Lee, 2015). Participants were instructed to list and show the sequence of instructional tasks necessary to teach badminton to secondary school students, and to diagram relationships among the content such as when they might combine skills, and combine skills and tactics.

To analyze the depth of content development presented in the content maps, the protocol used by Ward et al. (2017) was followed. First, each instructional task in a map was coded as informing (I), extending (E), extending applying tasks (EA), refining (R), refining applying tasks (RA), applying task game (AG), or applying task nongame (AN). Second, the formula (E+EA+R+RA+AG+AN) /I was used to calculate a ratio to reflect the depth of content knowledge. This formula is based on an assumption that an informing task is an initial task in a sequence against which all other tasks can be compared because it represents the starting place for the teaching of the content. The formula creates an index score that represents the number of tasks that are developed beyond the informing task. Thus, an index score of 2.0 would mean that

there were two other tasks (e.g., extending and applying) that were used to develop that skill. Research has shown that an index score of 3.0 could be considered as a depth of SCK benchmark (Dervent, Tsuda, Devrilmez, & Ward, 2016).

### Data Analysis

Pearson-product correlations were conducted to examine the relationships among the four dependent variables: French clear, tactical understanding, game performance, and content maps. A paired sample t-test was used to analyze the difference between the pre- and post-measures for all measures, with the significance level set at 0.013. Effect sizes (Cohen's d) were used to determine the meaningful difference among variables of interest. Effect sizes of <0.2, 0.2-0.5, 0.5-0.8, and >0.8 represented extremely low, low, medium, and high effect sizes respectively (Faul, Erdfelder, Lang, & Buchner, 2007).

## Results

The scores in French clear, tactical understanding, GPAI, and content maps are presented in Table 9. Results of the t-tests showed there were statistically significant improvements in all four measures from pre-to post-test after the Play Practice badminton course. All comparisons showed large effect sizes. Figure 5 presents the extent to which students were greater or less than Ward's cut-off for the benchmark depth of SCK.

Table 9

*Technique, Tactics, GPAI and SCK scores*

| Variables | Pre-test (*M, SD*) | Post-test (*M, SD*) | *t* | *p* | *d* |
|---|---|---|---|---|---|
| French Clear | 29.58 (7.71) | 46.47 (1.87) | 13.99 | <.001 | 2.33 |
| Tactical understanding | 53.28 (16.15) | 88.75 (8.68) | 12.06 | <.001 | 2.01 |
| GPAI | 2.82 (1.19) | 6.15 (2.00 | 11.37 | <.001 | 1.89 |
| SCK | 1.26 (0.90) | 3.69 (1.24) | 10.33 | <.001 | 1.72 |

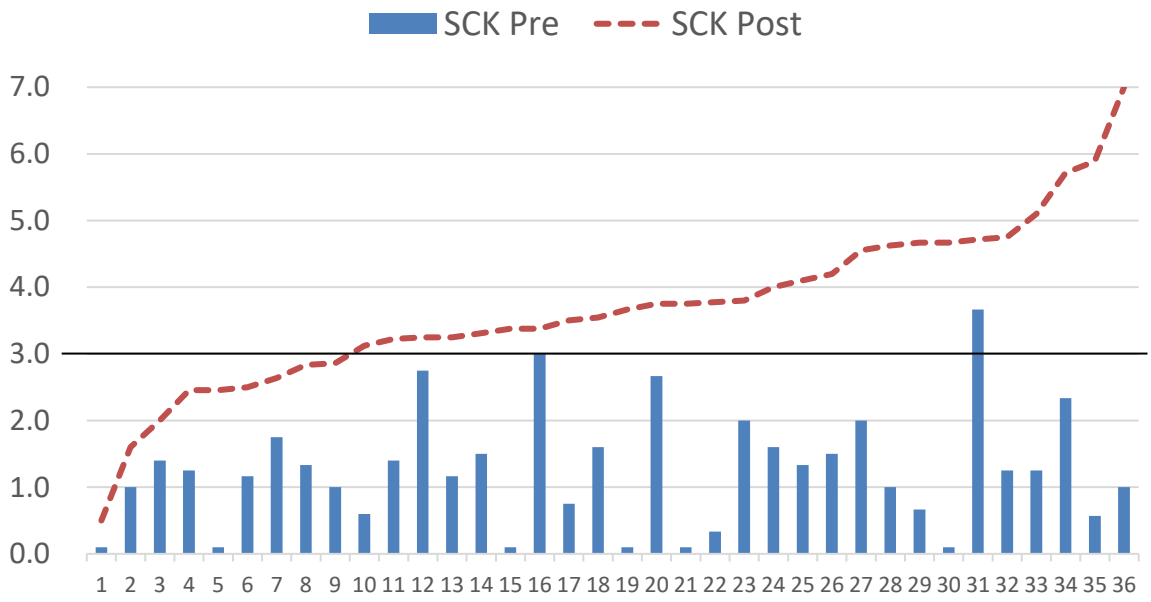


Figure 5. Comparisons of SCK scores prior to and on completion of the course

## Discussion

The purpose of this study was to determine whether the inclusion of Play Practice instruction would positively impact Chinese pre-service teachers' content knowledge of badminton. The results showed that the three pedagogies of shaping, focusing, and enhancing play seemed particularly effective in achieving this goal.

In terms of CCK, the primary pedagogy of Play Practice begins with an analysis of the activity and then determining which aspects of skilled play are most important for the particular group of learners (Launder, 2001). In this way, one would expect that those elements of CCK (knowing how to perform techniques and tactics) would be promoted by participation in challenges designed specifically to address current deficiencies in performance. This theory is indeed supported by the results of this study.

Most notably from the data in this study is that the SCK pre-test scores of students were particularly low, reinforcing previous results indicating deficiencies in Chinese teachers' SCK (Ward, 2018). However, post-test data show significant improvements so that the majority of students (>75%) achieved a depth of SCK considered to be an adequate benchmark (Ward, 2017; Dervent, Tsuda, Devrilmez, & Ward, 2016).

It is hypothesized here that that greatest contribution to the development of SCK came from the challenges students were asked to design during the course. Recall that the final 25 minutes of lessons involved students in progressively designing, teaching and playing technical and tactical related challenges to stimulate "game sense" skill and skill. In particular, the students were required to design tasks that would first, address a skill weakness that perceived as occurring in the class (a component of SCK) and then using shaping, focusing, and enhancing tasks to improve these weaknesses.

Previous research (Tsuda, Ward, Li, Higginson, Cho, He, & Su, 2019; Ward, Dervent, Lee, Ko, Kim, & Tao, 2017; Ward, Lehwald, & Lee, 2015; Dervent, Tsuda, Devrilmez, & Ward, 2016) has shown that lower-level content maps are dominant by informing tasks that neglect other tasks, such as extension, applying, and refining-tasks. To create a competent content map, the basic principle is to connect information with extension, applying, refining-tasks rather than

merely constrained in informing tasks (Ward, Lehwald, & Lee, 2015; Dervent, Tsuda, Devrilmez, & Ward, 2016). Given previous research suggesting that SCK needs to be explicitly taught in the Physical Education Teacher Education program rather than acquired in engagement in field teaching or experiences (Ingersoll, Jenkins, & Lux, 2014; Tsuda, Ward, Li, Higginson, Cho, He, & Su, 2019; Kim, Lee, Ward, & Li, 2015; Ward, Tsuda, Dervent, & Devrilmes, 2018), we suggest that the participation in a course where students are first exposed to these connections, and later, are required to design then, is one strategy that teacher preparation programs could use to improve SCK in sports-based courses.

## Conclusions

Play-Practice intervention can improve pre-service teachers' skills, tactical understanding, and specialized content knowledge (SCK) in badminton except for the game performance. We suggest PETE program considering apply Play Practice to their program training for pre-service teacher content knowledge development.

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# Chapter 5

## Conclusions

The first study aimed to examine the responses of stakeholders (students and teacher) concerning to the incorporation of the essential elements of Sport Education within an elective physical education basketball sports club in Chinese college physical education. The findings suggested that this new format was effective in creating a particularly engaging sports-based form of physical education. Engagement in this sense referred to both the behavioral intensity and the emotional quality of a person's active involvement during a task (Reeve et al., 2004). Evidence for the claim that students who participated in the Sport Education option showed substantive behavioral engagement lies in significantly higher attendance at the sports club than in previous years when this opportunity was not available.

The teacher's commentary supported the fidelity of the students' perceptions of the extent of their engagement. The teacher's notions of greater enthusiasm, engagement and high levels of peer support were consistent with the student data. These notions of "better than before" are consistent with previous studies where students have experienced Sport Education for the first time in university physical education courses (Bennett & Hastie, 1997; Mohr, Sibley, & Townsend, 2012). Given there was a significant increase in attendance by those who chose the Sport Education option over previous club attendance, and over those who preferred to practice independently, it would seem this arrangement of physical education within Chinese universities has particular promise. Indeed, it is one example of a more innovative approach to teaching physical education in higher education which has been encouraged by authors such as Stapleton, Taliaferro, and Bulger (2017).

The first Play Practice study aimed to investigate the differences between Play Practice and direct skill instruction on students' badminton performance with respect to skill execution, tactical knowledge, and competence in game play following a semester-long (16 weeks) intervention. The findings from provide further evidence in support of Launder and Piltz (2013), Holt et al. (2006), and Zhang et al.'s (2012) conclusion that Play Practice can effectively develop both fundamental skills and game play aspects simultaneously without negatively influencing the transfer effect from practice to games. It is clear that skill-driven instruction cannot directly transfer the skills into authentic game situations to produce a badminton player with tactical knowledge, strategies, and problem-solving abilities. Students situated in Play Practice could benefit from comprehensive learning opportunities without sacrificing skill and tactics development. However, this recommendation comes with the caveat provided by Zhang et al. (2012) who note that for effective Play Practice outcomes to be achieved, teachers must have sufficient content knowledge of the selected activity in order to select the critical sport skills for effective game play.

The second Play Practice study aimed to investigate whether the inclusion of Play Practice instruction would positively impact Chinese pre-service teachers' content knowledge in a badminton physical education. The findings suggested that Play Practice intervention can improve pre-service teachers' skills, tactical understanding, and specialized content knowledge (SCK) in badminton except for the game performance. We suggest the Physical Education Teacher Education program considering apply Play Practice to their program training for pre-service teacher content knowledge development.

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## Appendix 1 Basketball Club Background Survey

### Hubei Normal University Basketball Class Survey I
### 湖北师范大学篮球课问卷调查 I

同学，您好，欢迎您完成此次有关湖北师范大学体育课的问卷调查。您的回答完全保密，授课教师并不会得到此次问卷调查的结果，此调查仅供学校体育课改革和课程评估参考。感谢您的配合！

姓名（Name）：　　性别（Gender）：
年级（College rank）：
年龄（Age）：
课程（Class）：
教师(Instructor)：

Have you take any PE before at Hubei Normal University?
请问您之前在湖师选过其他体育课吗？

Yes=1　　No=0

Have you play basketball before?
请问您在选择篮球课之前有篮球基础吗？

Yes=1　　No=0

How you rate your skill?
请问你怎么评价自己的技能水平？

初学（Novice）
初级水平（entry-level）
中级水平（medium-level）
高级水平（High-level，expert）

Why do you select basketball as your PE?
请问你为什么选择篮球课作为你的体育课？
1 兴趣 Interest 2 爱好喜欢 Habit 3 体验尝试 Want to attempt
4 锻炼身体 Exercise 5 修学分 Earn credit
6 没得选 No option so that have to take basketball

Do you want to have some options in basketball class?
请问，你希望篮球课的教学形式多样，学生有更多的选择吗？
Yes=1　　No=0

Factor 1: Social affiliation (to make new friends, spending time with friends)
一，社交 （认识新朋友，和朋友在一起玩）

Factor 2: Health benefit (to keep in good health and physical condition)
二，健康 （为了锻炼身体，保持身体健康）

Factor 3: Satisfaction (e.g. to have fun, to learn new activities)
三，个人满足（篮球很有趣，可以学习新的体育技能）

Factor 4: Academic benefit (because I have to take a PE class)
四，学习学术（因为我不得不参加体育课）

Please rate the importance of each of these 4 factors in your choice to sign up for this class
请根据您选择这门体育课的情况，对上面四个部分的重要性分别打分。

| | | | |
|---|---|---|---|
| 1. Most important | 2. Important | 3. Less important | 4. Least important |
| 1. 最重要 | 2. 重要 | 3. 不是特别重要 | 4. 不重要 |

## Appendix 2 Traditional Basketball Survey

### Hubei Normal University Basketball Class Survey II
### 湖北师范大学篮球课问卷调查 II

同学，您好，欢迎您完成此次有关湖北师范大学体育课的问卷调查。您的回答完全保密，授课教师并不会得到此次问卷调查的结果，此调查仅供学校体育课改革和课程评估参考。感谢您的配合！

姓名（Name）：　　性别（Gender）：

年级（College rank）：

年龄（Age）：

课程（Class）：

教师(Instructor)：

| # | Questions | 强烈同意 | 同意 | 中立 | 不同意 | 强烈不同意 |
|---|---|---|---|---|---|---|
| 1 | I overall enjoyed that basketball class in this semester.<br>我非常喜欢这个学期篮球课的安排以及练习 | 1 | 2 | 3 | 4 | 5 |
| 2 | I enjoyed the format of basketball class.<br>我喜欢篮球课的组织形式。 | | | | | |
| 3 | I enjoyed the teaching from my instructor this semester<br>我喜欢篮球课老师的教学 | | | | | |
| 4 | I enjoyed the tests organizes in this semester.<br>我喜欢篮球课的考核方式 | | | | | |
| 5 | I enjoyed the performance I had in this basketball class.<br>我喜欢自己在课堂的表现 | | | | | |
| 6 | I enjoyed the climate in my basketball class.<br>我喜欢课堂的气氛 | | | | | |

| # | **Questions** |
|---|---|
| 7 | Give yourself a score from 1 (very poor) to 10 (excellent) for your skills at [insert sport] BEFORE you started this season. |
| | 在学期开始之前，请对自己的技能按照 1（非常差）- 10 （非常好）打分： |
| 8 | Now give yourself a score from 1 (very poor) to 10 (excellent) for your skills at [insert sport] AFTER you completed this season. |
| | 学期即将结束，请对自己的技能按照 1（非常差）- 10 （非常好）打分： |
| 9 | Give yourself a score from 1 (very poor) to 10 (excellent) for your understanding of how to play basketball showing good sportsmanship BEFORE you started this season. |
| | 在学期开始之前，请对自己对体育精神-公平竞赛的理解按照 1（不清楚）- 10 （非常清楚）打分： |
| 10 | Now give yourself a score from 1 (very poor) to 10 (excellent) for your understanding of how to play basketball showing good sportsmanship AFTER you completed this season. |
| | 学期即将结束，请对自己对体育精神-公平竞赛的理解按照 1（不清楚）- 10 （非常清楚）打分： |
| 11 | Give yourself a score from 1 (very poor) to 10 (excellent) for how much you enjoyed physical education the way in which you experienced before. |
| | 对比以往的体育课，请按照 1（讨厌）- 10 （非常喜欢）对以前的体育课打分： |
| 12 | Give yourself a score from 1 (very poor) to 10 (excellent) for how much you enjoyed physical education the way in which you experienced it in this semester. |
| | 对比以往的体育课，请按照 1（讨厌）- 10 （非常喜欢）对本学期篮球课的组织形式进行打分： |
| 13 | Compare with the skill level before you start this semester, rating your improvement from 1 - 10 after this semester.<br>对比开学前的技能水平，从 1 - 10 对自己提高的程度进行打分： |

Note: for traditional physical education class.

## Appendix 3 Sport Education Survey

### Hubei Normal University Basketball Class Survey II
### 湖北师范大学篮球课问卷调查 II

同学，您好，欢迎您完成此次有关湖北师范大学体育课的问卷调查。您的回答完全保密，授课教师并不会得到此次问卷调查的结果，此调查仅供学校体育课改革和课程评估参考。感谢您的配合！

姓名（Name）：　　性别（Gender）：

年级（College rank）：　　年龄（Age）：

课程（Class）：　　教师(Instructor)：

| # | Questions | 强烈同意 | 同意 | 中立 | 不同意 | 强烈同意 |
|---|---|---|---|---|---|---|
| 1 | I enjoyed that this season in physical education.<br>我非常喜欢这个学期篮球课的安排以及练习 | 1 | 2 | 3 | 4 | 5 |
| 2 | I enjoyed being placed on a team early in the season and staying on the same team for the entire season.<br>我喜欢体育课上团队的形式以及整个赛季都在一个队伍里 | | | | | |
| 3 | I enjoyed the schedule of team practice and formal competitions throughout the basketball season.<br>我喜欢篮球课上团队的练习和正式的比赛 | | | | | |
| 4 | I enjoyed the culminating event (the final four) at the end of the season.<br>我喜欢赛季最后的总决赛 | | | | | |
| 5 | I enjoyed keeping score and knowing the scores of my team.<br>我喜欢我的团队赢得分数，并知道我的团队排名的情况 | | | | | |
| 6 | I enjoyed having team names, colors, mascots, and posters.<br>我喜欢团队有自己的名称，吉祥物，队服等 | | | | | |

| # | Questions |
|---|---|
| 7 | Give yourself a score from 1 (very poor) to 10 (excellent) for your skills at [insert sport] BEFORE you started this season. |
| | 在学期开始之前，请对自己的技能按照 1（非常差）- 10 （非常好）打分： |
| 8 | Now give yourself a score from 1 (very poor) to 10 (excellent) for your skills at [insert sport] AFTER you completed this season. |
| | 学期即将结束，请对自己的技能按照 1（非常差）- 10 （非常好）打分： |
| 9 | Give yourself a score from 1 (very poor) to 10 (excellent) for your understanding of how to play basketball showing good sportsmanship BEFORE you started this season. |
| | 在学期开始之前，请对自己对体育精神-公平竞赛的理解按照 1（不清楚）- 10 （非常清楚）打分： |
| 10 | Now give yourself a score from 1 (very poor) to 10 (excellent) for your understanding of how to play basketball showing good sportsmanship AFTER you completed this season. |
| | 学期即将结束，请对自己对体育精神-公平竞赛的理解按照 1（不清楚）- 10 （非常清楚）打分： |
| 11 | Give yourself a score from 1 (very poor) to 10 (excellent) for how much you enjoyed physical education the way in which you experienced it before this format. |
| | 对比以往的传统体育课，请按照 1（讨厌）- 10 （非常喜欢）对传统体育课打分： |
| 12 | Give yourself a score from 1 (very poor) to 10 (excellent) for how much you enjoyed physical education the way in which you experienced it in this format (teams, games, competitions). |
| | 对比以往的传统体育课，请按照 1（讨厌）- 10 （非常喜欢）对本学期篮球课的组织形式进行打分（团队，比赛，季后赛等等）： |

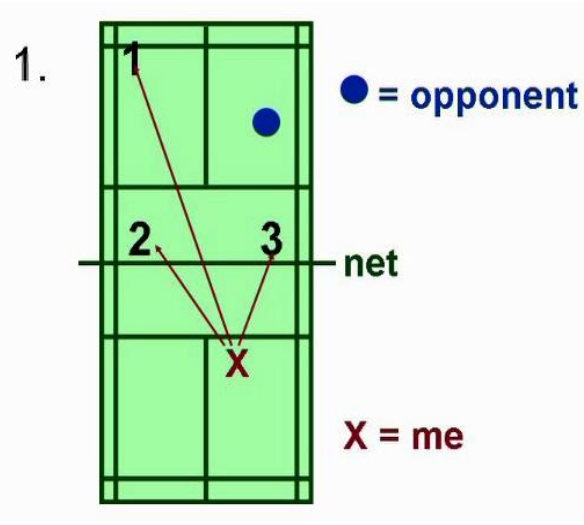
Note: for Sport Education

## Appendix 4 French Clear & Wall Volley Tests Table

| # | Name | 1st Wall Volley | 2nd Wall Volley | Best Wall Volley | French Clear 1st | French Clear 2nd | Best French Clear |
|---|---|---|---|---|---|---|---|
| 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |
| 9 | | | | | | | |
| 10 | | | | | | | |
| 11 | | | | | | | |
| 12 | | | | | | | |
| 13 | | | | | | | |
| 14 | | | | | | | |
| 15 | | | | | | | |
| 16 | | | | | | | |
| 17 | | | | | | | |
| 18 | | | | | | | |
| 19 | | | | | | | |
| 20 | | | | | | | |
| … | | | | | | | |

## Appendix 5 The Game Tactical Understanding Tests

The example of Selected Stroke Options (SSO)




The Selected Argument Options (SAO)

| | |
|---|---|
| **1** | **In order to have as much time as possible to get to the next stroke** |
| **2** | **Because it is much harder to move backwards** |
| **3** | **So that my opponent has to move as far as possible to his/her next stroke** |
| **4** | **Because my opponent was moving in the other direction** |
| **5** | **So that my opponent has as little time as possible to get to the next stroke** |
| **6** | **So that my opponent has to change direction** |
| **7** | **Because his/her racket was on the opposite side** |
| **8** | **Because it is harder for my opponent to hit from this side** |
| **9** | **Because this is my best stroke** |
| **10** | **Because my opponent would not expect this kind of a stroke** |

**Video Selections**

**Name:** **Number:**

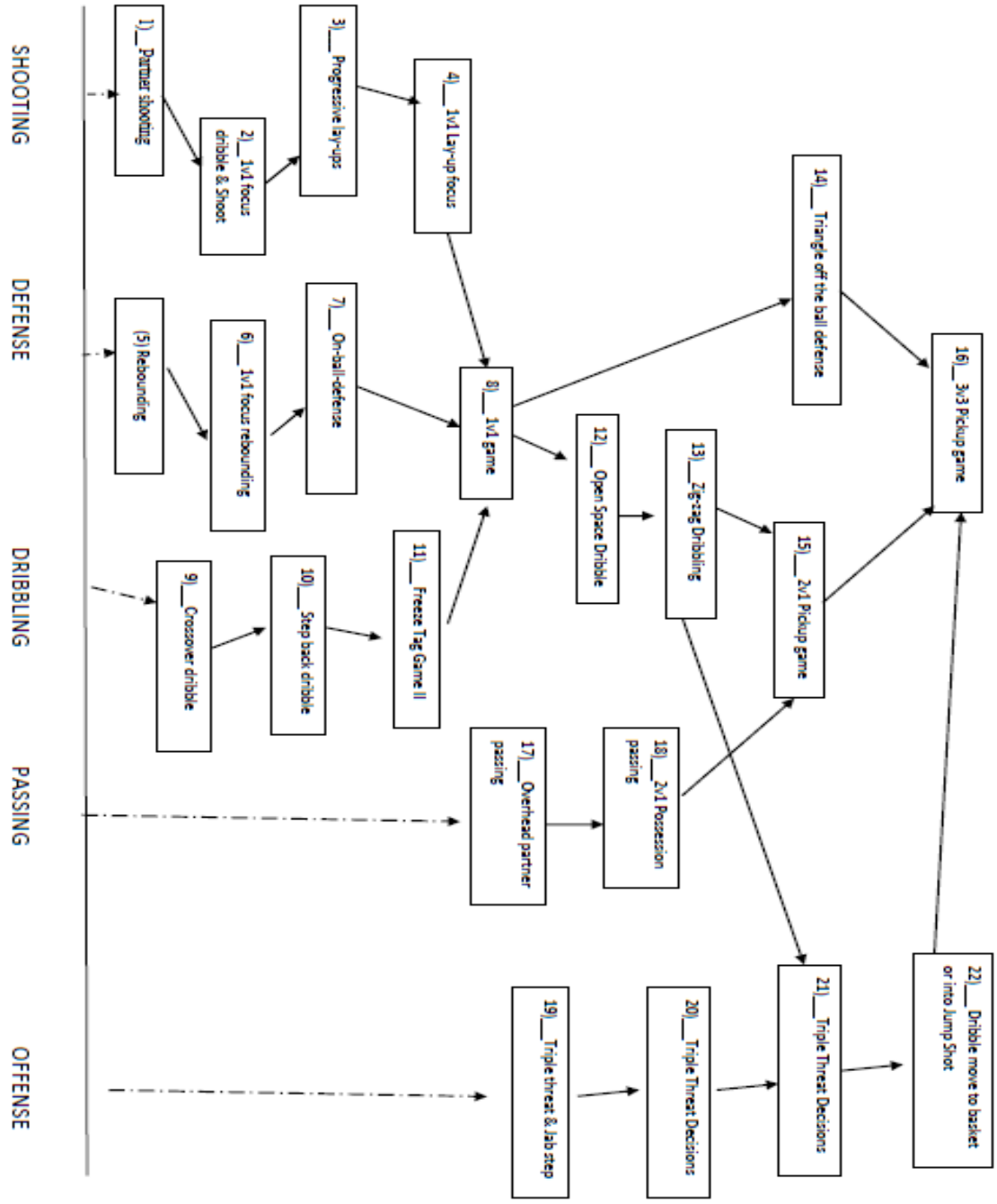
| Scenarios | Decision | Reason 1 | Reason 2 |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |
| 11 | | | |
| 12 | | | |
| 13 | | | |
| 14 | | | |
| 15 | | | |
| 16 | | | |
| 17 | | | |
| 18 | | | |

## Appendix 6 Game Performance Assessment Instrument Coding Table

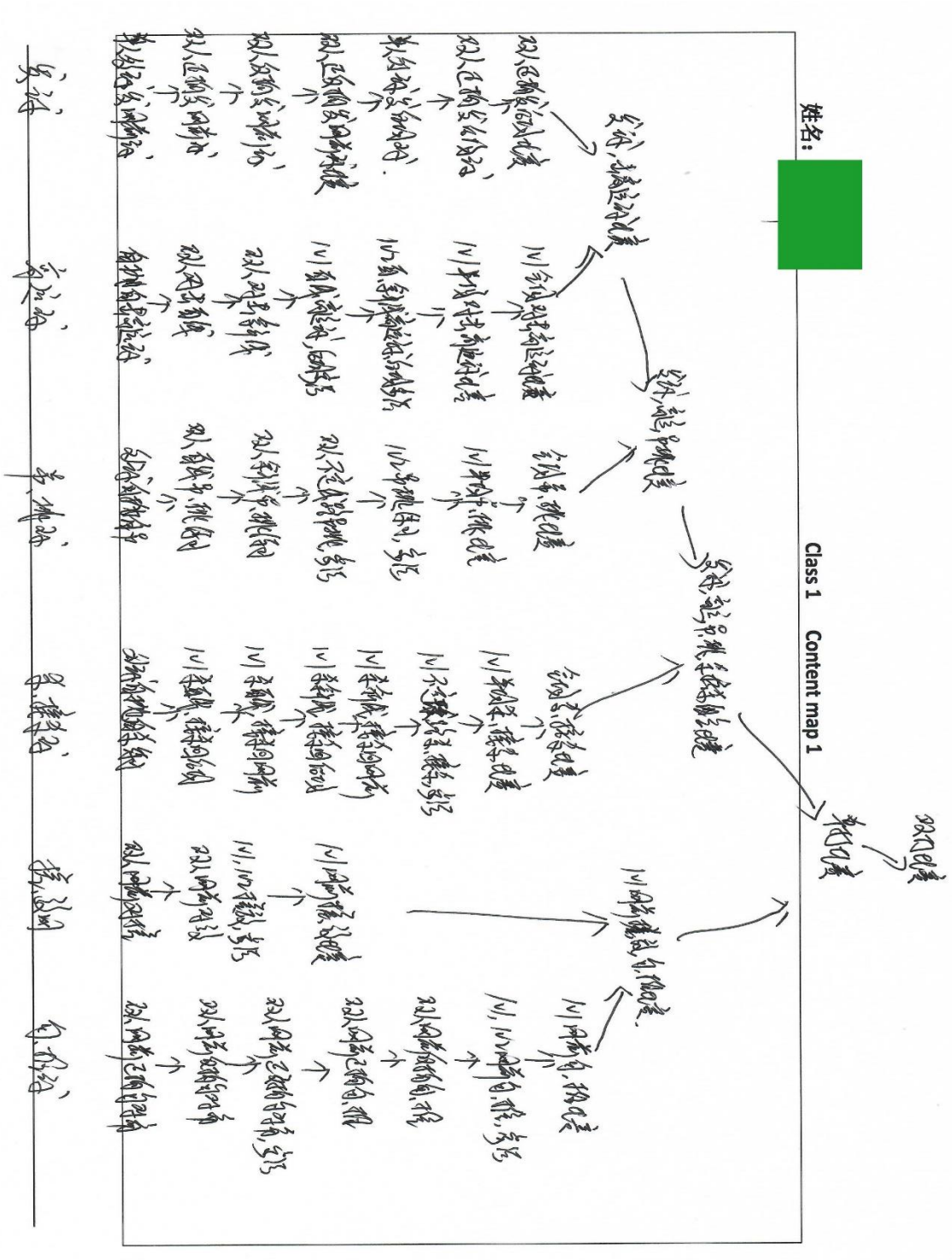
| Student # | | | | |
|---|---|---|---|---|
| Video # | | | | |
| Coder 1 | | | Coder 2 | |
| # | Decision-Making Index (DMI) | | Skill Execution Index (SEI) | |
| | Appropriate decisions | Inappropriate decisions | Successful skill executions | Unsuccessful skill executions |
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | | | | |
| 11 | | | | |
| 12 | | | | |
| 13 | | | | |
| 14 | | | | |
| 15 | | | | |
| 16 | | | | |
| 17 | | | | |
| 18 | | | | |
| 19 | | | | |
| 20 | | | | |
| … | | | | |

## Appendix 7 Content Maps

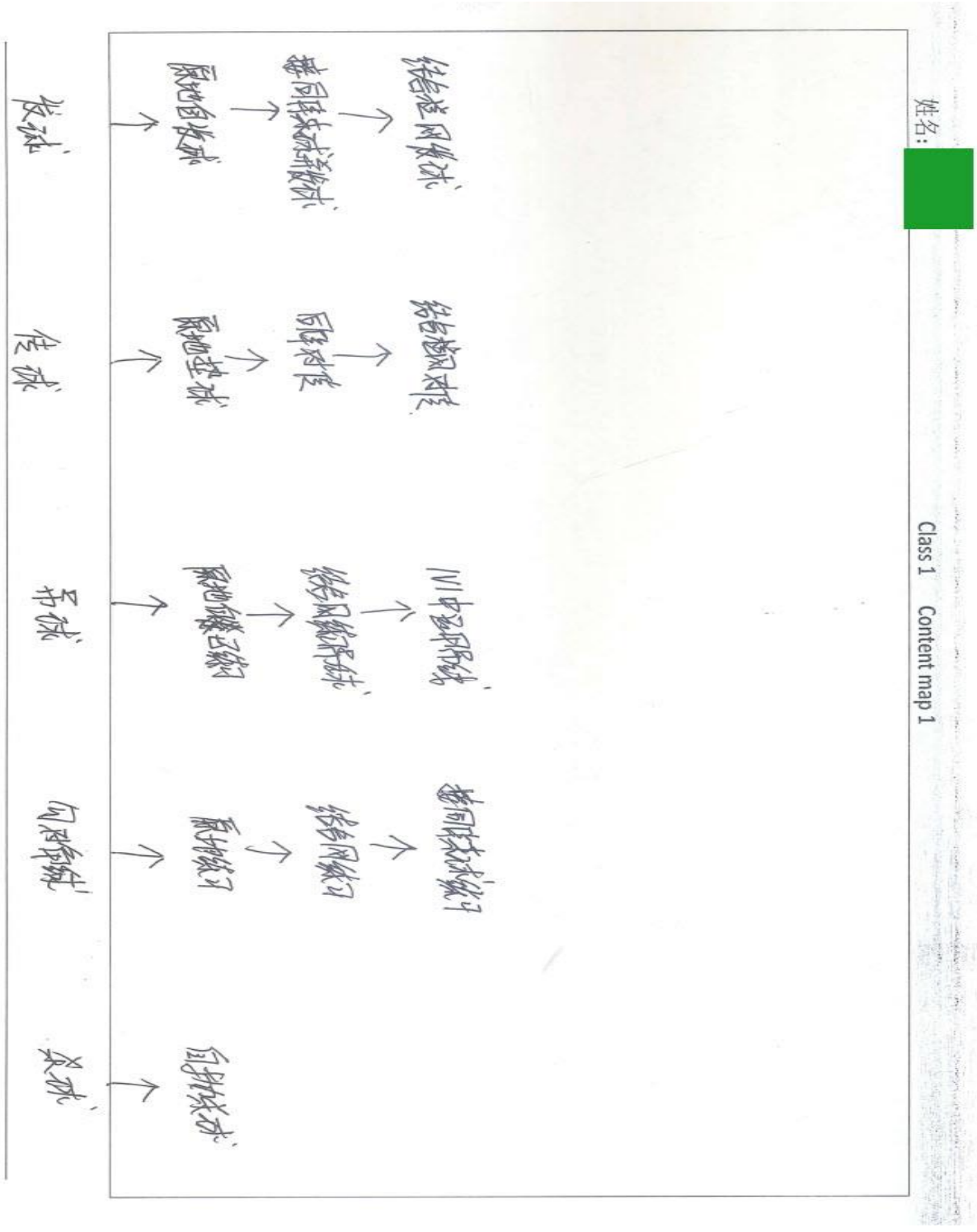
### Content Map Example in Basketball



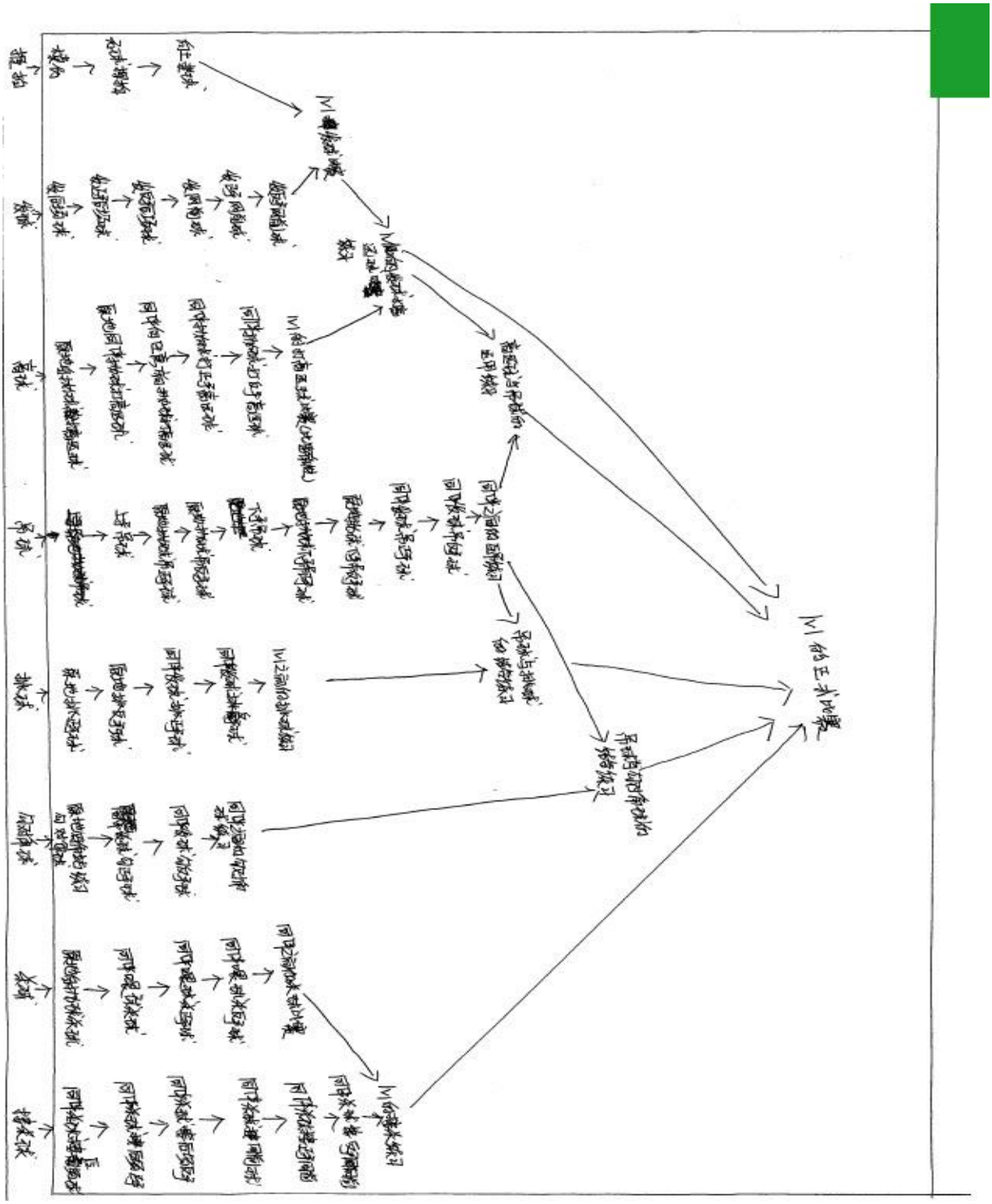
**Content Map from Badminton Teacher**



**Content Map Example from Badminton Student (pre-test)**



**Content Map Example from Badminton Student (post-test)**



## Appendix 8 IRB: Basketball Club

**湖北师范大学科学研究伦理审查表**
**Hubei Normal University Institutional Review Board for Research Involving Human Subjects**

| | |
|---|---|
| 伦理审查批件号<br>**IRB #** | 2018005 |
| 项目名称<br>**Project Name** | 大学体育俱乐部—篮球课程竞技体育模型教学实验研究 |
| 项目负责人<br>**Principle Investigator & CO-PI** | 胡安义, Hairui Liu, Peter Hastie, 周曙, 张春合 |
| 项目负责人职称<br>**The title of PI** | 副教授 Associate Professor |
| 项目负责人所在 院系<br>**Department** | 体育学院<br>College of Physical Education<br>Hubei Normal University |
| 项目负责人 **E-mail** | 19382769@qq.com |
| 项目负责人电话<br>**Contact Information** | 130-3440-9228 |
| 项目研究场所<br>**Location** | 湖北师范大学体育馆<br>The Physical Education Gym |
| 项目研究时间<br>**Time** | 2019.9-2020.1 |

| | |
|---|---|
| **研究对象**<br>**Participants** | 大学体育俱乐部—篮球课程学生<br>College students who register in basketball club (Non-PE major). |
| **项目结束时间**<br>**When does this project end?** | 2020.1 |

**研究目的 (Research Purpose):**

体育课程是大学生以身体练习为主要手段，通过合理的体育教育和科学的体育锻炼过程，达到增强体质、增进健康和提高体育素养为主要目标的公共必修课程，俱乐部是体育课程教学的一种形式，但是又区别于体育课。学校由于场地、场馆等硬件设施不足，体育课受天气影响比较大，因此传统的体育课教学难以满足学生体育课的需求。同时体育课的教学目标重点关注的是增强体质、增进健康和社会适应，而在团队协作和个体角色参与方面相对不足。因此本研究的主要目的探索对包含竞技体育模型因素的高校篮球俱乐部对学生技战术的协同发展、体能的提高、角色的胜任和团队协作能力是否有好的影响。

**项目概况 (Project Overview):**

本次研究的对象来自湖北师范大学选择《大学体育俱乐部—篮球》课程的非体育专业学生（公共体育课学生），实验周期以学期为单位（2019-2020 学年）。胡安义是湖北师范大学体育学院篮球专项教师，球类教研室负责人，篮球课程负责人，大学体育俱乐部—篮球课程负责人。本次教学实验由胡安义老师个人负责教案的设计、教学内容的安排、课程的组织和测试与考试工作。具体工作为 2019 年秋季进行大学体育俱乐部—篮球课程教学实验。2019 年秋季进行实验随机问卷测试。

**研究的潜在风险 (Potential risks)：**

参与本研究的风险很小，可能存在如：

1）研究对象在实验过程中的参与是否受到老师的胁迫；

2）测试过程中研究对象可能存在运动损伤的可能；

**风险的控制 (Precautions and elimination of risks)：**

1）为最大程度降低胁迫，本研究在开展教学过程中不强迫学生完成无法完成的任务；

2）学生根据自愿原则进行选课，实验过程中允许学生退出；

3）实验测试前学生充分热身，最大程度降低学生受伤机率。

**研究承诺 (Research Ethics Promises)：**

保证数据收集的真实性和有效性；

研究过程中严格遵照科学伦理规范；

为本次科研研究负责；

保证研究对象的质量；

教学实验过程按照实验要求，严格把控各个环节。

负责人签名：

科研部门盖章：

时间：2018 年 5 月 25 日

## 湖北师范大学研究受试者知情同意书

## Hubei Normal University Institutional Review Board for Research Involving Human Subjects - Consent Form

**研究题目：**大学体育俱乐部—篮球课程竞技体育模型教学实验研究

**您被邀请参加一项研究的目的：**检验“Sport Education ”教学模式对大学体育俱乐部—篮球课程学生技战术的协同发展、体能的提高、角色的胜任和团队协作能力是否有好的影响。本研究由湖北师范大学体育学院胡安义老师负责。您被挑选为参与者的原因是你在学校选了大学体育俱乐部—篮球课程，且你的年龄≧18 岁。

**您参与本研究需要涉及到的测试内容：**如果你决定参与本项研究，你将在 2019 年秋季学期进行 4 次问卷测试。

**测试的时间段如下：问卷**测试时间在课程第 10-16 周完成，即 2019 年 11 月 3 日-12 月 29 日期间。所有测试均有胡安义老师负责，测试的过程和结果被观察和记录以用于后续分析。

**本研究有无存在潜在风险或不适：**此项研究参与者无任何风险，强迫性也许是潜在风险。本研究将强迫性降到最低的措施是：您可以随时退出本项研究。为了最大化的降低保密风险，本研究将保障数据的安全性。所有相关笔记和视频将在成果出版后销毁，该时间不超过 2022 年 8 月。

**参与本研究对自己或他人的益处：**如果您参与本项研究，您可以期望从体育课程运用的体验式练习方法中受益。

**您是否会因参与本项研究而获得任何形式的补偿？**参与本项研究没有任何补偿。

**您参与本研究会产生的相关费用？**您的参与不需要任何费用。

**如果您改变参与想法，**您可以在学习过程中随时退出。您的参与完全是自愿的。您参与或不参与以及参与后退出均不会对您与湖北师范大学、与体育学院以及胡安义老师之间的关系产生影响，同时您本门课的考试成绩也不会因为您的参与与否而受到影响。

**您的隐私将受到保护。**您参与本研究的任何信息都将保密，您参与的相关信息可能会在专业期刊或者会议上发表。在任何演示文稿或出版物中，您的真实姓名将不会出现，因此数据是保密的。

**如果您对本研究还有其他疑问，**可以通过胡安义老师的电话（130-3440-9228）或邮件（19382769@qq.com）与其进行联系或咨询。我们将提供此文件的副本予以保存。

**如果您对参与者的权利有疑问，**可以与湖北师范范大学科研处进行咨询，电话是0714-6571396。

***在阅读完以上信息后，您必须决定是否愿意参与本研究。 您的签名表示您愿意参与。***

受试者签名　　日期

获得同意的研究者签名　　日期 2018.5.25

合作研究者签名　　日期

科研部门盖章：　　日期 2018.5.25

# Appendix 9 IRB: Auburn University Badminton Study

**AUBURN UNIVERSITY INSTITUTIONAL REVIEW BOARD for RESEARCH INVOLVING HUMAN SUBJECTS**
**RESEARCH PROTOCOL REVIEW FORM**
**FULL BOARD or EXPEDITED**

For Information or help contact **THE OFFICE OF RESEARCH COMPLIANCE (ORC)**, 115 Ramsay Hall, Auburn University
Phone: 334-844-5966 **e-mail:** IRBAdmin@auburn.edu **Web Address:** http://www.auburn.edu/research/vpr/ohs/index.htm

Revised 2.1.2014 **Submit completed form to IRBsubmit@auburn.edu or 115 Ramsay Hall, Auburn University 36849.**

Form must be populated using Adobe Acrobat / Pro 9 or greater standalone program (do not fill out in browser). Hand written forms will not be accepted.

1. **PROPOSED START DATE of STUDY:** 8/19/2019

**PROPOSED REVIEW CATEGORY (Check one):** ☐ FULL BOARD ☑ EXPEDITED

**SUBMISSION STATUS (Check one):** ☑ NEW ☐ REVISIONS (to address IRB Review Comments)

2. **PROJECT TITLE:** The development of skill and tactical competencies in badminton under a technical challenge integrated directed teaching method

| 3. Peter Hastie | Professor | Kinesiology | hastipe@auburn.edu |
|---|---|---|---|
| PRINCIPAL INVESTIGATOR | TITLE | DEPT | AU E-MAIL |
| 301 Wire Road, Auburn, AL | | 334-844-1469 | |
| MAILING ADDRESS | | PHONE | ALTERNATE E-MAIL |

4. **FUNDING SUPPORT:** ☑ N/A ☐ Internal ☐ External Agency: _____ ☐ Pending ☐ Received

**For federal funding, list agency and grant number (if available).** _____

**5a. List any contractors, sub-contractors, other entities associated with this project:**

_____

**b. List any other IRBs associated with this project (including Reviewed, Deferred, Determination, etc.):**

_____

## PROTOCOL PACKET CHECKLIST

**All protocols must include the following items:**

- ☑ **Research Protocol Review Form** (All signatures included and all sections completed)
  (Examples of appended documents are found on the OHSR website: http://www.auburn.edu/research/vpr/ohs/sample.htm)
- ☑ **CITI Training Certificates** for all Key Personnel.
- ☑ **Consent Form or Information Letter** and any Releases (audio, video or photo) that the participant will sign.
- ☑ **Appendix A**, "Reference List"
- ☐ **Appendix B** if e-mails, flyers, advertisements, generalized announcements or scripts, etc., are used to recruit participants.
- ☐ **Appendix C** if data collection sheets, surveys, tests, other recording instruments, interview scripts, etc. will be used for data collection. Be sure to attach them in the order in which they are listed in # 13c.
- ☐ **Appendix D** if you will be using a debriefing form or include emergency plans/procedures and medical referral lists (A referral list may be attached to the consent document).
- ☐ **Appendix E** if research is being conducted at sites other than Auburn University or in cooperation with other entities. A **permission letter** from the site / program director must be included indicating their cooperation or involvement in the project. NOTE: If the proposed research is a multi-site project, involving investigators or participants at other academic institutions, hospitals or private research organizations, a letter of **IRB approval** from each entity is required prior to initiating the project.
- ☐ **Appendix F** - Written evidence of acceptance by the host country if research is conducted outside the United States.

**FOR ORC OFFICE USE ONLY**

DATE RECEIVED IN ORC: _____ by _____ PROTOCOL #
DATE OF IRB REVIEW: _____ by _____ APPROVAL C
DATE OF IRB APPROVAL: _____ by _____ INTERVAL FC
COMMENTS:

The Auburn University Institutional Review Board has approved this Document for use from
08/07/2019 to ----------
Protocol # 19-318 EP 1908

**7. PROJECT ASSURANCES** The development of skill and tactical competencies in badminton under a technical challenge integrated directed teaching method

## A. PRINCIPAL INVESTIGATOR'S ASSSURANCES

1. I certify that all information provided in this application is complete and correct.
2. I understand that, as Principal Investigator, I have ultimate responsibility for the conduct of this study, the ethical performance this project, the protection of the rights and welfare of human subjects, and strict adherence to any stipulations imposed by the Auburn University IRB.
3. I certify that all individuals involved with the conduct of this project are qualified to carry out their specified roles and responsibilities and are in compliance with Auburn University policies regarding the collection and analysis of the research data.
4. I agree to comply with all Auburn policies and procedures, as well as with all applicable federal, state, and local laws regarding the protection of human subjects, including, but not limited to the following:
    a. Conducting the project by qualified personnel according to the approved protocol
    b. Implementing no changes in the approved protocol or consent form without prior approval from the Office of Research Compliance
    c. Obtaining the legally effective informed consent from each participant or their legally responsible representative prior to their participation in this project using only the currently approved, stamped consent form
    d. Promptly reporting significant adverse events and/or effects to the Office of Research Compliance in writing within 5 working days of the occurrence.
5. If I will be unavailable to direct this research personally, I will arrange for a co-investigator to assume direct responsibility in my absence. This person has been named as co-investigator in this application, or I will advise ORC, by letter, in advance of such arrangements.
6. I agree to conduct this study only during the period approved by the Auburn University IRB.
7. I will prepare and submit a renewal request and supply all supporting documents to the Office of Research Compliance before the approval period has expired if it is necessary to continue the research project beyond the time period approved by the Auburn University IRB.
8. I will prepare and submit a final report upon completion of this research project.

My signature indicates that I have read, understand and agree to conduct this research project in accordance with the assurances listed above.

| Peter Hastie | Peter Hastie | 7/15/19 |
|---|---|---|
| **Printed name of Principal Investigator** | **Principal Investigator's Signature** | **Date** |

## B. FACULTY ADVISOR/SPONSOR'S ASSURANCES

1. I have read the protocol submitted for this project for content, clarity, and methodology.
2. By my signature as faculty advisor/sponsor on this research application, I certify that the student or guest investigator is knowledgeable about the regulations and policies governing research with human subjects and has sufficient training and experience to conduct this particular study in accord with the approved protocol.
3. I agree to meet with the investigator on a regular basis to monitor study progress. Should problems arise during the course of the study, I agree to be available, personally, to supervise the investigator in solving them.
4. I assure that the investigator will promptly report significant incidents and/or adverse events and/or effects to the ORC in writing within 5 working days of the occurrence.
5. If I will be unavailable, I will arrange for an alternate faculty sponsor to assume responsibility during my absence, and I will advise the ORC by letter of such arrangements. If the investigator is unable to fulfill requirements for submission of renewals, modifications or the final report, I will assume that responsibility.

| PETER HASTIE | Peter Hastie | 7/15/19 |
|---|---|---|
| **Printed name of Faculty Advisor / Sponsor** | **Faculty Advisor's Signature** | **Date** |

## C. DEPARTMENT HEAD'S ASSSURANCE

By my signature as department head, I certify that I will cooperate with the administration in the application and enforcement of all Auburn University policies and procedures, as well as all applicable federal, state, and local laws regarding the protection and ethical treatment of human participants by researchers in my department.

| Mary Rudisill | Mary Rudisill Gee | 7/15/19 |
|---|---|---|
| **Printed name of Department Head** | **Department Head's Signature** | **Date** |

3

AUBURN UNIVERSITY

SCHOOL OF KINESIOLOGY

INFORMED CONSENT

for a Research Study entitled

"The development of skill and tactical competencies in badminton under a technical challenge integrated directed teaching method"

**You are invited to participate in a research study** to examine how "play practice" approach can improve students' ability to execute appropriate skills in actual badminton play. The study is being conducted by Dr. Peter Hastie, Professor of the School of Kinesiology at Auburn University and Hairui Liu, a doctoral student in the school of Kinesiology of Auburn University. You were selected as a possible participant because you are registered in the physical education (PHED 1400: badminton) class at Auburn University and are age 18 or older.

**What will be involved if you participate?** If you decide to participate in this research study, you will be asked to participate in 4 tests twice during the fall semester of 2019. The tests included French Clear, Wall Volley, Tactical Understanding (video watching), and free play 5 minutes with video recording.

The time frames of the tests list below:

Pre-test, week 2 of fall 2019 (August 26th-30th); Post-test, week 14 of fall 2019 (December 2nd – 6th). The tests will lead by Professor Peter Hastie. The test will be observed and recorded for later analysis. Your total time commitment will be approximately 1 hours for pre-test and post-test, respectively.

**Are there any risks or discomforts?** The risks associated with participating in this study are minimal. Coercion could be a risk. To minimize the risk of coercion, you may withdraw from participation in the study at any time (see below). Dr. Hastie will recruit the participants from the class. Hairui will teach the badminton class. To minimize the risk of breach of confidentiality, we will keep your data safe, and you will be given a participant ID number. No one will know which ID number is assigned to you except for Dr. Hastie. All of the notes and videos will be destroyed after the findings are published or no later than August of 2021.

**Are there any benefits to yourself or others?** If you participate in this study, you can expect to benefit from experience the play-practice approach based physical education class.

**Will you receive compensation for participating?** There is no compensation for participation.

Participant's initials _____





301 Wire Road, Auburn, AL 36849-5323; Telephone: 334-844-4483; Fax: 334-844-1467

AUBURN UNIVERSITY
SCHOOL OF KINESIOLOGY

**Are there any costs?** There is no any cost for your participation.

**If you change your mind about participating,** you can withdraw at any time during the study. Your participation is completely voluntary. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the School of Kinesiology, and Dr. Hastie. Your grade in this class will not impact by your decision to the participation.

**Your privacy will be protected.** Any information obtained in connection with this study will remain confidential. Information obtained through your participation may be published in a professional journal or presented at a professional meeting. In any presentation or publication, real names will not be used, that is the data will be confidential.

**If you have questions about this study,** *please ask them now or* contact Dr. Peter Hastie at hastipe@auburn.edu or 334-844-1469. A copy of this document will be given to you to keep.

**If you have questions about your rights as a research participant,** you may contact the Auburn University Office of Research Compliance or the Institutional Review Board by phone (334)-844-5966 or e-mail at IRBadmin@auburn.edu or IRBChair@auburn.edu.

**HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO PARTICIPATE.**

| | |
|---|---|
| _____ | _____ |
| Participant's signature Date | Investigator obtaining consent Date |
| _____ | _____ |
| Printed Name | Printed Name |
| | _____ |
| | Co-Investigator Date |
| Participant's initials _____ | _____ |
| | Printed Name |

The Auburn University Institutional Review Board has approved this Document for use from 08/07/2019 to _____ Protocol # 19-318 EP 1908



301 Wire Road, Auburn, AL 36849-5323; Telephone: 334-844-4483; Fax: 334-844-1467

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SCHOOL OF KINESIOLOGY

# VIDEO RELEASE

During your participation in this research study, "The development of skill and tactical competencies in badminton under a technical challenge integrated directed teaching method", you will be videotaped. Your signature on the Informed Consent gives us permission to do so.

Your signature on this document gives us permission to use the videotape(s) for the additional purposes of (*publication, training, etc...)* beyond the immediate needs of this study. These videotapes will be destroyed after the findings are published or no later than August of 2021.

In addition, the following persons or groups will have access to the tapes:

Your permission:

**I give my permission for videotapes produced in the study,** "The development of skill and tactical competencies in badminton under a technical challenge integrated directed teaching method" **to be used for the purposes listed above, and to also will be destroyed after the findings are published or no later than August of 2021.**

| | | | |
|---|---|---|---|
| Participant's Signature | Date | Investigator's Signature | Date |
| Participant's Printed Name | | Investigator's Printed Name | |

The Auburn University Institutional Review Board has approved this Document for use from 08/07/2019 to ----------
Protocol # 19-318 EP 1908



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AUBURN UNIVERSITY

SCHOOL OF KINESIOLOGY

## RECRUITMENT PROCEDURE AND RECRUITMENT SCRIPT

At the conclusion of a [PHED-1400] class meeting, the course instructor will leave the room and Dr. Hastie will address the class about the opportunity to participate in the study. He will follow the following recruitment script:

Hello. My name is Dr. Hastie, and I am a professor in the School of Kinesiology here at Auburn University. I would like to invite you to participate in a research study that is focusing on the development of skill and tactical competencies in badminton during your upcoming physical education class.

Anyone in this class is able to participate. Your course instructor will not know who is or is not participating in the study, and your grade in this class will not reflect your decision not to participate. You will not receive extra credit if you do decide to participate. You may also drop out of the study at any time if you wish with no penalty.

As a participant, you will be asked to do the following.

4 tests in the week 2 (August 26th-30th) - Pre-test

1. French Clear test, Dr. Hastie will serve to the participants in the badminton court. The participants will use the French Clear skill to playback. The shuttlecock lands in the courts will be assigned with a specific score (5, 4, 3, 2, 1, 0). The test will repeat 10 times. It will take 1-2 minutes to finish.

2. Wall Volley test: Participants will be required to play the shuttlecock to against the wall. There is a line-5 feet height marked in the wall. And another line 5 feet long to the wall set on the ground. For every single volley not only above the line on the wall but the participant's feet also not crossing the line on the ground will be recorded. The participants can reach as many as they can within 30 seconds. The test will last around 1 minute.

3. Tactical understanding test (video watching). All participants will watch a short badminton game video on a personal computer. The participants will ask to make personal decisions assume they are one of the players in the video. The sample questions will be "where should you hit the shuttle back?"



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4. The last test is a video recording. Participants will be asked to be paired first. Then free play in the badminton court for 5 minutes. Dr. Hastie can be recording their free play. Dr. Hastie will be coding their game performance based on the participant's decision making and skill execution. Each participant will have an overall game performance score result from the decision making and skill execution.

Week 14th (December 2nd -6th): Post-test will repeat all of the pre-test.

The French Clear and the wall volley will represent the skill competencies while the tactical understanding and the free play feature the tactical understanding.

I am going to pass out consent forms to everyone. If you are interested, please sign the form and leave it in the box as you leave. If you are not interested, you may simply deposit the unsigned in the box."





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**Appendix 10 IRB: Chinese Badminton Study 1**

**湖北师范大学科学研究伦理审查表**
**Hubei Normal University Institutional Review Board for Research Involving Human Subjects**

| | |
|---|---|
| **伦理审查批件号 IRB #** | 2018001 |
| **项目名称**<br>**Project Name** | Play Practice 模式下大学生羽毛球技战术发展的教学实验研究 |
| **项目负责人**<br>**Principle Investigator & CO-PI** | 王伟, Hairui Liu, Peter Hastie, 周曙, 张春合 |
| **项目负责人职称**<br>**The title of PI** | 副教授 Associate Professor |
| **项目负责人所在 院系**<br>**Department** | 体育学院<br>College of Physical Education |
| **项目负责人 E-mail** | 14109952@qq.com |
| **项目负责人电话**<br>**Contact Information** | 158-2697-8259 |
| **项目研究场所**<br>**Location** | 湖北师范大学体育馆<br>The Physical Education Gym |
| **项目研究时间**<br>**Time** | 2018.6-2019.9 |
| **研究对象**<br>**Participants** | 体育专业学生、大学体育课程学生<br>(1) Physical Education Students who register in badminton; (2) |

| | |
|---|---|
| | College students who register in badminton (Non-PE major). |
| **项目结束时间**<br>**When does this project end?** | 2019.9 |

**研究目的 (Research Purpose):**

传统体育术科课程教学强调单一技能的学习和掌握，忽略了运动项目本身的实践意义和价值，难以适应真实比赛环境，对学习目标与实际能力脱节。本研究的目的是在羽毛球课堂中引入竞争性的 “Play Practice” 方法干预教学来提高学生在真实条件下的技战术水平和灵活运用能力，通过学期前和学期末的方法测试检验 “Play Practice” 方法是否有助于学生技战术水平在真实环境能够有效提高。预计游戏练习方法将提高大学生羽毛球运动的技能和战术知识，并可以帮助学生对实际羽毛球比赛建立深入而全面的理解。

**项目概况 (Project Overview):**

本次研究的对象来自湖北师范大学体育学院羽毛球专项学生和选择《大学体育-羽毛球》课程的公体学生。公体学生来自湖北师范大学体育学院以外院系，实验周期以学期为单位。王伟是湖北师范大学体育学院羽毛球专项教师，负责体育学院和大学体育羽毛球课程。本次教学实验由王伟老师个人负责教案的设计、“游戏挑战练习”方法的设计、课程的组织和测试与考试工作。具体工作为 2018 年秋季进行体育学院羽毛球主项课程的教学实验和 2019 年春季大学体育-羽毛球课程的教学实验。实验前后测试的内容为四项测试，包括技能和战术测试，分别是对墙击球测试、高远球测试、战术素养测试、比赛测试。

**研究的潜在风险 (Potential risks)：**

参与本研究的风险很小，可能存在如：

1）研究对象在实验过程中的参与是否受到老师的胁迫；

2）测试过程中研究对象可能存在运动损伤的可能；

**风险的控制 (Precautions and elimination of risks)：**

1）为最大程度降低胁迫，本研究在开展教学过程中不强迫学生完成无法完成的任务；

2）学生根据自愿原则进行选课，实验过程中允许学生退出；

3）实验测试前学生充分热身，最大程度降低学生受伤机率。

**研究承诺 (Research Ethics Promises)：**

保证数据收集的真实性和有效性；

研究过程中严格遵照科学伦理规范；

为本次科研研究负责；

保证研究对象的质量；

教学实验过程按照实验要求，严格把控各个环节。

负责人签名：

科研部门盖章：

时间：2018年 5月 10日

## 湖北师范大学研究受试者知情同意书

## Hubei Normal University Institutional Review Board for Research Involving Human Subjects – Consent Form

**研究题目：**Play Practice 模式下大学生羽毛球技战术发展的教学实验研究

**您被邀请参加一项研究的目的：**检验“play practice”教学方法在实际羽毛球比赛中能否提高学生技战术水平和实际运用能力。本研究由湖北师范大学体育学院王伟老师负责。您被挑选为参与者的原因是您在学校选了羽毛球课程且您的年龄≧18 岁。

**您参与本研究需要涉及到的测试内容：**如果您决定参与本项研究，您将参与两次测试，每次测试包括四项内容，如果您是体育学院羽毛球主项学生，您需要在 2018 年秋季学期进行测试，如果您是公共体育羽毛球课程学生，您需要在 2019 年春季学期进行测试。测试的具体内容包括高远球测试、对墙击球测试、战术素养测试（通过观看视频）和 5 分钟自由比赛的视频录制测试。

**测试的时间段如下：**针对体育学院羽毛球主项学生，前测时间在课程第 1-2 周完成，即 2018 年 9 月 3-14 日期间；后测时间在课程第 17-18 周完成，即 2018 年 12 月 31 日-2019 年 1 月 11 日期间。针对公共体育羽毛球课程学生，前测时间在课程第 1-2 周完成，即 2019 年 2 月 25 日-3 月 10 期间；后测时间在课程第 13-16 周完成，即 2019 年 5 月 20 日-6 月 16 日期间。所有测试均有王伟老师负责，测试的过程和结果被观察和记录以用于后续分析。

**本研究有无存在潜在风险或不适：**此项研究参与者的风险极低，强迫性也许是潜在风险。本研究将强迫性降到最低的措施是：您可以随时退出本项研究。王伟作为羽毛球教师将负责此项课程的教学。为了最大化的降低保密风险，本研究将保障数据的安全性。所有相关笔记和视频将在成果出版后销毁，该时间不超过 2021 年 8 月。

**参与本研究对自己或他人的益处：**如果您参与本项研究，您可以期望从体育课程运用的体验式练习方法中受益。

**您是否会因参与本项研究而获得任何形式的补偿？**参与本项研究没有任何补偿。

**您参与本研究会产生的相关费用？**您的参与不需要任何费用。

**如果您改变参与想法，**您可以在学习过程中随时退出。您的参与完全是自愿的。您参与或不参与以及参与后退出均不会对您与湖北师范大学、与体育学院以及王伟老师之间的关系产生影响，同时您本门课的成绩也不会因为您的参与与否而受到影响。

**您的隐私将受到保护。**您参与本研究的任何信息都将保密，您参与的相关信息可能会在专业期刊或者会议上发表。在任何演示文稿或出版物中，您的真实姓名将不会出现，因此数据是保密的。

**如果您对本研究还有其他疑问，**可以通过王伟老师的电话（158-2697-8259）或邮件（14109952@qq.com）与其进行联系或咨询。我们将提供此文件的副本予以保存。

**如果您对参与者的权利有疑问，**可以与湖北师范范大学科研处进行咨询，电话是0714-6571396。

***在阅读完以上信息后，您必须决定是否愿意参与本研究。 您的签名表示您愿意参与。***

受试者签名　　日期

获得同意的研究者签名　　日期 2018.5.10

合作研究者签名　　日期

科研部门盖章：　　日期 2018.5.10

**Appendix 11 IRB: Chinese Badminton Study 2**

(Play Practice for PE major content knowledge development)

**湖北师范大学科学研究伦理审查表**

**Hubei Normal University Institutional Review Board for Research Involving Human Subjects**

| | |
|---|---|
| **伦理审查批件号 IRB #** | 2018009 |
| **项目名称 Project Name** | Play Practice 模式下对体育专业大学生羽毛球 Specialized Content Knowledge (SCK) 及技战术发展的教学实验研究 |
| **项目负责人 Principle Investigator & CO-PI** | 王伟, Hairui Liu, Peter Hastie |
| **项目负责人职称 The title of PI** | 副教授 Associate Professor |
| **项目负责人所在 院系 Department** | 体育学院<br>College of Physical Education<br>Hubei Normal University |
| **项目负责人 E-mail** | 14109952@qq.com |
| **项目负责人电话 Contact Information** | 158-2697-8259 |
| **项目研究场所 Location** | 湖北师范大学体育馆<br>The Physical Education Gym |
| **项目研究时间 Time** | 2018.6-2022.8 |
| **研究对象 Participants** | 体育专业学生<br>Physical Education Students who register in badminton |
| **项目结束时间 When does this project end?** | 2022.8 |

**研究目的 (Research Purpose)：**

我国高校体育专项课程的教学过于强调碎片化技能的学习和掌握，忽略了战术知识的学习和运用，这一脱节现象使得体育专业学生的技能难以适应真实比赛环境，不利于学生学习与掌握专项教学内容知识。本研究的目的是通过“Play Practice” 方法干预羽毛球专项课程教学，进而检验体育专业学生羽毛球项目的技能执行力和 SCK 的变化。研究假设为“Play Practice” 方法可以提高体育专业大学生羽毛球运动的内容知识、技能和战术知识，并可以帮助学生打好专项基础，胜任未来教师职业。

**项目概况 (Project Overview)：**

本次研究的实验对象来自湖北师范大学体育学院体教专业大学生。实验周期以学期为单位。王伟老师是湖北师范大学体育学院羽毛球专项教师，负责体育学院羽毛球课程。本次教学实验由 Peter Hastie 教授和刘海瑞老师负责教案的设计，王伟老师负责 “Play Practice” 挑战方法的设计、课程的组织、测试及考试工作。实验前后的测试包括技能和战术测试四项内容，分别是内容图测试、高远球测试、战术素养测试、比赛评估测试。

**研究的潜在风险 (Potential risks)：**

参与本研究的风险很小，可能存在如：

1）研究对象在实验过程中的参与是否受到老师的胁迫；

2）测试过程中研究对象可能存在运动损伤的可能。

**风险的控制 (Precautions and elimination of risks)：**

1）为最大程度降低胁迫，本研究在开展教学过程中不强迫学生完成无法完成的任务；

2）学生根据自愿原则进行选课，实验过程中允许学生退出；

3）实验测试前学生充分热身，最大程度降低学生受伤机率。

**研究承诺 (Research Ethics Promises)：**

1）保证数据收集的真实性和有效性；

2）研究过程中严格遵照科学伦理规范；

3）为本次科学研究负责；

4）保证研究对象的质量；

5）教学实验过程严格遵照实验要求，把控各个环节。

负责人签名：

科研部门盖章：

时间：2018 年 10 月 27 日

## 湖北师范大学研究受试者知情同意书

## Hubei Normal University IRB Informed Consent

**研究题目：**Play Practice 模式下对体育专业大学生羽毛球 SCK 及技战术发展的教学实验研究

**您被邀请参加一项研究的目的：**检验“Play Practice”教学方法在实际羽毛球比赛中能否提高学生技战术水平和专项内容知识能力。本研究由湖北师范大学体育学院王伟老师负责。您被挑选为参与者的原因是您在学校选了羽毛球课程且您的年龄≧18 岁。

**您参与本研究需要涉及到的测试内容：**如果您决定参与本项研究，您将参与两次测试，每次测试包括四项内容，如果您是体育学院学生，您需要在参与羽毛球课程期间进行 4 项测试，测试的具体内容包括高远球测试、内容图测试、战术素养测试（通过观看视频）和 5 分钟自由比赛的视频录制测试。

**测试的时间段：**针对体育学院学生，前测时间在参与课程前完成，后测时间在课程教学结束后（常规教学周的第 17-18 周）完成。所有测试均有王伟老师负责，测试的过程和结果被观察和记录以用于后续分析。

**本研究有无存在潜在风险或不适：**本项研究参与者的风险极低，强迫性也许是潜在风险。本研究将强迫性降到最低的措施是：您可以随时退出本项研究。王伟老师作为羽毛球教师将负责此项课程的教学。为了最大化程度降低保密风险，本研究将保障数据的安全性，采集的数据将不会联系到任何您的个人信息，如需采用姓名，将采用化名来避免泄露您的个人信息。所有相关笔记和视频将在成果出版后销毁，该时间不超过 2022 年 8 月。

**参与本研究对自己或他人的益处：**如果您参与本项研究，您可以期望从本课程采用的体验式教学方法中受益。

**您是否会因参与本项研究而获得任何形式的补偿？**参与本项研究没有任何补偿。

**您参与本研究会产生的相关费用？**您的参与不需要任何费用。

**如果您改变参与想法，**您可以在学习过程中随时退出。您的参与完全是自愿的。您参与或不参与以及参与后退出均不会对您与湖北师范大学、与体育学院以及王伟老师之间的关系产生影响，同时您本门课的成绩也不会因为您的参与与否而受到影响。

**您的隐私将受到保护。**您参与本研究的任何信息都将保密，您参与的相关信息可能会在专业期刊或者会议上发表。在任何演示文稿或出版物中，您的真实姓名将不会出现，因此数据是保密的。

**如果您对本研究还有其他疑问，**可以通过王伟老师的电话（158-2697-8259）或邮件（14109952@qq.com）与其进行联系或咨询。我们将提供此文件的副本予以保存。

**如果您对参与者的权利有疑问，**可以与湖北师范大学科研处进行咨询，电话是0714-6571396。

*在阅读完以上信息后，您必须决定是否愿意参与本研究。 您的签名表示您愿意参与。*

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|---|---|
| 受试者签名 | 日期 |
| 获得同意的研究者签名 | 日期 2018-11-20 |
| 合作研究者签名 | 日期 |
| 科研部门盖章： | 日期 2018-11-20 |