AN EVALUATION OF THE IMPLEMENTATION OF THE USTA 10 & UNDER
CURRICULUM: A COMPARISON OF TWO CLASSES

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ABSTRACT

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A new format for teaching tennis to children ten years of age or younger has been implemented

by the United States Tennis Association (USTA) to increase enjoyment and grow the game by

helping children achieve success through rally performance. The curriculum for the new format

was published by the USTA in a manual titled *Quickstart Tennis: A Guide for Parents and*

Recreational Coaches. Modified equipment and a games model for teaching is used in the new

format as opposed to standard "adult" equipment and a traditional model of teaching. Studies

have shown the benefits of using modified equipment in youth sports, including tennis, but no

studies have evaluated the implementation of the 10 & Under curriculum produced by the

USTA. Therefore, the purpose of this study is to evaluate the implementation of the USTA 10 &

Under curriculum in two already intact 10 & Under Level II classes. Two 10 & Under Level II

tennis classes at two tennis clubs will be observed, one class following the USTA 10 & Under

Curriculum and one that has deviated from the guidelines within the manual. Sixteen children

ages 7-9 completed an enjoyment measure at the end of each lesson and took part in a pre- and

post-rally performance test. No significant differences were found between the two classes for

sport enjoyment and rally performance. However, observation data supported the hypothesis that

the club in which the instructor implemented the 10 & Under manual more closely followed the

principles and guidelines offered in the manual. Future research should focus on long-term

outcomes of the 10 & Under Quickstart Tennis Format.

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CHAPTER 1

Introduction

In 2008, the United States Tennis Association (USTA) implemented 10 & Under Quickstart tennis, a new format for teaching tennis to children under ten years of age. Quickstart tennis utilizes modified equipment along with developmentally appropriate court and ball sizes to introduce the sport of tennis to children. Along with modified equipment, Quickstart tennis also includes a games model to teaching rather than the more traditional model, which focuses on skill acquisition prior to gameplay and involves instructors demonstrating skills to children who then individually practice what was demonstrated.

The primary goal of the new 10 & Under Quickstart format is to increase participation in tennis through increasing levels of enjoyment and improving rally performance. Tennis is known as a lifetime sport; once people learn to play they can play the sport for the rest of their life. The rationale behind the new approach is that by increasing the amount of enjoyment children experience in 10 & Under Tennis, the more motivated they will be to continue participating, thus enabling them to continue being active through the sport for the remainder of their lives. To make tennis more enjoyable and to improve rally performance for children, the USTA changed the size of the racket, ball, court, and net to better fit the physical size and mental capabilities of children.

Before the introduction of the 10 & Under Quickstart program, the USTA found the equipment used during lessons served as a barrier when teaching tennis to children. Adult sized rackets, balls, courts, and nets were too larger and not appropriate developmentally. An adult sized racket is both too big and too heavy for children to swing with the correct form. A standard tennis ball bounces too high for children, which results in poor technique because children have

trouble reaching for the ball. Lastly, children are unable to cover the entirety of a standard tennis court, resulting in an inability to rally with another player.

To overcome the equipment barrier, the USTA included the use of modified equipment within the 10 & Under Quickstart program. Smaller rackets, bigger and lighter tennis balls, smaller courts, and smaller nets are all used within the program.   Modified equipment is more appropriate for children developmentally. The children are more able to hit successful shots as the equipment is suited to their motor skills and strength levels.

Another method the USTA used to make tennis more enjoyable and to improve rally performance for children was implementing a games model to teaching tennis as opposed to the traditional model. The traditional model of teaching tennis to youth under 10 years of age emphasizes skill learning and technique. Generally, a skill is demonstrated and explained and then the players stand in line and wait for a turn to hit a ball thrown by the instructor. Once skill competence is reached, players then attempt to perform those skills in rallies, playing with another player, during game situations usually toward the end of the session (Turner & Martinek, 1999). Standing in line is not fun for children, as they spend most of their time waiting for their turn to hit a ball. Having a coach throw the ball to the player is also unrealistic, as tennis players need to be able to react to any kind of shot hit at them during a match.

The new format of 10 & Under Quickstart tennis includes gameplay to help players learn skills and technique (p. 5, USTA Manual). Instead of the coach feeding tennis balls to children in line, the children play with each other. The games used within the Quickstart format allow players opportunities to rally, giving them the ability potentially to rally more successfully than players who learned with the traditional format. The games approach is seemingly more fun for kids, because they are active for a majority of time during the lesson.

Until now, only three studies have evaluated the effectiveness of modifications such as the ones used in the new format for 10 & Under Tennis. Farrow and Reid (2010) found that children were more engaged and had more success when using the modified equipment as compared to standard tennis equipment. Of the three studies done, none have examined the use of the USTA curriculum as specified in the USTA *Quickstart Tennis: A Guide for Parents and Recreational Coaches* manual. Created by the USTA, the *Quickstart Tennis: A Guide for Parents and Recreational Coaches* manual serves as a guide for tennis coaches and parents, providing lesson plans for three different age groups over an eight-week period. The manual presents games and activities for each lesson, allowing a coach to complete an 8-week tennis program using just the lessons given in the manual.

Currently, most tennis clubs and coaches have begun to implement the USTA 10 & Under curriculum. Though most clubs have begun to use the modified equipment as outlined in the 10 & Under curriculum, as typical with any national program that goes to scale there is considerable variance in terms of adherence to the recommended methods of teaching. Some tennis clubs are implementing programs with fairly good adherence to the 10 & Under manual using the lessons and teaching method, a games model, employed in the curriculum. The games model of teaching emphasizes game-like situations and children work together to learn skills. The implementation failure of the 10 & Under curriculum exists when the instructors, though using the modified equipment, deviate from the teaching model within the curriculum and use the more traditional method of teaching. The traditional method includes putting an emphasis on skill and technique and the children wait in lines for their turn to practice skills with the instructor (K. Anderson, personal communication, November 15, 2013).

The effects of only employing the changes in equipment specified in the 10 & under tennis program but not adhering to methods used has not been studied. In fact, little is known about how individual instructors are using the 10 and under tennis curricular materials, the reasons behind their decisions to adhere or not adhere to the suggested guidelines, and how such changes might influence the major program outcomes such as increased enjoyment of tennis by the children and more success in rally performance. For this reason, evaluation research that systematically investigates the effectiveness of interventions like the USTA 10 & Under Tennis curriculum is badly needed. Thus, the purpose of this study is to evaluate the implementation of the USTA 10 & Under curriculum in two already intact 10 & Under Level II tennis classes.

Two 10 & Under Level II tennis classes, purposefully selected will be studied in this investigation. Within the USTA 10 & Under Manual, there are three levels of classes. Level 1 is for the youngest players typically ages five and six, Level II includes players ages seven and eight, and Level III includes players ages nine and ten. Therefore, some players in Level II classes may have started in a Level I class or may be new to the program. Informal observations of one class reveals that the instructor appears to closely follow the 10 & Under curriculum and uses the activities found within the USTA 10 & Under manual. In the second class, initial observations have revealed that the instructor appears to deviate greatly from the curriculum and instead uses a more traditional method of teaching, while still using the modified equipment.

Conducting this study will provide much needed data on how this key USTA 10 & Under Tennis program is being implemented, the reasons why coaches adhere or make changes to the recommended format, and the effects of how degrees of implementation influence the ultimate goals of 10 & Under Tennis. Specifically, do high levels of enjoyment and improved rally performance lead to an increase in tennis participation for children under 10 years of age?

This study, then, will evaluate differences in enjoyment and rally performance between the two classes that are expected to differ greatly in their implementation methods. As there has not been research conducted on the implementation of USTA 10 & Under tennis curriculum, this study is exploratory in nature to describe differences in the two common implementation methods and to explore whether differences exist in enjoyment and rally performance between the two implementation methods

The investigator's original intent for this research was to instruct two 10 & Under Level II classes, one using the guidelines found in the USTA 10 & Under manual and one using a more traditional method of teaching. This intent proved not feasible, due to costs and logistical constraints (facility availability). Instead the investigator decided to evaluate two intact 10 & Under Level II classes that have implemented the USTA 10 & Under Curriculum in different ways, one following the curriculum found within the USTA *Quickstart Tennis: A Guide for Parents and Recreational Coaches* manual and one that deviates from the manual. Though this proposal has been written as a traditional study, the investigation is an evaluation of the implementation of the USTA 10 & Under curriculum using the goals of the USTA 10 & Under program as performance indicators.

This study has three specific purposes tied to this overall objective. These include:

(1) Evaluate and describe differences in the implementation of the 10 & Under curriculum in two already intact 10 & Under Level II tennis classes.

(2a) Explore whether differences exist in rally performance in two already intact 10 & Under Level II tennis classes that implement the 10 & Under curriculum differently on the modified size tennis court.

(2b) Explore whether differences exist in rally performance in two already

intact 10 & Under Level II tennis classes that implement the 10 & Under curriculum differently on the standard size tennis court.

(3) Explore whether differences exist in sport enjoyment in two already intact 10 & Under Level II tennis classes that implement the 10 & Under curriculum differently.

To evaluate differences between the two implementation types of teaching 10 & Under Tennis, two already existing 10 & Under Level II tennis classes at two different tennis clubs will be observed. At one club, the 10 & Under Level II tennis class follows the curriculum given in the 10 & Under manual, while the second tennis club deviates from the curriculum and uses a more traditional model of teaching. Each class session will be videotaped and checklists adapted from the USTA 10 & Under manual will be used to describe differences in activities and equipment used within the two clubs for each class session. The participants, children ages 7-9, will complete a sport enjoyment measure after each lesson. A rally pre-test will be done at the start of the first lesson and a rally post-test will be done at the end of the last lesson to measure rally performance improvement. Several local facilities have been identified that already use the modified equipment but vary in their adherence to the curriculum as described in the USTA *Quickstart Tennis: A Guide for Parents and Recreational Coaches* manual. This allows for an evaluation of how the program is being implemented and, given the lack of evidence on the effectiveness of the new format, should provide valuable information to the tennis and scientific community.

CHAPTER 2

Review of Related Literature

Quickstart Tennis, the new format for teaching 10 & Under Tennis was implemented by the USTA in 2008. To increase participation in tennis for youth under ten years of age, Quickstart Tennis incorporates modified equipment and a games model for teaching. The new format was published by the USTA (2009) in the manual "Quickstart Tennis: A Guide for Parents and Recreational Coaches." The manual consists of eight lessons for three different age groups; ages 5-6, ages 7-8, and ages 9-10. Lessons occur once a week and last for about an hour, depending on the age of the children. Each lesson includes a theme, along with different activities and games related to that theme. The lessons also provide activities for the child to practice and play with their parent at home. Included in the lessons are guidelines for the use of modified equipment.

Modified Equipment

The modified equipment and rules proposed for use in the USTA 10 & Under Manual include six different specifications: age, court size, racket length, ball size and weight, net height, and scoring. Each age group uses different sized equipment during lessons. The different size tennis balls include larger red felt or foam balls, which move slower and bounce lower than standard tennis balls. Next, are orange tennis balls are used which are similarly sized as standard tennis balls but have lower compression and are lighter, causing them to bounce lower. Green dot balls are next, which are just slightly less compressed than traditional tennis balls. As the tennis players improve their skills and strength, they move through the different types of tennis balls until they are able to play with traditional tennis balls. Thus, it is recommended that 5-6

year old children use the red foam or felt ball, 8-10 year olds use orange tennis balls, and 11 and up play with green dot tennis balls ("Tennis equipment sized just right for kids", 2014).

Court sizes also vary in Quickstart tennis along with net height. The youngest players start on the smallest court, 36' x 18', with the lowest net 2'9". As the children improve or become older, they move to the 60' x 21' sized court with a 3' net. Lastly, they can advance to a standard size court and net height. Similar to court size, smaller racket lengths are used by the youngest age group and increase in size with age. The youngest children use 23-inch-long rackets and can move all the way to a 27-inch-long racket. The different equipment sizes coincide with each other as the child continues to play in 10 & Under tennis. The youngest children play on the smallest court with the lowest net, using the biggest tennis ball and the smallest racket. As they keep playing they can move to the larger court, with a smaller tennis ball and bigger racket, until they reach the standard court and standard tennis ball ("Tennis equipment sized just right for kids", 2014). Therefore, the equipment matches the children developmentally.

The rationale used for the USTA's decision to implement Quickstart Tennis is to increase fun, allow for more shot and rally success, and increase participation rates. The USTA believes that "for young people to be attracted to and succeed in a sport, the equipment, playing area and competitive structures need to be appropriate" (p. 5, USTA Manual, 2009). The effect of modified equipment on a child's success in sport has been studied across a variety of sports and ages. Repeatedly, throughout the literature, modifying equipment in sport to fit a child's developmental age has been found to lead to greater success than using adult formatted equipment and venues (Chase, Ewing, Lirgg, & George, 1994; Ferguson, Lirgg, Gorman, & Ting, 2005). Both boys and girls ages 9-12 years old had more success when shooting on a

basketball hoop with a modified height of 8-ft. as compared to the standard 10-ft. basketball hoop. A modified basket height was especially important for girls, as the strength of the difference between shots scored on the 10-ft. basket height and the 8-ft. basket height was very strong. The researchers believed the increase in successful shots on the 8-ft. basket height could have been because of the lack of physical strength of the children to shoot to the 10-ft. basket height. This conclusion is based on a higher number of air balls shot at the 10-ft. basket height than the 8-ft. basket height, as physical strength was not measured (Chase et al., 1994). Self-efficacy was also measured which showed that self-efficacy was highest when the children were shooting at the basketball hoop with height of 8 ft. (Chase et al.,1994).

Within the sport of golf, Ferguson et al., (2005) implemented a 12-week golf program for 18 college-age beginner students. The golf program consisted of a combination of modified equipment, instructional tools, and a curriculum based on progressive tasks. During the first 6-weeks, participants used modified equipment and in the last six weeks they switched to traditional equipment. Though success was not measured, participants showed a significant increase in self-efficacy for all skills during the first 6-weeks and this increase remained significantly higher through the traditional section of the class. Full swing, pitch, and chip skills did not significantly change when the class switched from modified to traditional equipment, though putting self-efficacy did decrease significantly after the switch (Ferguson, Lirgg, Gorman & Ting, 2005). Though this study included college-age participants, the results showed that modified equipment can lead to higher self-efficacy for any sport beginner, regardless of age. Ultimately, studies have shown that the use of modified equipment for developmental age leads to increases in both success and self-efficacy in sport.

Three studies have assessed the success of modified equipment within tennis for children under ten years of age. The effectiveness of modified equipment on success has been found repeatedly throughout the research. A five-week acquisition program using modified equipment lead to children having more success in stroke proficiency than children playing with standard equipment (Farrow & Reid, 2010). Children, with a mean age of eight years, were assigned to one of four conditions: scaled ball/scaled court, scaled ball/standard court, standard ball/scaled court, and standard ball/standard court. The researchers found that children in the scaled ball/scaled court condition had more hitting opportunities during each lesson than the participants who learned with a standard court/standard ball size. The children in the standard ball/standard court condition had the poorest stroke proficiency relative to the other three conditions as they had less hitting opportunities on both the forehand and backhand side during the five-week program (Farrow & Reid, 2010). The researchers believed that because the players on the scaled court and using scaled ball size had more hitting opportunities they had a greater opportunity to establish new coordination patterns which lead to more successful shot proficiency (Farrow & Reid, 2010). The researchers tested rally performance for every participant on each condition; the children were tested on how many balls they could rally on each court size and each ball type. The only improvement from pre-test to post-test were children in the standard ball/scaled court and scaled ball/standard court conditions, though this result was not significant. No significant improvements in rally performance may be due to the program lasting only 5-weeks and sessions only 30 minutes long, not allowing children enough practice time. Perhaps with a longer program, significant differences in rally performance improvement may have been apparent (Farrow & Reid, 2010).

Furthermore, Larson and Guggenheimer (2013) found that when focusing entirely on the forehand groundstroke and using a scaled court and scaled ball, participants hit significantly more successful forehand groundstrokes than when they were using a standard court and ball size. The researchers also measured velocity and lateral and longitudinal ball placement, which participants also had higher scores on when using the scaled ball on a scaled court. Participants in this study were between the ages of 7-9 years, similar to the targeted population of this study, but had prior tennis experience with the scaled tennis balls. The higher success levels of the participants when using a scaled ball and scaled court may have been due to the increased reaction time as the scaled tennis balls travel slower than standard tennis balls because of the increased size and weight.

However, in one case using a lower compression tennis ball had no significant effect on success rate in a tennis class (Hammond & Smith, 2006). Fourteen beginner tennis players ages 5-11 were divided into two groups, one group using lower compression tennis balls and the other using standard tennis balls. Both groups participated in similar tennis classes with the same instructor and completed a pre- and post-skills test. The researchers found no significant improvements on the skills test for either group, regardless of ball type. This may be because of the wide variety of ages of the participants. Though there were no significant improvements on the skills test, instructor interviews showed a general belief in positive effects of using a lower compression ball for teaching to beginner tennis players. The instructors believed that because the lower compression balls bounced at waist height for the children, they were able to use the right technique for the skills they learned (Hammond & Smith, 2006). The instructors used both aspects of a traditional and games approach to teaching, but this was not measured to find the effect of teaching approach on participant success.

The use of modified equipment in sport can allow for children to experience more success as the equipment is fitting for the size and stature of the child (Haywood & Getchell, 2009). Modified equipment helps to facilitate more proficient or desired movements, as the weight and size of the equipment no longer serves as a barrier to the child's movement. All children have individual constraints, such as height or weight, but by using modified equipment, the relationship between individual constraints and task constraints can be manipulated and made easier for the child to produce more proficient movement patterns (Haywood & Getchell, 2009). For example, in tennis, the size of the court and weight of the racket are reduced to become more developmentally appropriate for the physical size and strength of a child under ten years of age.

Although, the use of modified equipment has been found to increase success in 10 & Under Tennis, there has been no research on the use of different teaching models used to teach tennis to children. In the world of tennis, most professional instructors employ a traditional model for teaching that involves the instructor demonstrating skills to the players who then individually practice what was demonstrated in static drills. The focus is put on technique and instructors look for technique proficiency before challenging the players in a game setting. A newer format that is starting to be used more often is a games model, in which players learn in game situations first and then practice skill technique. The difference between the two models' effectiveness in increasing fun and rally performance in tennis has not yet been studied.

Ultimately, greater success comes from the use of modified equipment because the altered environment allows for more developmentally appropriate functional motor skills (Haywood & Getchell, 2009). Research has repeatedly shown that greater success occurs in youth sports when using modified equipment, rather than traditional equipment (Chase, Ewing, Lirgg, & George, 1994; Ferguson, Lirgg, Gorman, & Ting, 2005). In tennis, two studies showed

that when children play with a modified ball on a modified court, they have more success than when using a standard ball on a standard court (Farrow & Reid, 2010; Larson & Guggenheimer, 2013). With the goals of the USTA 10 & Under Quickstart Tennis format being increased fun and improved rally performance, research shows support for the use of modified equipment found in the program. The more success that comes with using modified equipment can lead to more enjoyment and improved rally performance.

Models for Teaching Sport

Teaching tennis to children under ten years of age generally includes a traditional model. A traditional model to teaching sport is based on technique and emphasizes skill improvement, demonstrations, and group instructions. Typically, the instructor demonstrates a skill then employs drill situations in which the player practices the skill (Turner & Martinek, 1999). The drills are static and the players often stand in line and wait for a turn to practice the skill. The instructors may include one game at the end of the lesson (Silverman, 1997). The game used is not played in initial lessons, rather time is heavily spent on skill acquisition. Games are played after the player's success in drills (Browne, Carlson, & Hastie, 2004). Although this is known as the traditional approach to teaching sport, not all instructors follow this single approach and may include elements of each model within their lessons.

Unlike the traditional model to teaching sport, a games model emphasizes the use of games to enhance the player's tactical understanding. The focus is put on the player's development of decision-making ability within game situations (Crespo, Reid, & Miley, 2004). Skill acquisition is still a priority in the games model, but rather than static activities, players interact with each other to practice skills. For example, an activity within the USTA Manual includes players working together, with one player throwing the ball and the other player

catching the ball between two rackets and throwing it back to their partner, mimicking a forehand swing (USTA Manual, 2009). Both players are active and practicing skills needed in the game of tennis. The instructor in the games model works as a facilitator, helping with technique as the children continue to play.

The games model to teaching sport began with the development of the Sport Education Model (SEM; Siedentop, 1994). The model consisted of three major themes: participation requirements, developmentally appropriate competition, and diverse roles (Siedentop, 1998). Much like in the USTA's 10 & Under Tennis, participation requirements include each student being involved in activities at all times, all students have an equal opportunity to play and learn. Modified equipment and rules are also used to allow for developmentally appropriate competition. Different from a games model is the use of diverse roles in the SEM. Students learn to perform, be a referee, and keep score for each sport within the curriculum (Siedentop, 1998). Another model, Tatical Games for Understanding (TGfU) was also developed within the physical education field (Bunker & Thorpe, 1982).

TGfU, similar to SEM, emphasized the use of game play and tactical learning for skill acquisition (Werner, Thorpe, & Bunker, 1996). When first learning a sport, students engaged in six steps, facilitated by the teacher. In the first step, students began to understand the game format and figure out problems unique to that game. It was within this first step that teachers modify the game equipment to highlight the problems of playing the game. The second step involved game appreciation in which students began to understand how rules shape the game. Tactical awareness was the third step in which the children are introduced to tactics through movement exercises. It was within step four that technical skills become relevant, as the students become aware of when a particular skill is needed to play the game. This awareness

helped students to become ready to learn proper technique, as they understood why they needed

the skill. Within step five, the students learned and executed the skills they perceive as important

to the game, and finally in step six, the students performed the skills they learned in a game

situation (Werner, Thorpe, & Bunker, 1996).

TGfU has many objectives when teaching sport to children. By giving students the

understanding behind game format, students could then see similarities between two sports that

appear dissimilar. For example, many sports utilized similar tactical structures such as

badminton and tennis. The modified equipment and rules allowed for students to understand the

tactical structures of the sport but with a fundamental representation necessary for the age group

(Werner, Thorpe, & Bunker, 1996). The primary objective of TGfU, according to Werner,

Thorpe, and Bunker (1996) was "to improve students' game performance and to improve their

enjoyment and participation in games, which might lead to a more healthy lifestyle" (p.30). The

researchers believed that importance of affiliation, stress/sensation, and self-direction that comes

from a games model, serves as reasons for student's motivation to be involved in sport (Werner,

Thorpe, & Bunker, 1996).

After the development of TGfU further research led to a third model: Tactical Games

Approach (Griffin, 1997). Tactical Games Approach served as a method of teaching that

combines both technique and tactics.   Within this approach were four components upon which

the lessons were built. First the initial game forces students to think about the tactical aspects of

the activity. Second, student-centered question and answer session allows students to discuss the

goal of the game and what skills are needed to do the activity. The third component was a

practice resulting from the question and answer session in which the players practice the skills

discussed. Lastly, another game was played that stresses the skill that has been practiced

(Griffin, 1997). Gubacs-Collins (2007) researched this model in a college level physical education class in which participants were involved in an 8-week tennis class learning with a Tactical Games Approach. The results showed that participants gave positive reviews of the approach. They believed the class was more meaningful because it combined both skill development and tactical knowledge. They also believed the class to be more enjoyable and several students commented that because activities were different each day and they never had to wait in line for a turn, they were excited to attend class (Gubacs-Collins, 2007).

Both types of teaching models, traditional and games, were found to improve performance in sport (Browne, Carson, & Hastie, 2004; Pritchard, Hawkins, Wiegand, & Metzler, 2008). When using both a traditional-approach and a games-approach during a rugby season, both groups of participants, boys ages 12-13, made significant improvements in their knowledge of the rules and of the game over a 20 lesson unit, as well as improvements in their own perceived skills (Browne, Carson, & Hastie, 2004). The traditional approach used included a skill-drill-game approach, similar to the traditional approach used in tennis, and the games approach was based on the Sport Education Model. The participants in the Sports Education Model group reported that they enjoyed the autonomy and organization duties required and that the instructor had more time to provide feedback to the participants (Browne, Carson, & Hastie, 2004). Allowing the instructor to have more time to provide feedback would be ideal for children in the 10 & Under Tennis Program, as younger kids may need more attention from instructors to learn new skills.

Comparing teaching models in a physical education setting during a 20-session volleyball unit, both groups, traditional and Sport Education Model, showed some improvements in a skills test but not significantly (Pritchard, Hawkins, Wiegand, & Metzler, 2008). When game

performance was analyzed between the two groups, the games group outperformed the traditional group. Researchers believed this was because the games group had more practice in a real situation early in the practice sessions, while the traditional group did not have practice in a games context until midway through the practice sessions. The extra practice in game like situations allowed for participants to have more opportunities to make decisions regarding the right type of shot and executing that shot correctly, which lead to better game performance (Pritchard, Hawkins, Wiegard, & Metzler, 2008).

Games for Understanding approach was used during a 15-session field hockey season, where the games for understanding group improved control and passing execution significantly, as well as better passing decisions and improved both their declarative and procedural knowledge signficantly (Turner & Martinek, 1999). Similar to Pritchard, Hawkins, Wiegard, and Metzler (2008), the researchers believe the improvements in the Games for Undersanding group was attributed to practicing in games and gamelike contexts during instruction, allowing the students more opportunities for decision making (Turner & Martinek, 1999).

With little research done on teaching approaches used in tennis, one study examined differences in both skills and game knowledge in two different tennis classes; one who learned with a traditional approach and one with a games approach (McPherson & French, 1991). The class that learned with the traditional approach significantly improved their game knowledge, forehand groundstroke, and backhand groundstroke. The students in the games class had little skill improvement for the forehand groundstroke, backhand groundstroke, and serve but significantly improved their volley skills. They also improved significantly in the percentage of strong decisions during game play, such as how fast and where to serve. Only when the teacher began to emphasize skill instruction in the games class, did the researchers see improvement in

skills. The researchers believe that little skill improvement occurred when a games approach was used because the students may not have had capacity to adequately attend to the requirements of both the skills and environment at the same time. When skills are learned first, then the participants could focus more on the environment and strategy of the game (McPherson & French, 1991). Though this study gives insight on the use of teaching approaches in tennis, participants were adults with a mean age of 22.4 years and participated in tennis class for 14 weeks, three hours a week. As the children in 10 & Under Tennis are 10 years old or younger and will only participate in class once a week for eight weeks, it is unclear how this limited teaching approach will effect skills and game knowledge.

Though both types of teaching models led to some improvement in skills, the games model has been found to also improve game knowledge (Turner & Martinek, 1999, Browne, Carson, & Hastie, 2004, Pritchard, Hawkins, Wiegand, & Metzler, 2008). Game knowledge is commonly divided into two different components: declarative and procedural knowledge. Declarative knowledge refers to factual knowledge such as rules and goals of the game. Procedural knowledge specifies the strategy of the game, selecting the correct action within the context of the game (Turner & Martinek, 1999). The goal of the games model was to improve player procedural knowledge by introducing game-like experiences along with the presenting games rules and goals to increase declarative knowledge (Turner & Martinek, 1999).

Both knowledge components, declarative and procedural, improved when using a games model to teach sport (Turner & Martinek, 1999). Players in the games for understanding condition in Turner and Martinek's (1999) field hockey study were found to demonstrate better passing decisions than both the technique approach and the control group. Games were used for the games for understanding condition that highlighted passing in a game-related context. Thus

participants had opportunities to practice their passing decision making in game-related contexts that participants in the technique and control group did not. This finding was not common amongst most research in this area, as most studies have shown no significant difference in knowledge between traditional and games model (Pritchard, Hawkins, Wiegand, & Metzler, 2008; French, Werner, Rink et al., 1996). A study comparing volleyball skills and knowledge, found no significant difference in volleyball knowledge, for participants ages 14-15, between each condition after 20 lessons (Pritchard, Hawkins, Wiegand, & Metzler, 2008). Interestingly, both conditions did not improve their volleyball knowledge significantly, although both groups did receive instruction in volleyball knowledge during class. The researchers believed this lack of knowledge was due to low effort levels of the participants when taking the knowledge test (Pritchard, Hawkins, Wiegard, & Metzler, 2008).

The relationship between the games model for teaching sport and enjoyment has been shown to be positively correlated (Wallhead & Ntoumanis, 2004). Comparing two different physical education classes, one which used the SEM and the other which used a traditional model, Wallhead and Ntoumanis (2004) found that the students in the SEM condition reported significantly more enjoyment than the students in the traditional model condition. Their enjoyment was derived from the task-involving climate that was created by the use of SEM. A task-involving climate put the focus on one's own effort and improvement, rather than comparing participants to one another. This type of climate created an autonomy for the participants and thus made class more enjoyable (Wallhead & Ntoumanis, 2004). Spittle and Byrne (2009) found similar results with 115 participants in physical educations classes. The participants who were in a class that used SEM reported higher levels of enjoyment than the participants in the traditional model classes. The participants in the traditional condition had a

decrease in adaptive aspects of motivation, while participants in the SEM condition maintained

their existing motivation levels (Spittle & Bryne, 2009).

In summary, looking across all the studies when the games model has been compared to

the traditional model of teaching, results have shown that both teaching models result in

improvement in skill performance (Browne, Carson, & Hastie, 2004; Pritchard, Hawkins,

Wiegand, & Metzler, 2008). When teaching approaches were researched in tennis, the

traditional approach led to more skill improvement than the games approach (McPherson &

French, 1991). Using this information, when a tennis instructor employs a traditional approach in

10 & Under Quickstart tennis, the children may have more success than when the instructor uses

a games approach. When focusing on the tactical knowledge of sport, it was the games model

which has shown the most improvement rather than the traditional model, as players have more

opportunity to learn the tactics of the sport in the games used within the games model (Turner &

Martinek, 1999; Browne, Carson, & Hastie, 2004; Pritchard, Hawkins, Wiegand, & Metzler,

2008). The strengths of this research included the wide variety of ages and sports used when

comparing teaching models, which shows consistency in the results. A major limitation is the

length of the studies that range from two to four months. There are no studies of the long-term

differences in athletes who learned using a games model compared to a traditional model.

Enjoyment in Sport

Of the many reasons children stay involved in sport, fun and enjoyment are repeatedly

found as the primary reasons for continued sport participation (Weiss, Kimmel, & Smith, 2001;

Gill, Gross, & Huddleston, 1983). Sport enjoyment is commonly defined in research as a

"positive affective response to sport experience that reflects generalized feelings such as

pleasure, liking, and fun." (Scanlan & Simons, 1992). Fun is associated with a positive affective

state consisting of feelings of happy, cheerful, and friendly (Wankel & Sefton, 1989). Fun and enjoyment in youth sport are often used interchangeably as children commonly use the word "fun" when describing their enjoyment (Scanlan & Simons, 1992). Within the world of youth sports, enjoyment has become a popular topic of interest, specifically the many sources of sport enjoyment.

Sport enjoyment is derived from various sources including both extrinsic and intrinsic factors as with achievement and nonachievement factors (Scanlan & Simons, 1992). Scanlan, Stein, and Ravizza (1986) created a two-dimensional framework showing the sources of enjoyment in youth sports. The four quadrants within the model consist of Achievement-Intrinsic (Quadrant I), Achievement-Extrinsic (Quadrant III), Nonachievement-Intrinsic (Quadrant II), and Nonachievement-Extrinsic (Quadrant IV). The purpose of Scanlan and Lewthwaite's (1986) model was to create a broad view that includes all potential sources of sport enjoyment.

Within the Intrinsic-Achievement quadrant are factors that include personal perceptions of competence and control, such as feelings of mastery in performing a skill, e.g. hitting a successful forehand shot. In the Achievement-Extrinsic quadrant are feelings of competence and control that are derived from feedback of other people, such as encouragement from the parent or coach. The Nonacheivement-Intrinsic sources of sport enjoyment consists of experiences of the sport, such as movement sensations and excitement of competition, in this case just playing the sport of tennis. Nonacheivement-Extrinsic sources include the nonperformance aspect of sport, including social recognition and affiliation with peers (Scanlan & Lewthwaite, 1986). For 10 & Under tennis this could be playing tennis and games with a group of other children (McCarthy, Jones, & Clark-Carter, 2008).

Numerous studies have shown support for the Scanlan and Lewthwaite's (1986) model of sources of sport enjoyment. Male and female elite level figure skaters reported that they derived sport enjoyment from achievement recognition, competitive achievement, family/coach relationships, friendships, and mastery (Scanlan, Stein, & Ravizza, 1989). Elite level figure skaters reported enjoyment sources similar to those of youth sport athletes but with greater variety. The similar sources of enjoyment reported, regardless of skill level, showed that athletes derive their enjoyment from similar experiences. The figure skaters studied in this research had a mean age of 35 years, thus not giving much insight into sport enjoyment sources in youth athletes. Athletes from recreational tackle football, high school soccer, and non-school volleyball reported that positive team interactions and support, positive coach support, and satisfaction with player's performance were significant predictors of sport enjoyment (Scanlan, Carpenter, Lobel, & Simons, 1993). Effort and mastery were also found to be sources of enjoyment, which showed that not just special events and affiliation made sport fun for youth but rather processes and accomplishments that come with playing a sport. In this study, 1,342 children participated with ages ranging from 10-20 years, which showed how large a role fun or enjoyment has in youth sports (Scanlan, Carpenter, Lobel, & Simons, 1993).

Sport enjoyment is influenced by a child's developmental stage, though research has shown mixed results. Scanlan and Lethwaite (1986) found sport enjoyment to decrease as chronological age increases. The researchers found that younger wrestlers with high perceived ability enjoyed sport more than their older counterparts. The researchers were unsure as to why this difference in sport enjoyment for different ages occured. There may be some aspects of sport that were more appealing for the younger children, than their older counterparts. The younger children in this study were 9-11 years of age, which is similar to the ages of the children

in 10 & Under Quickstart Tennis (Scanlan & Lethwaite, 1986). Thus, the children in 10 &

Under Quickstart tennis may have a high level of sport enjoyment at baseline because of their

young age. More recently, McCarthy, Jones, and Clark-Carter (2008) found that older children

reported greater enjoyment when compared with younger children. Participants included ages 8-

15 years old in a variety of different sports including both team and individual sports. The

researchers believed that older children's more mature understanding of the competitive process,

more advanced attributional abilities, and their capacity for self-evaluation leads to greater sport

enjoyment. Also, older children may have had more opportunity to demonstrate superior ability

in competitions, adding to both the Intrinsic- and Extrinsic-Achievement sources of sport

enjoyment. Children in team sports reported more sport enjoyment than children in team sports,

which suggested that team sports meet the needs for enjoyment for youth (McCarthy, Jones, &

Clark-Carter, 2008). This finding supported the need to research sport enjoyment in individual

youth sports, such as tennis

Sources of sport enjoyment in the different developmental stages have shown that

children of different ages report different sources that influence sport enjoyment. Harris and

Ewing (1992) asked children 8-15 years old what they considered to be fun about playing tennis.

The youngest children, eight years of age, reported that being able to perform a skill is fun. The

nine-year-old children reported that improving skills and learning was fun. Playing with friends

was fun when the children were ten years old. Competing became fun for 11-year-olds but only

when competing with someone of about the same ability level. Twelve-year-olds also reported

competing to be fun but against a challenging opponent. Winning became a source of fun when

the children were 13-15 years old (Gano-Overway, Ewing, & Waldron, 2001).

Sport enjoyment served as a motivating factor for sport commitment. Research has

shown repeatedly that sport enjoyment is the primary factor for youth to commit to a sport

(McCarthy, Jones, & Clark-Carter, 2008; Weiss, Kimmel, & Smith, 2001; Casper, Gray, &

Babkes-Stellino, 2007). Sport commitment is defined as "a psychological state representing the

desire or resolve to continue sport participation" (Scanlan, Carpenter, Schmidt, Simons, &

Keeler, 1993). Committing to a sport is a general psychological state made of a motivational

force endorsing continued involvement (Scanlan, Carpenter, Schmidt, Simons, & Keeler, 1993).

Five factors have been found to predict sport commitment within the model developed by

Scanlan and Simons (1992). Each factor within the model influenced sport commitment

independently and different skill levels may lead to different magnitudes of influence for each

predictor. The five factors that were found to predict sport commitment are sport enjoyment,

involvement alternatives, personal investments, social constraints, and involvement opportunities

(Scanlan, Carpenter, Schmidt, Simons, & Keeler, 1993). The model was tested with youth sport

athletes by Scanlan, Carpenter, Schmidt, Simons, and Keeler (1993) who found sport enjoyment

and personal investments to be the most prominent influences of sport commitment.

Of the five determinates, sport enjoyment has been found to be one of the most

significant predictors of sport commitment. Youth athletes ages 10-19 who were involved in

football, soccer, and volleyball reported midseason that sport enjoyment, along with involvement

opportunities and personal investments, were the strongest predictors of sport commitment

(Carpenter, Scanlan, Simons, & Lobel, 1993). Similarly, Scanlan, Carpenter, Schmidt, Simons,

& Keeler (1993), found that with softball and baseball players, sport enjoyment and personal

investments accounted for a significant portion of the variance of sport commitment. In a

longitudinal study done on elite youth cricketers, sport commitment showed that sport

enjoyment, recognition opportunities, and social opportunities significantly predicted sport

commitment (Carpenter & Coleman, 1998).

Because the role of enjoyment within the sport commitment model has repeatedly found

to be the most significant predictor, a second sport commitment model was created (Weiss,

Kimmel, & Smith, 2001). This second sport commitment model included enjoyment as a

mediator for the relationship between the other determinants and level of sport commitment. In

this model, sport enjoyment served as a filter for the other determinants influence on sport

commitment (Weiss, Kimmel, & Smith, 2001). This model was tested with tennis players ages

10-18 to understand their motivation to continue involvement in tennis. The mediational model

was supported with results showing enjoyment to be the strongest influence on commitment.

Personal investments and attractive alternatives were found to be predictors of enjoyment and

were more strongly related to sport enjoyment than to sport commitment (Weiss, Kimmel, &

Smith, 2001). The results of this study showed that with tennis players specifically, enjoyment

served as the primary influence on level of tennis commitment. The more athletes enjoyed

playing tennis, the more likely they would continue involvement in the sport (Weiss, Kimmel, &

Smith, 2001).

Because one of the primary goals of USTA's Quickstart Tennis is to increase

participation, sport enjoyment served as a way to reach this goal. By increasing the level of sport

enjoyment or fun that children experience when they first start playing tennis, the USTA can

increase the likelihood of the child's long-term participation. As previous studies have shown,

when children experience fun or enjoyment when playing a sport they are more likely to commit

(Weiss, Kimmel, & Smith, 2001). As shown specifically in the sport of tennis, sport enjoyment

plays an important role when a child is deciding to commit to a sport (Weiss, Kimmel, & Smith, 2001).

Enjoyment has been found to be a major reason for continued participation in youth sports for children of all ages (Weiss, Kimmel, & Smith, 2001; Gill, Gross, & Huddleston, 1983). What makes sport fun for children are mastery, perceptions of competence from outside sources, movement sensation, excitement of competition, and the social aspect of sport (Scanlan & Simons, 1992). The USTA 10 & Under Quickstart Tennis program attempts to meet the sources of enjoyment through using a games approach. A games approach allows for more movement, more opportunities for competition, and support from the instructor. Analyzing the research on enjoyment in youth sport, the results support the goal of increasing enjoyment in tennis through a games approach. Research has also shown that when enjoyment is high, youth sport participants are more likely to commit to the sport (Weiss, Kimmel, & Smith, 2001; Gill, Gross, & Huddleston, 1983). Thus, by increasing enjoyment, the primary goal of the USTA to increase participation in tennis might be reached.

Evaluation

This research study is an evaluation of the implementation of two intact 10 & Under Level II tennis classes. Program evaluation is "the use of social research methods to systematically investigate the effectiveness of social intervention programs in ways that are adapted to their political and organizational environments and are designed to inform social action to improve social conditions" (Rossi, Lipsey, & Freeman, 2004, p. 16). For this research project, social research methods will be used to evaluate and explore differences in the implementation of the 10 & Under tennis program. There are many branches and types of program evaluation; this research study will employ a process evaluation. Process evaluation

"verifies what the program is and whether or not it is delivered as intended to the targeted recipients" (Scheirer, 1994).

Process evaluation works to answer two key questions; whether a program is reaching the appropriate target population and whether its service delivery and support functions are consistent with program design specifications or other appropriate standards (Rossi, Lispey, & Freeman, 2004, p. 171). This research study will focus on the second question. Are tennis clubs and instructors implementing the 10 & Under curriculum consistent with the program design specifications found in the 10 & Under manual? Also included in process evaluation are the resources that are being used to conduct the program, in this case, modified equipment, instructor training, and teaching model used.

A key part of a process evaluation is the administrative standards or objectives that exist to monitor implementation performance (Rossi, Lispey, & Freeman, 2004, p. 174). The administrative standards or objectives that are used in this study come from the manual *Quickstart Tennis: A Guide for Parents and Recreational Coaches* which gives the resources needed and lesson plans to use to run a 10 & Under tennis class. If the instructor is not using the right equipment or teaching different activities, then they are failing to implement the 10 & Under curriculum correctly, resulting in implementation failure.

Implementation failure is defined as "when the outcomes are poor because the program activities assumed necessary to bring about the desired improvements did not actually occur" (Rossi, Lipsey, & Freeman, 2004, p. 79). Implementation failure differs from theory failure. Theory failure is the failure of implemented programs to attain desired outcomes (Patton, 2012, p. 194). Theory failure suggests that the program, implemented correctly, does not lead to successful outcomes, whereas implementation failure refers to a correct theory that is wrongly

implemented (Patton, 2012, p. 194). For this research study, implementation failure is occurring as instructors are deviating from the *Quickstart Tennis: A Guide for Parents and Recreational Coaches* manual. The purpose of this study will be to evaluate in which way the 10 & Under curriculum is failing to be implemented correctly.

While this study is primarily a process evaluation of the implementation of 10 & under tennis in two clubs, two outcome evaluation measures will be taken: sport enjoyment and rally performance. Unlike process evaluation, outcome evaluation focuses on whether a program is meeting its stated objectives. In the case of USTA 10 and under tennis this would include enjoyment and rally performance.

Hypotheses

Based on the review of the related literature and the knowledge of the investigator, several hypotheses will be tested with the general and two specific purposes of this study.

Hypothesis 1. It is expected that the 10 & Under level II tennis class in which the instructor implements the USTA *Quickstart Tennis: A Guide for Parents and Recreational Coaches* manual will more closely implement the principles outlined in the manual as compared to the second 10 & Under Level II tennis class in which the instructor deviates from the guidelines found in the manual.

Hypothesis 2a. Participants in the 10 & Under Level II tennis class with the instructor that more closely follows the manual will have higher rally performance scores than participants in the 10 & Under Level II tennis class with the instructor who deviates from the manual on the modified size court.

Hypothesis 2b. Participants in the 10 & Under Level II tennis class with the instructor that more closely follows the manual will have higher rally performance scores than participants

in the 10 & Under Level II tennis class with the instructor who deviates from the manual on the standard size tennis court.

Hypothesis 3. Participants in the 10 & Under Level II tennis class with the instructor that more closely follows the manual will report higher levels of enjoyment than participants in the 10 & Under Level II tennis class with the instructor who deviates from the manual.

CHAPTER 3

Method

Subjects

The participants in this study were beginner tennis players enrolled in a 10 & Under Level II tennis class at one of two different tennis clubs, located in a Midwestern state. At one tennis club, the instructor followed the curriculum given in the USTA *Quickstart Tennis: A Guide for Parents and Recreational Coaches* manual. The instructor at the second tennis club deviated from the curriculum and employed a more traditional model of teaching. Permission from club directors, instructor consent, parental consent, and child assent was obtained before the start of the study. Both 10 & Under Level II tennis classes lasted four weeks with one hour classes once a week.

Sample Characteristics

A total of 15 children participated in this study. Ages ranged from 7-9 years and participated in a 10 & Under Level 11 tennis class at one of two tennis clubs (M = 8.125, SD = .71). Club A included six participants, five females and one male, with an average age of 7.5 years (SD = .58). Club B included nine participants, six females and two males, with an average of age of 8.5 years (SD = .49). Participants' parents in Club A reported on average that their child played tennis for five months of year, three weeks per month, and for one hour a week in group tennis classes. Participants' parents in Club B reported on average that their child played tennis ten months of the year, three weeks per months, and for one hour per week in group tennis classes.

Measures

   Player demographic and background information. Age, gender, tennis experience, parents' tennis experience, number of older and younger siblings, previous sport activity, family activity level, importance of physical activity to family, and importance of physical activity to the child was assessed with a demographic survey given to a parent of each participant (Appendix A, p. 56). Tennis experience was considered the number of years or months and times per week the child played tennis to have a realistic amount of hours spent on the tennis court. The parents also defined their own type of tennis experience, if any, e.g., recreationally, group classes, or private lessons.

   Sport Enjoyment. Sport Enjoyment was assessed via four items taken from the Sport Commitment Model (Scanlan, Simons, Carpenter, Schmidt, & Keeler, 1993). The Sport Commitment Model measures six constructs which includes sport commitment, sport enjoyment, involvement activities, personal investments, social constraints, and involvement opportunities. For this study, just the sport enjoyment construct of the measure was used. The Cronbach's alpha reliability for the Sport Commitment Model (Scanlan, Simons, Carpenter, Schmidt, & Keeler, 1993) was reported at .90 and .95. Scanlan et al. (1993) uses four synonymous terms, enjoy, happy, fun, and like, to measure sport enjoyment with four questions (Appendix B, p. 58). The questions include: Did you enjoy playing in tennis class today? Were you happy playing in tennis class today? Did you have fun playing tennis today? Did you like playing tennis today? Participants respond to the questions using a 5-point Likert scale (1 = Not really, 2 = A little, 3 = It was okay, 4 = It was good, 5 = It was great!). This measure was chosen because the language used is understandable by children and this measure has been used with children under 10 years of age (Scanlan, Simons, Carpenter, Schmidt & Keeler, 1993). Because the participants in this

study are under ten years of age, an image based Likert scale was chosen that uses pictorial representatives of agreement to the question (Read, MacFarlane, & Casey, 2002).   Underneath each face are words to describe that face. The descriptive words were altered to fit the American culture of the participants, rather than the British culture where the scale was developed, e.g., "brilliant" has been changed to "great". Participants were asked to pick the face that best represents the answer to each of the questions. The sport enjoyment measure was given at the end of each lesson and an average score was calculated for each participant. Cronbach's alpha for the sport enjoyment scale was .517.

   Tennis rally test. A Rally test was used to measure rally success (see Appendix C, p. 59). The rally test developed by Farrow and Reid (2010) was chosen because it had been used to measure rally success in tennis with children under 10 years of age. The researcher, an experienced tennis player and coach, conducted the rally test. Specifically, the researcher fed a tennis ball, with controlled pace and direction, to the participant in a standardized sequence (i.e., forehand, backhand, forehand, backhand, etc.). The total number of strokes hit consecutively over the net and into the opposite side of the tennis court was recorded for each rally. Five rallies were started for each participant. To standardize the rally test for each class, the participants performed the rally test on both the 60ft x 21ft court and the 36ft x 18ft court as the two tennis clubs used in the study use different sized courts during the lessons. The participants alternated on which court they completed the first rally test. The total number of shots the participant was able to hit over the net and into the court, was recorded for each trial (Appendix C, p. 59). Then rally scores on each court were averaged together for each participant. The rally pre-test was done before the first lesson and a rally post-test was done after the end of the last

lesson. The rally performance tests were conducted on the both the modified court and the

standard court. The rally performance score was the average score of all five rallies.

Observation Checklists. Three observation checklists adapted from the USTA *Quickstart*

Tennis: A Guide for Parents and Recreational Coaches manual was used to observe differences

in implementation of the two 10 & Under Level II classes (Appendix D, p. 61). The first

checklist consisted of each activity to be used in each week's lesson plan found within the

manual as well as the equipment needed, player/teacher ratio, theme, and time for that week's

lesson. This checklist determined how closely the class followed the lesson plans given in the

manual. The second checklist consisted of the progression of skills taught during the class

sessions as compared to the manual. The third checklist focused on time on task of each class,

which allowed for a comparison of how each class was taught. This checklist also allowed for

the observation of activities the instructors employed during lessons and how closely the

activities matched the guidelines and principles of the manual.

Procedure

Permission to conduct the research study from both tennis club directors was obtained

prior to the start of the study (Appendix E, p. 72).   Permission and consent were also obtained

before the start of the study from the tennis instructors of each class (Appendix F, p. 73). Each

instructor was asked to give their endorsement of the study to the parents and players that were

in the session prior to the start of the session when data were collected (Appendix G, p. 76).

Information was provided to parents and consent and assent was obtained from parents and

children (Appendix H, p. 78; Appendix I, p. 82). The researcher attended two or three of the

tennis classes during the session prior to the session when data would be collected in order to

meet and recruit parents and explain the study. Based on previous experience most players in the

session were likely to continue to participate in the next session. For potential participants who had not signed up for the previous session, a class list with parent emails was collected. With permission from the club director the parents were contacted and informed as to the nature of the study by the researcher. As an incentive for participating in this study, both tennis clubs gave each participant one free play day at the tennis club where they took their class. A play day is an opportunity for children to have fun and play tennis with other children, with a focus on play rather than drills, supervised by the tennis instructors of each club. Each club offers play days for the 10 & Under age group regularly and participants were able to attend one free of charge. The consent form was obtained from the parents as well as an assent form for the child during the recruitment sessions. The demographic survey was also given to the parents at that time and they completed the survey for their child. Once consent and assent was obtained from all parents and children, participants were assigned a number which was placed on each measure and test record sheet (Appendix J, p. 84).

Prior to the start of the first lesson of the session, parents were asked to bring their children to class an hour before class starts and to have their children stay an extra hour at the end of the last lesson. The researchers had the two court sizes and cameras set up to perform and videotape the rally pre-test. One participant at a time completed the rally test. The rally test for each participant was completed by the researcher. A researcher assistant recorded the number of shots rallied for each participant e.g., "0", "1", "3", "5".

The tennis lesson proceeded as it normally did. At the end of the lesson, the researcher met with the participants on the tennis court and had them sit down in a circle on the court. The researcher handed each participant a colored pencil and a sport enjoyment form with their participant number on it, along with a colored blank piece of paper. The researcher asked the

participants to cover the sport enjoyment form with the colored paper. The researcher then read

through each question, one at a time, with the participants having had the rest of the questions

covered until the previous question is answered. The researcher told the participants there were

no right or wrong answers and to answer how they felt at that moment. The sport enjoyment

forms were collected once all the forms were completed. Participant attendance during the

session was recorded (Appendix K, p. 85).

After all sport enjoyment forms were collected, the rally post-test was completed on both

sized tennis courts. The rally post-test was done with the same research volunteer who did the

rally pre-test. The total number of shots rallied by the participant with the researcher was

recorded.

Data Analysis

Descriptive statistics were conducted on both the total sample and each club. Sport

enjoyment scores were summed for each participant and then averaged. A t-test was run to

determine if differences in average sport enjoyment scores existed between the two classes.

Rally performance scores for both pre- and post-tests were averaged for each player. A separate

t-test was run to find differences in rally performance scores from pre- to post-test for each class,

as well as between the two classes on the two court sizes. Although inferential statistics were

used, because of the small sample sizes a visual inspection of tables and graphs were used to

display data.

To evaluate differences in implementation of the 10 & Under Curriculum in the two

classes, the video recordings of each class were watched by the researcher and the three

checklists were completed by the researcher. The researcher used the observations and the

checklists to summarize and find differences in the implementation of the 10 & Under

curriculum between the two classes.

CHAPTER 4

Results and Specific Discussion

Attendance

Attendance of participants between the two clubs varied. All six participants at Club A (games approach) attended all four tennis classes. At Club B (traditional approach), of the nine participants enrolled in the class, three participants attended all four classes. At the first class eight participants were present, seven participants were present at the second class, five participants were present at the third class, and six attended the last class. Only four participants could complete both the rally pre-test and the rally post-test. The missing data in the rally test scores was not used in data analysis, however as sport enjoyment scores were averaged for each lesson, all completed sport enjoyment scales were included in the analysis.

Sport Enjoyment

There were no significant differences between Club A and Club B in enjoyment scores, $t(13) = .08$, $p = .48$. Participants at Club A (games approach) reported an average sport enjoyment score of 4.44 over the four tennis classes ($SD = .46$, $n = 6$) while participants in Club B (traditional approach) reported an average sport enjoyment score of 4.41 ($SD = .11$, $n = 9$).

Sport enjoyment was also examined for each class. The average sport enjoyment score for the first class for Club A (games approach) was 4.58, 4.78 for the second class, 4.25 for the third class, and 4.29 for the fourth class. For Club B (traditional approach) the average sport enjoyment score for the first class was 4.78, 4.07 for the second class, 4.15 for the third class, and 4.41 for the fourth class.

Table 1. Participant Enjoyment Rating

Club	# of Participants	Class 1	Class 2	Class 3	Class 4
Club A (games approach)	(6)	4.58 *(n=6)*	4.7 *(n=5)*	4.25 *(n=6)*	4.29 *(n=6)*
Club B (traditional approach)	(9)	4.78 *(n=8)*	4.07 *(n=6)*	4.15 *(n=5)*	4.41*(n=6)*

Although no significant differences between Club A (games approach) and Club B (traditional approach) were found, the trend of the data shows enjoyment scores decreased in both clubs, while Club B scores remained higher at both the beginning and end of the four classes (see Figure 4).
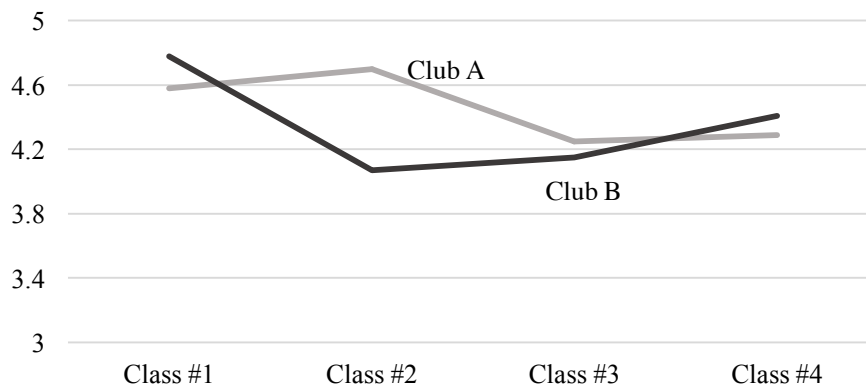
Figure 1. Sport Enjoyment Score

Rally Tests

Two rally tests were conducted for each class on the two different court types. A rally pre-test was conducted at the start of the first lesson on both the standard and modified courts and a rally post-test was conducted on both the standard and modified courts at the end of the last lesson. A series of t-tests were conducted to examine the differences between the two classes and improvements in each class. On the modified court, Club A (games approach) ($M =1.73$, *SD*

= .56, n=6) and Club B (traditional approach) (*M* = 1.3, *SD* = .89, n=4) were not significantly

different in rally pre-test scores, t = .957, *p* = .26, df = 8. There were no significant difference in

rally post-test scores between Club A (games approach) (*M* = 3.03, *SD* = 4.03, n=6) and Club B

(traditional approach) (*M* = 2, *SD* = .97, n=4) on the modified court, t = .49, *p* = .18, df = 8 (see

Figure 5). The trend in the data shows that both clubs improved rally scores from pre-test to post-

test with Club A (games approach) having higher scores on the modified court for both tests.

Club A participants improved almost two times more than Club B on the modified court.
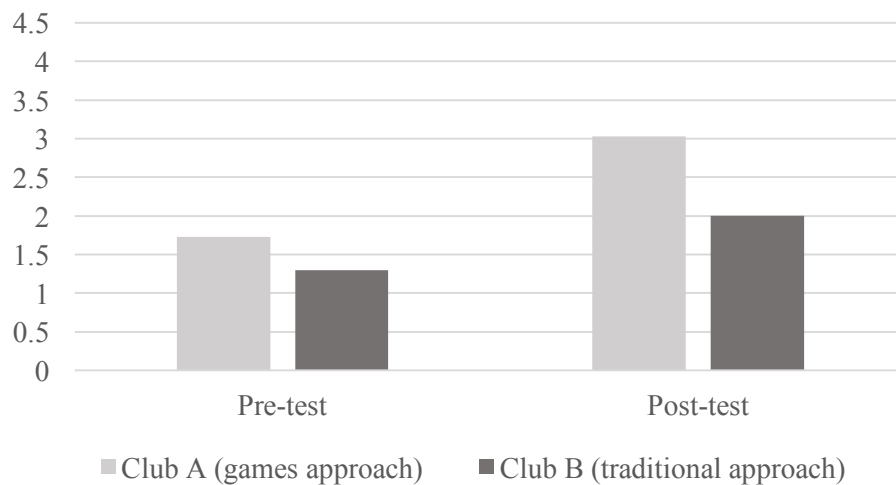
Figure 2. Rally Pre- and Post-Test Scores on the Modified Court

On the standard court, Club A (games approach) (*M* = .7, *SD* = .41, n=6) and Club B

(traditional approach) (*M* = 2.45, *SD* = 1.56, n=4) were significantly different in pre-test scores,

t = -2.68, p < .00, df = 8. Club A (games approach) (*M* =.9, *SD* = .77, n=6) and Club B

(traditional approach) (*M* = 4.05, *SD* = 2.9, n=4) did not significantly differ in rally post-test

scores on the standard court, t = -2.60, *p* = .072, df = 8 (see Figure 6). The trend in the data

shows improvement for both clubs with Club B participants (traditional approach) having higher

scores for each test on the standard court. The difference in the two groups in rally post-test

improvement scores on the standard court is eight times greater for Club B. The data, however, may be skewed due to the low sample size and one participant having a much higher rally post-test score than the rest of the participants in the class.
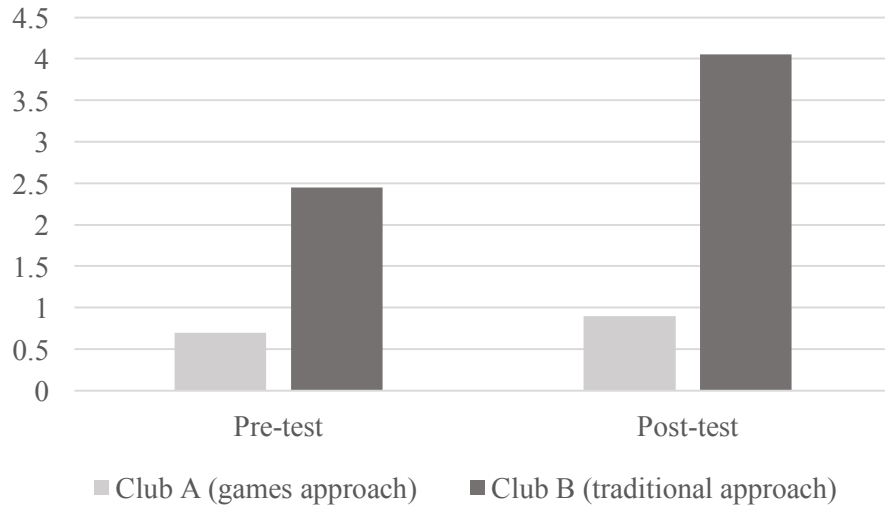
Figure 3. Rally Pre- and Post-Test Scores on the Standard Court

There were no significant differences in rally pre- and post-test scores in Club A (games approach) on either court type. Club A participants did not significantly improve in rally performance on either the modified, $t = -.78$, $p = .06$, $df = 10$, or standard court, $t = -.562$, $p = .08$, $df = 10$, however the data show slight improvement in rally scores from pre-test to post-test on both court types (Figure 7).
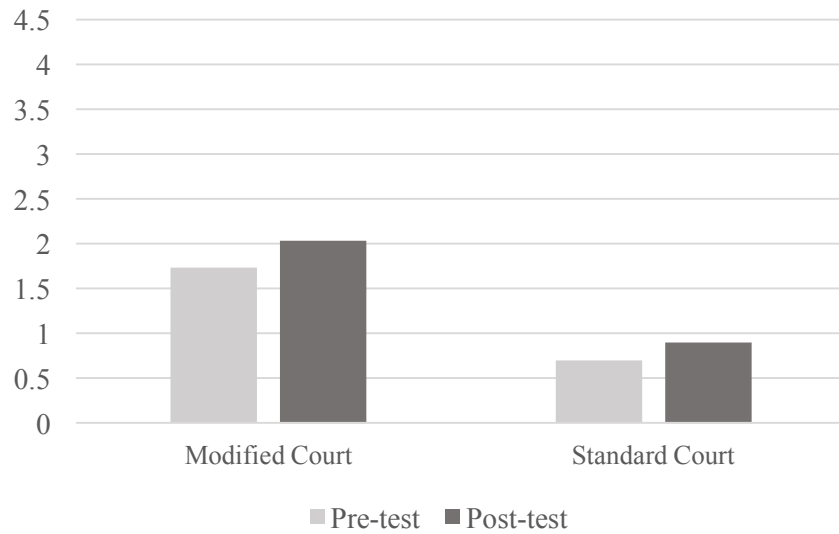
Figure 4. Club A Rally Score

There were no significant differences in rally pre- and post-test scores in Club B (traditional approach) on either the modified court, $t = -1.06$, $p = 1.0$, $df = 6$, or the standard court, $t = -.972$, $p = .436$, $df = 6$. Club B participants did not significantly improve in rally performance on either court; However, the data show modest improvement in rally scores from pre- to post-test on both court types (Figure 8).

Figure 5. Club B Rally Scores

Implementation Checklist and Observations

Lesson Plans. A curriculum implementation checklist was used to examine how closely the instructors followed the USTA 10 & Under Manual during the class. The manual consists of eight weeks of lessons for each class; However, both classes were only four-weeks in lengt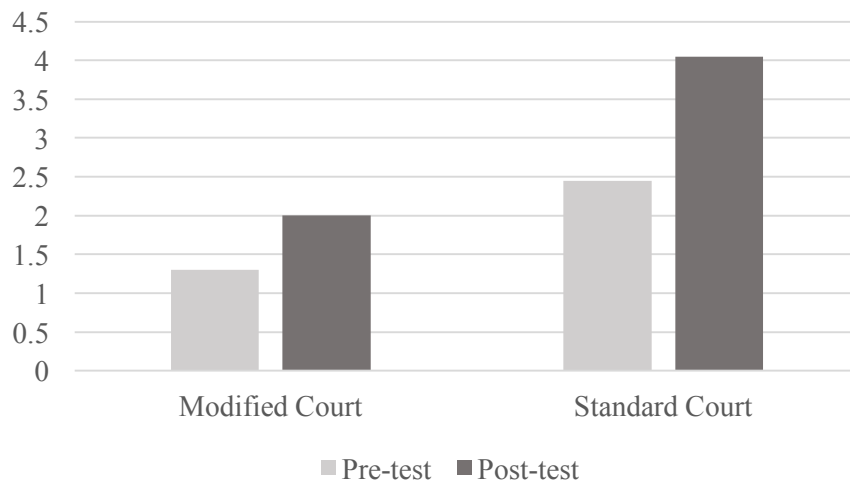h, having only four lessons due to the structure of the club's programs. The manual consists of eight different parts to each lesson: Theme, equipment, time, kids to instructor ratio, movement activities, skills taught, games, and take home tennis. As only four lessons were conducted for each class, the first four lessons were used for the observation checklists. Each part of the lesson will be discussed.

Theme. There are four different themes for the first four lessons in the 10 & Under Manual. The first lesson focuses on racket control, the second on forehand instant rally progression, the third on backhand instant rally progression, and the fourth on forehand and backhand rallying. Neither Club A (games approach) nor Club B (traditional approach) followed this progression of themes in the lessons. Club A's (games approach) first lesson theme focused on forehands, the second lesson focused on backhand and serve, the third lesson focused on forehand and backhand rally, and the fourth lesson focused on backhand and serving. Club B's (traditional approach) first lesson theme focused on forehand, backhand, and serve, the second lesson focused on the forehand, the third lesson focused on backhands, and the last lesson on forehands. Neither Club A (games approach) or Club B (traditional approach) followed the recommended theme guidelines.

Equipment. All four lessons in the manual include 21-23 inch rackets, foam or oversized low compression balls (red) and a 36' court. Club A (games approach) used all three of these as lessons were conducted on the 36' court and the players used either foam or red balls. Club B

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(traditional approach) included the correct sized rackets, however a 60' court and orange balls were used. Equipment also included in the manual consisted of poly spots, playground balls, and throw down lines. Club A (games approach) used all three of the necessary types of equipment and also included a variety of additional equipment as well such as hula hoops, bean bags, baskets, frisbees, dice, clothes pins, and stickers. Club B used only poly spots. Thus, Club A (games approach) more often used the appropriate equipment found in the manual as compared to Club B (traditional approach).

   Time. Each lesson in the manual is under one hour in length. Both clubs consisted of lessons that were 50-60 minutes each. Thus, both Club A (games approach) and Club B (traditional approach) followed the guidelines for time length of lessons.

   Kids to Instructor Ratio. The USTA 10 & Under Manual includes a player to instructor ration of 4:1, with four players to one instructor. Club A (games approach) only had this ratio in the first lesson with seven players to two instructors. In the next three classes, the ratio was six and seven players to one instructor. Similarly, Club B (traditional approach) had this ratio in the first lesson but the remaining lessons had ratio of five to seven players to one instructor. Hence, neither Club A (games approach) or Club B (traditional approach) followed the guidelines for instructor to players ration.

   Movement Activities. Movement activities found in the manual are exercises meant to improve fundamental motor skills for the players, such as running and jumping, and are typically done at the beginning of the lessons as a source of warm-up for the players. Such movement activities include tossing and catching a ball while jogging or following the leader, where the leader can jump, skip, run, walk, etc. Neither Club A (games approach) nor Club B (traditional approach) included the movement activities found in the manual. However, Club A (games

approach) included movement activities similar to those found in the manual. For example, one movement activity in Club A had players in pairs balancing a rubber ball between their heads while shuffling around the court. While not the same as the manual activities, the activity is similar in its focus on motor skills rather than tennis specific skills. Club B (traditional approach) did not have any similar activities, rather all activities were tennis focused. Therefore, although Club A (games approach) did not include the specific movement activities found in the manual, games with similar goals were used, while Club B (traditional approach) included no movement activities.

Skills Taught. This part of the lesson consists of the specific drills that are done to teach the theme of the lesson. As the themes in the manual were not followed by both clubs, skills taught did not match as well. However, the important aspect of this part of the lesson is the use of a games approach rather than a traditional approach to teaching. The drills included in the manual consists of players working together to learn skills rather than instructor fed drills. Club A (games approach) followed the games approach to teaching and the instructors never fed the ball to players out of the basket. At Club B (traditional approach), the first lesson was taught mostly with the instructor feeding balls to the players from the basket. During the second, third, and fourth lesson, a games approach was mixed with the traditional approach. This may have been due to a change in the main instructor for the class. Hence, Club A (games approach) followed the manual by including activities that used a games approach, while Club B (traditional approach) did not follow the manual.

Games. Games are included in the manual as a chance for the players to practice the skill they have worked on throughout the lesson. For example, if forehand and backhand rally was the skill taught, the game would include a challenge to rally a certain number of balls without

missing. As noted above, because skills taught was not followed by the clubs, the games were also not included in the lessons. However, both clubs incorporated a variation of games in the lessons. Club A (games approach) included a game at the end of each lesson, where the players were challenged to meet a goal using the skill they had learned. Club B (traditional approach) also included a game at the end of the lesson, but were typically instructor fed games. Thus, both clubs followed the manual.

Take Home Tennis. This part of the lesson is meant for instructors to give the players an activity to practice their skills outside of the class. Neither club introduced the take home tennis activities to their class. However, the instructors at Club A (games approach) did mention opportunities to play tennis at the club outside of the class to the players and parents at the end of each lesson. Hence, neither club followed the recommended guidelines for including take home tennis at the end of each lesson.

Progression of Skills Taught. In the USTA 10 & Under Manual the progression of skills taught consists of, in order, racquet control, forehand, backhand, rallying, serve and return, rally skills, volley, and play day. Neither Club A nor Club B followed this progression of skills. Club A (games approach) included, first, forehand, then backhand and serve, then rally, and lastly backhand and serving. Club B (traditional approach) included first forehand, backhand and serve, then forehand, then backhand, then forehand. Thus, neither club followed the guidelines offered in the manual.

Time Spent on Activities. Activities per lesson at Club A (games approach) ranged from five to eight activities per lesson. On average, there were 6.75 activities per each lesson. The number of minutes spent on each activity ranged from 2:10 minutes to 13:00 minutes. On average, activities lasted 7:55 in length. Activities per lesson at Club B (traditional approach)

ranged from four to six activities per lesson. On average, there were 5.25 activities per lesson.

The number of minutes spent on each activity ranged from 5 minutes to 24 minutes. On average,

activities lasted 10:51 length.

Total Implementation. Overall, the instructor at Club A implement more principles

outlined in the manual. Of the eight principles outlined, Club A (games approach) included four,

while Club B (traditional approach) only included two principles (see Table 2).

Table 2. Total Implementation

Manual	Club A (games approach)	Club B (traditional approach)
Theme		
Equipment	✓	
Time	✓	✓
Kids to Instructor Ratio		
Skills Taught	✓	
Games	✓	✓
Take Home Tennis		

CHAPTER 5

Discussion

The primary goal of the new 10 & Under Quickstart format is to increase participation in tennis through increasing levels of enjoyment and improving rally performance. To address the two goals, this study sought to explore differences in enjoyment and rally performance in two already intact 10 & Under level II tennis classes, one that used a traditional approach and one that used a games approach. Club A was recruited for having a curriculum using a games approach, while Club B used a more traditional approach.

It was hypothesized that participants in the 10 & Under Level II class with the instructor that more closely followed the manual would report higher levels of enjoyment than participants in the 10 & Under class with the instructor who deviates from the manual. No support was found for this hypothesis. There were no significant differences found between the two tennis classes in enjoyment scores. Participants in both classes reported high levels of sport enjoyment over the course of the four lessons. This high level of sport enjoyment may be due to the young age of participants as younger children tend to have higher levels of sport enjoyment compared to older children (Scanlan & Lethwaite, 1986). As sport enjoyment has been found to be a major reason for continued participation in youth sports for children, it is promising that scores are high for young tennis participants (Weiss, Kimmel, & Smith, 2001; Gill, Gross, & Huddleston, 1983). The lack of differences in sport enjoyment scores may also be due to the short duration of the tennis class and the small sample sizes in each class. Participating in only four classes may not be enough time to reflect changes in sport enjoyment.

It was hypothesized that participants in the class that follows the 10 & Under manual will have higher rally performance scores on both the modified and standard size courts than the class

that does not follow the manual. This hypothesis was not supported. There were no significant differences in rally pre- and post-test scores in Club A (games approach) or Club B (traditional approach). Neither participants in Club A nor Club B significantly improved their rally scores over the course of four-week class. This may be due to both classes being Level II classes, as players in class may have already had experience in 10 & Under tennis and tennis in general. There were no significant differences in changes of scores when the clubs were compared. Although there were no significant differences, both clubs show improvement in rally performance on both court types, with the most improvement from Club B on the standard court. However, only four of the original six participants who completed the pre-test could complete the post-test.

Although there were no significant differences, it is important to note the improvement in rally test scores from pre-test to post-test. As the classes only consisted of four lessons, a longer timeframe may have resulted in more improvement in rally test scores. The results of this study are similar to Farrow and Reid (2010) who also found no significant improvement in rally performance. The researchers attributed the lack of improvement to the short duration of the program, which was 5-weeks in length. With a longer amount of practice time, significant differences in rally performance may be found. Another important aspect of the rally test to note is the significant differences in pre-test scores on the standard court between the two clubs. Although this difference existed at the pre-test, the differences in scores were not significant for the post-test on the standard court. Again, this may be due to the lack of attendance at club B, as only four of the original nine participants completed both the rally pre- and post-test.

It was hypothesized that the club which the instructor implemented the 10 & Under manual would more closely follow the principles and guidelines offered in the manual. This

hypothesis was supported by the observed data. The level II tennis class at club A was recruited primarily because of the observed use of activities and guidelines found in the 10 & Under Quickstart Manual. While Club A (games approach) did not directly follow the practices given in the manual, the activities used in the class mirrored the principles and guidelines. For example, many of the activities in the manual include partner style games in which children play together rather than the instructor feeding while the players wait in line. Club A followed this principle and in every lesson, players were put in pairs to do activities. No activities in the classes at club A consisted of the instructor feeding while the players waited in line. The manual also emphasizes the use of movement activities to help children develop their fundamental motor skills. Club A implemented movement activities in each class.

Club A (games approach) also used the equipment recommended by the manual. Participants in the class played on the 36' court, used 21-23 inch rackets, and players used foam or red balls. As modified equipment is an important aspect of the Quickstart tennis format, Club A implemented classes using the prescribed equipment. The manual recommends using a variety of additional equipment such as poly spots, playground balls, and throwdown lines, all of which were used at Club A in addition to several other types of equipment such as bean bags, hula hoops, and frisbees. Although Club A did not follow the progression of skills taught found in the manual, the amount of activities and time spent on each activity aligned with that found in the manual. However, neither club included the theme of racket control in their classes. Racket control may be an important skill for young tennis players as fine motor movements can be difficult for children this age. Also, both clubs included serving as a theme although this skill is not included in the manual.

The level II tennis class at Club B (traditional approach) was recruited because of the use of the more traditional style of teaching tennis. This style of teaching was seen throughout the four lessons, as some activities consisted of the instructor feeding the ball to the players while they waited in line for their turn. Generally, the traditional model of teaching consists of the instructor demonstrating and explaining a skill and then players stand in line and wait for a turn to hit a ball thrown by the instructor. The instructor at Club B spent many minutes explaining technique to the players, while they sat and listened. However, the manual suggests spending little time explaining and more time spent in the activities for players to learn through doing.

Club B used few of the modified equipment found in the manual. The correct sized rackets were used: However, players were put on the adult sized court and told to play at the service line. Although this does shorten the court, the net height remains too high for the height of the players. Additionally, orange balls were used rather than the prescribed red balls. One aspect of the class that differed from the manual was the time spent on each activity. On average, over ten minutes were spent on each activity with some activities lasting over 24 minutes in length.

Limitations

There were several limitations that may have influenced the lack of significant differences between Club A and Club B. First, the differences in attendance between the two clubs made comparisons between the two classes difficult. All six participants at Club A attended each of the four classes and completed both the rally pre- and post-tests. At Club B only four of participants completed the pre- and post-rally tests and only three of the four participants attended all four lessons. Of the remaining five participants, most attended only two lessons. This lack of attendance at Club B may have been caused by the change in location for

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the second and third lesson. Club B had two locations and lessons one and four were held at the main location while lessons two and three were held at the secondary location. The locations are eighteen minutes apart and may have been farther of a drive for some participants resulting in lack of attendance for participants.

Another limitation of this study was the changes in instructors at both Club A and Club B. At Club A, there were two instructors during the first lesson. During the second lesson, one new instructor taught the class, while the same instructor taught the next two lessons with different assistants for each class. At Club B, one instructor taught the first lesson, while a different instructor taught the remaining three lessons. Inconsistencies in instructors may have led to changes in how lessons were taught over the course of the class. If instructors could consistently teach the class, results may have been different. Additionally, the length of the class served as a limitation. Having only four lessons may not be long enough for skill improvement to occur.

The most notable limitation of this study is the use of already intact tennis classes. With the goal of examining how the 10 & Under Quickstart program is fulfilling its goals, this study would have been stronger if one class had followed the 10 & Under Manual as it is written. Instead two classes had to be found that included the principles of the new format or the traditional approach. This would have allowed for a direct comparison between the two teaching methods. However, some elements of the new format were found at Club B, the traditional style class, such as the use of modified equipment and the games approach to teaching, but did not result in any differences pre- or post-test. To gain better information, an experimental design should be used to examine differences in the games vs. traditional approach. Using random

assignment and having control of the instructor could lead a better understanding of teaching approach on the measured outcomes.

Although the results of this study were not significant the trend in the data supports the goals put forth by the USTA in the 10 & Under Tennis program. One of the goals for 10 & Under Tennis is to increase enjoyment and both classes reported high levels of sport enjoyment. The second goal was to increase rally performance. Club A (games approach) showed improvements of rally performance on both courts, as did Club B who had the greatest improvement of both classes on the standard court (traditional approach). This finding may be due to the high amount of time the participants spend on the traditional court throughout the four-weeks rather than the modified court.

Future Research Directions

While this study offers insight into how instructors are currently using the 10 & Under format, future research should focus on long-term outcomes. As one of the goals of 10 & Under tennis is to increase participation in tennis, research should examine participation rates of adolescents who had learned tennis through the 10 & Under format. Qualitative interviews with adolescents who have continued participation and who have dropped out of tennis may give insight into whether the USTA is meeting their goal of increasing participation in tennis.

As this study only followed two classes for four weeks, research that consists of observing classes that are longer in length may lead to significant results. As the manual suggests classes be eight weeks in length, research that follows participants over this length or longer may find more skill improvement as the participants have a longer time to practice. Additionally, the use of modified equipment has only been studied using children as participants. However, as the USTA wants to increase participation and the modified equipment is meant to make learning

easier, research should examine the use of modified equipment with adult novice tennis players. By using a modified tennis ball, adult players will have more control over their execution of the skill as the ball will be lighter and easier hit.

Finally, while this study certainly had limitations relative to testing the effectiveness of the 10 and under curriculum, it does raise questions on the importance of evaluating how national programs are implemented. Gould (2016), for example, has discussed how there is a need for coaching educators and programmers to examine how information is disseminated and used by practitioners. First, there are theories such diffusion theory or the behavioral change wheel that discuss how knowledge dissemination takes place and is implemented. Diffusion theory (Dearing & Kerr, 2012) for instance suggests that practitioners will almost always customize programs when implementing them which is consistent with the Club A (games approach) coaches in this study. However, Club B (traditional approach) coaches other than using some of the modified equipment did not adhere to the recommendations at all. Understanding why this is the case will be important for future investigators. Qualitative interviews with club directors and instructors on why they do not use the program or adhere to major components of the curriculum is needed. Second, determining how to get coaches to use more of the curriculum is important. Conducting a needs assessment to understand the needs of practioners of the USTA 10 & Under program could help researchers understand how to tailor research studies to the issues of the population perceives in implementing the 10 & under curriculum. In addition, dissemination of information and programs is not a simple task. To make a difference in how 10 & under tennis is taught and to increase the amount of instructors using the games approach to teaching, considerable time and effort to needs to be done to disseminate findings on effectiveness of the games approach to teaching sport (Gould, 2016).

Summary

This study sought to explore differences in enjoyment and rally performance in two already intact 10 & Under Level II classes. One class was taught with the principles of the 10 & Under format while the second class was taught using a more traditional approach. Results showed no significant differences in sport enjoyment between the two classes. However, participants in both classes reported relatively high levels of sport enjoyment. Further, no significant differences in rally pre- or post-test scores between the two classes were found. The class which followed the 10 & Under tennis format showed the most improvement in rally test scores on the modified court.

APPENDICES

APPENDIX A

Participant Information

(I) Personal Information

    1. Child's Name: _____

    2. Child's Birthdate: _____

    3. Child's Gender:

        _____Male   _____Female

    4. Number of older siblings:

    5. Number of younger siblings:

(2) Child's Tennis Experience:

    6. About how many hours of private tennis lessons has your child had?_____

    7. About how many hours of group lessons has your child been involved? _____

    8. About how many hours has your child played tennis recreationally? _____

    9. Number of years your child has played tennis: _____

(3) Family Background

    10. Parents tennis experience:

        ____Recreational   ____High School   ____College

        ____Professional   ____ None

    11. Other sports your child has played: _____

        _____

        _____

    12. How many hours a week is your family physically active? _____

    13. On a scale from 1-10 how important is physical activity for your family? (1 = not at all important, 10 = extremely active)

1   2   3   4   5   6   7   8   9   10

14.On a scale from 1-10 how important do you think physical activity is for your child?
(1 = not at all important, 10 = extremely active)

1   2   3   4   5   6   7   8   9   10

Sport Enjoyment

Date _____   **Participant #**_____

Lesson #_____   **Participant Color**_____

Circle the face that matches your answer to each question

1. **Did you enjoy playing in tennis class today?**

   Not really.   A little.   It was okay.   It was good.   It was great!

2. **Were you happy playing in tennis class today?**

   Not really.   A little.   It was okay.   It was good.   It was great!

3. **Did you have fun playing tennis today?**

   Not really.   A little.   It was okay.   It was good.   It was great!

4. **Did you like playing tennis today?**

   Not really.   A little.   It was okay.   It was good.   It was great!

APPENDIX C

Tennis Rally Test

Participant #	MC #1	MC #2	MC #3	MC #4	MC #5	SC #1	SC #2	SC #3	SC #4	SC #5	Total
1A											
2A											
3A											
4A											
5A											
6A											
7A											
8A											

Participant #	MC #1	MC #2	MC #3	MC #4	MC #5	SC #1	SC #2	SC #3	SC #4	SC #5	Total
1B											
2B											
3B											
4B											
5B											
6B											
7B											
8B											

APPENDIX D

Curriculum Implementation Checklists

Practice 1, Club ____

	Curriculum	**Class**
Theme	Racquet Control	
Equipment	21-23 inch Rackets Foam or oversized low compression balls 36' Court	
Time	No more than 60 mins	
Kids:Instructors	4:1	
Movement Activities	Different Moves Ball Chase	
Skills	Kirk-O-Rama Lobster Trap Half-Pound Lobster Trap	
Game	Roll Ball Tennis	

Take Home Tennis	Roll Ball Tennis	

Curriculum Implementation Checklist #1

Practice 2, Club ____

	Curriculum	Class
Theme	Instant Rally Progression -Forehand	
Equipment	21-23 inch Rackets Foam or oversized low compression balls 36' Court Poly spots or donuts Playground balls	
Time	No more than 60 mins	
Kids:Instructors	4:1	
Movement Activities	Dynamic Warmup Ball Drop	

Skills	Instant Rally Progression –Forehand Tap up, bounce and catch Self-rally Rally with a partner to a target Rally over line with partner Rally over a net Game--Step-back Forehands	
Game	Splat Throw Ball Tennis	
Take Home Tennis	Driveway/Playground Forehand Tennis or Forehand Wall Tennis	

Curriculum Implementation Checklist #1

Practice 3, Club ____

	Curriculum	Class
Theme	Instant Rally Progression -Backhand	
Equipment	21-23 inch Rackets Foam or oversized low compression balls 36' Court	

	Poly spots or donuts Chalk	
Time	No more than 60 mins	
Kids:Instructors	4:1	
Movement Activities	Two Ball Roll Two Ball Toss Jog Ball	
Skills	Instant Rally Progression 　　　–Backhand Tap up, bounce and catch Self-rally Rally with a partner to a 　　　target Rally over line with 　　　partner Rally over a net Game--Step-back 　　　backhands	
Game	Lobster Rally	
Take Home Tennis	Driveway/Playground 　　　Backhand Tennis 　　　or Backhand Wall 　　　Tennis	

Curriculum Implementation Checklist #1

Practice 4, Club ____

	Curriculum	Class
Theme	Forehand and Backhand Rallying	
Equipment	21-23 inch Rackets Foam or oversized low compression balls 36' Court Throw down or chalk lines	
Time	No more than 60 mins	
Kids:Instructors	4:1	
Movement Activities	Partner Ball Tossing and Catching Call My Name Rally Me Jacks	
Skills	Review forehand and backhand skills	
Game	Four Square Tag Team Singles	
Take Home Tennis	Driveway/Playground Continuous Rally	

	or Wall Tennis	

Curriculum Implementation Checklist #1

Practice 5, Club ____

	Curriculum	Class
Theme	Serve and Return	
Equipment	21-23 inch Rackets Foam or oversized low compression balls 36' Court	
Time	No more than 60 mins	
Kids:Instructors	4:1	
Movement Activities	High Fiver Mirror	
Skills	Introduction to underhand serve	
Game	Champions	
Take Home Tennis	Driveway/Playground or Wall Tennis	

Curriculum Implementation Checklist #1

Practice 6, Club ____

	Curriculum	Class
Theme	Rally Skills	
Equipment	21-23 inch Rackets Foam or oversized low compression balls 36' Court Throw down lines or spots Beach balls	
Time	No more than 60 mins	
Kids:Instructors	4:1	
Movement Activities	Slamma Jamma	
Skills	3-2-1 Juggle Rally Continuous Rally	
Game	Tag Team Singles Up and Down the River	
Take Home Tennis	Driveway/Playground Or Wall Tennis	

Curriculum Implementation Checklist #1

Practice 7, Club _____

	Curriculum	Class
Theme	Volley	
Equipment	21-23 inch Rackets Foam or oversized low compression balls 36' Court Koosh Balls or bean bags Hoops or ropes for circles	
Time	No more than 60 mins	
Kids:Instructors	4:1	
Movement Activities	Jog Ball Koosh Ball Step-back	
Skills	The Volley Volley Game - Basketball	
Game	Champion of the Court Star Catcher	
Take Home Tennis	Driveway/Playground Or Wall Tennis	

Curriculum Implementation Checklist #1

Practice 8, Club ____

	Curriculum	Class
Theme	Play Day	
Equipment	As needed	
Time	No more than 60 mins	
Kids:Instructors	4:1	
Movement Activities	NONE	
Skills	NONE	
Game	Favorite Games or Activities from previous lessons	
Take Home Tennis	Driveway/Playground Or Wall Tennis	

Curriculum Implementation Checklist #2

Progression of Skills Taught

Manual	Club A	Club B
Racquet Control		
Forehand		
Backhand		
Forehand and Backhand Rally		
Serve and Return		
Rally Skills		
Volley		
Play Day		

Curriculum Implementation Checklist #3

Time on Task

Minutes	Activity

Club Permission Letter

Date:

To: Dan Gould, Ph.D.

        Jennifer Nalepa

        Michigan State University

From:

By signing below, I indicate that (a) athletes participating on our club, and/or at our facility, and/or that I coach may voluntarily participate (with the consent of their parents and assent of the child) in an evaluation of the implementation of the 10 & Under Curriculum; and (b) the researchers may use our facilities to administer surveys, complete rally-tests, and videotape lessons.

Sincerely,

Consent Form Instructor

RESEARCH PARTICIPANT INFORMATION AND CONSENT FORM - INSTRUCTOR

You are being asked to participate in a research study. Researchers are required to provide a consent form to inform you about the research study, to convey that participation is voluntary, to explain risks and benefits of participation, and to empower you to make an informed decision. You should feel free to ask the researchers any questions you may have.

Study Title: An Evaluation of the Implementation of the USTA 10 & Under Curriculum: A Comparison of Two Classes.

Researcher and Title: Jennifer Nalepa, Graduate Student

Department and Institution: Department of Kinesiology, Michigan State University

Address and Contact Information: 207 IM Sports Circle, Michigan State University, East Lansing, MI 48824

Sponsor: Daniel Gould, PhD.

1. PURPOSE OF RESEARCH

- You are being asked to participate in a research study evaluating the implementation of the USTA 10 & under curriculum.
- You have been selected as a possible participant in this study because you are the instructor of a 10 & Under Level II class that has been chosen to be observed.
- From this study, the researchers hope to learn about implementation of the USTA 10 & under curriculum and explore differences in enjoyment and rally performance with children 7-8 years of age in 10 & Under Tennis.
- Your participation in this study will take about one hour for four weeks.
- Your name was obtained with permission from the tennis club.
- In the entire study, 16 children are being asked to participate along with two instructors.
- This study is being conducted collaboratively by Court One Athletic Club and Michigan State University

2. WHAT YOU WILL DO

- Your participation in this study will require about an extra hour outside of normally instructing the 10 & Under Level II tennis class.
- Instructor consent will be obtained prior to the start of the study. The researcher will meet with the instructor to discuss the study and obtain consent. The instructor will then teach the

10 & Under Level II tennis class as they normally would with the researcher observing and videotaping each lesson. After the completion of the last lesson, the researcher will meet with the instructor for an interview, which will be about an hour in length. At this time the instructor will also fill out the instructor demographic form.

3. POTENTIAL BENEFITS

- You will not directly benefit from your participation in this study. However, your participation in this study may contribute to the understanding of which teaching model used in 10 & Under tennis is most effective in improving rally performance and increasing participation in tennis through a high level of enjoyment.

4. POTENTIAL RISKS

- There are no foreseeable risks associated with participation in this study.

5. PRIVACY AND CONFIDENTIALITY

- The data for this project will be kept confidential. Although we will make every effort to keep your data confidential there are certain times, such as a court order, where we may have to disclose your data.
- Although we will make every effort to keep your data confidential there are certain times, such as a court order, where we may have to disclose your data.
- Data will be stored on a password protected computer. Data will be de-identified at the completion of the study.
- Only the researchers and research staff and the Institutional Review Board (IRB) will have access to the data.
- The results of this study may be published or presented at professional meetings, but the identities of all research participants will remain anonymous.
- During this study, you will be videotaped in order to analyze shot success and touches on the ball. This is a required element of the research study. Only the researchers will see the videotapes. I agree to allow audiotaping/videotaping of the lessons.
  ☐ Yes   ☐ No   Initials_____
- Video Tapes will be stored on a password protected computer and will be erased after the completion of the study.

6. YOUR RIGHTS TO PARTICIPATE, SAY NO, OR WITHDRAW   *(This is a required element of consent)*

- Participation is voluntary. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled.
- You have the right to say no.
- You may change your mind at any time and withdraw.

- You may choose not to answer specific questions or to stop participating at any time.
- Choosing not to participate or withdrawing from this study will not make any difference in the quality of any services you may receive.

7. COSTS AND COMPENSATION FOR BEING IN THE STUDY

- You will not receive money or any other form of compensation for participating in this study.

8. CONTACT INFORMATION

If you have concerns or questions about this study, such as scientific issues, how to do any part of it, or to report an injury, please contact the researcher (Jennifer Nalepa, 207 IM Circle, Michigan State University, East Lansing, MI 48824, nalepaje@msu.edu, 810-522-7666)

If you have questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the Michigan State University's Human Research Protection Program at 517-355-2180, Fax 517-432-4503, or e-mail irb@msu.edu or regular mail at Olds Hall, 408 West Circle Drive #207, MSU, East Lansing, MI 48824.

12. DOCUMENTATION OF INFORMED CONSENT.

Your signature below means that you voluntarily agree to participate in this research study.

_____   _____

Signature   Date

You will be given a copy of this form to keep.

Research Study Information

Evaluation of the Implementation of the USTA 10 & Under Curriculum:
A Comparison of Two Classes

PURPOSE

Evaluating two different types of implementation of the USTA 10 & Under Curriculum, as well as differences in enjoyment and rally performance between the two classes.

INVITATION

You are being asked to take part in a research study on the effect of using a games model vs. a traditional model on enjoyment level and rally performance scores after a four week 10 & Under Level II tennis class. This study is being lead by Jennifer Nalepa, a Michigan State University graduate student in the Kinesiology department. This study is supervised by Daniel Gould, PhD., Michigan State University. This project has been approved by the Institutional Review Board.

WHAT WILL HAPPEN

In this study, your child will be asked to participate in the 10 & Under Level II class they are signed up in. Only the time spent in class and a half hour extra will be needed to complete the study. Your child will partake in a rally pre-test and post-test at the beginning and end of the 10 & Under Level II session. At the end of each hour long class, your child will complete an enjoyment scale, which includes answering four questions about how much they enjoyed tennis class that day. In addition, each tennis class and rally performance test will be videotaped in order for the researchers to observe the use of both teaching models. To be able to distinguish each player, your chid will be asked to wear a certain color shirt with a number on both sides. However, the focus of the observations are on instructor-child interactions and number of time children get to hit the ball so the focus is not on what each child does but general patterns that occur in the class. No names will be associated with the video taping.

TIME COMMITMENT

The study typically takes 60 minutes (per session) across 4 sessions, with an additional half hour at the beginning and end of the 4 week session.

PARTICIPANTS' RIGHTS

You may decide to stop being a part of the research study at any time without explanation. You have the right to ask that any data you have supplied to that point be withdrawn/destroyed. Your child will still be able to participate in the 10 & Under class if you decided to stop being a part of the research study.

You have the right to omit or refuse to answer or respond to any question that is asked of you.

You have the right to have your questions about the procedures answered (unless answering these questions would interfere with the study's outcome). If you have any questions as a result of reading this information sheet, you should ask the researcher before the study begins.

BENEFITS AND RISKS

There are no known benefits or risks for you in this study.

COST, REIMBURSEMENT AND COMPENSATION

Your participation in this study is voluntary.

CONFIDENTIALITY/ANONYMITY

The data for this study will be kept confidential. Data will be stored on a password protected computer and de-identified at the completion of the study. Only the researchers and research staff and the Institutional Review Board (IRB) will have access to the data. The results of this study may be published or presented at professional meetings, but the identities of all research participants will remain anonymous. Videotaped lessons will be stored on a password protected computer and will be erased after the completion of the study.

FOR FURTHER INFORMATION

Jennifer Nalepa will be glad to answer your questions about this study at any time. You may contact her at nalepaje@msu.edu, (810) 522-7666, 207 IM Circle, Michigan State University, East Lansing, MI 48824.

If you want to find out about the final results of this study, you should contact Jennifer Nalepa.

APPENDIX H

Consent Form Participant

RESEARCH PARTICIPANT INFORMATION AND CONSENT FORM

You are being asked to participate in a research study. Researchers are required to provide a consent form to inform you about the research study, to convey that participation is voluntary, to explain risks and benefits of participation, and to empower you to make an informed decision. You should feel free to ask the researchers any questions you may have.

Study Title: An Evaluation of the Implementation of the USTA 10 & Under Curriculum: A Comparison of Two Classes

Researcher and Title: Jennifer Nalepa, Graduate Student

Department and Institution: Kinesiology Department, Michigan State University

Address and Contact Information: 207 IM Sports Circle, Michigan State University, East Lansing, MI 48824

Sponsor: Daniel Gould, PhD.

1. PURPOSE OF RESEARCH

- You are being asked to participate in a research study evaluating the implementation of the USTA 10 & under curriculum.
- You have been selected as a possible participant in this study because your child is enrolled in a 10 & Under Level II tennis.
- From this study, the researchers hope to learn about the implementation of the USTA 10 & under curriculum and explore differences in enjoyment and rally performance with children 7-8 years of age in 10 & Under Tennis.
- In addition to the normal amount of time your child will spend in tennis class (about one hour each week for four weeks) he or she will be asked to participate in two rally tests, one at the beginning and one at the end of the course (taking approximately 1 hour total, 30 minutes per rally test). You will be asked to complete a demographic and background form on behalf of your child. This will take about 15 minutes.
- Your name was obtained with permission from the tennis club.
- Since your child is under 18, they cannot participate in this study without parental consent.
- In the entire study, 16 children are being asked to participate.
- This study is being conducted collaboratively by Court One North and Michigan State University.

2. WHAT YOU WILL DO

- Parental consent will be obtained prior to the start of the study for the child. Parents will meet with the researcher, discuss the study, and parental consent will then be obtained. During this meeting, after collecting parental consent forms, the researcher will have the parents fill out a demographic survey for the child. This meeting will take about 30 minutes.

     While the parents complete the demographic survey, the researcher will meet with the child to obtained assent. A script will be read by the researcher and the child will answer yes/no to whether they will participate in the study.

     After consent and assent is obtained, each child will be assigned a number to distinguish them from other participants. A half an hour before the first lesson, the parent will bring them to tennis class in order to complete the rally pre-test. The rally pre-test involves the child to hit back and forth with a research assistant to count how many times in a row the child can rally. The children will complete the rally pre-test on two different sizes courts and will have five rallies on each court. After the rally pre-test is completed, participants will participate in tennis class as they would normally. Each lesson will be videotaped, to allow the researcher to fully observe and collect data from each lesson. At the completion of each tennis lesson, the children will complete a sport enjoyment questionnaire with the researcher giving directions. This will take 10 minutes after the completion of the lesson. After the completion of the entire tennis session, at the end of the last lesson, the children will be asked whether they want to continue taking tennis lessons and then the participants will complete the rally post-test.

3. POTENTIAL BENEFITS

- You and your child will not directly benefit from your participation in this study. However, your participation in this study may contribute to the understanding of which teaching model used in 10 & Under tennis is most effective in improving rally performance and increasing participation in tennis through a high level of enjoyment.

4. POTENTIAL RISKS

- There are no foreseeable risks associated with participation in this study.

5. PRIVACY AND CONFIDENTIALITY

- The data for this project will be kept confidential. Although we will make every effort to keep your data confidential there are certain times, such as a court order, where we may have to disclose your data.
- Data will be stored on a password protected computer. Data will be de-identified at the completion of the study.
- Research records will be kept for three years after the completion of the study.
- Only the researchers and research staff and the Institutional Review Board (IRB) will have access to the data.
- The results of this study may be published or presented at professional meetings, but the identities of all research participants will remain anonymous.

- During this study, your child will be videotaped in order to analyze shot success and touches on the ball. This is a required element of the research study. Only the researchers will see the videotapes. I agree to allow audiotaping/videotaping of the lessons.
  ☐ Yes   ☐ No   Initials_____

- Video Tapes will be stored on a password protected computer and will be erased after the completion of the study.

6. YOUR RIGHTS TO PARTICIPATE, SAY NO, OR WITHDRAW

- Participation is voluntary. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled.
- You have the right to say no.
- You may change your mind at any time and withdraw.
- You may choose not to answer specific questions or to stop participating at any time.
- Choosing not to participate or withdrawing from this study will not make any difference in the quality of any services you may receive.

7. COSTS AND COMPENSATION FOR BEING IN THE STUDY

- You will not receive money or any other form of compensation for participating in this study.

8. CONTACT INFORMATION

If you have concerns or questions about this study, such as scientific issues, how to do any part of it, or to report an injury, please contact the researcher (Jennifer Nalepa, 207 IM Circle, Michigan State University, East Lansing, MI 48824, nalepaje@msu.edu, 810-522-766).

If you have questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the Michigan State University's Human Research Protection Program at 517-355-2180, Fax 517-432-4503, or e-mail irb@msu.edu or regular mail at Olds Hall, 408 West Circle Drive #207, MSU, East Lansing, MI 48824.

12. DOCUMENTATION OF INFORMED CONSENT.

Your signature below means that you voluntarily agree to participate in this research study.

_____   _____

Signature   Date

Your signature below means that you give parental consent for your child to participate in this research study.

_____   _____

Signature   Date

You will be given a copy of this form to keep

Child Assent Form

An Evaluation of the Implementation of the USTA 10 & Under Curriculum:

A Comparison of Two Classes

Hi. My name is Jenny Nalepa. I'm a student at Michigan State University. Right now, I'm trying to learn about your tennis class. I would like to ask you to help me by being in a study, but before I do, I want to explain what will happen if you decide to help me.

I will ask you to play in your tennis class just like you normally do. Twice, during the four weeks you are in tennis class, you will hit the tennis ball back and forth with another student who is helping me and I will count how many times you can hit it back and forth. Also, at the end of each class, I will ask you to answer some questions about how much fun you had in tennis class that day. There are no right or wrong answers, you will just tell me how you feel. I will also be videotaping your lessons, so later I can see what you did each time and what your coach told you.

Your parents, teacher, and classmates will not know what you have written about how much fun you had. When I tell other people about my study, I will not use your name, and no one will be able to tell who I'm talking about.

Your parents said it's okay for you to be in my study. But if you don't want to be in the study, you don't have to be. What you decide won't make any difference what you learn in tennis class. I won't be upset, and no one else will be upset, if you don't want to be in the study. If you want to be in the study now but change your mind later, that's okay. You can stop at any time. If there is anything you don't understand you should tell me so I can explain it to you

You can ask me any questions about the study. If you have a question later that you don't think of now, you can call me or ask your parents to call me or send me an email.

Do you have any questions for me now?

Would you like to be in my study and help me learn about your tennis class?

Name of Child: _____

Parental Permission on File: ☐ Yes ☐ No

(If "No," do not proceed with assent or research procedures.)

Child's Voluntary Response to Participation: ☐ Yes ☐ No

Signature of Researcher: _____ **Date:** _____

APPENDIX J

Participant Numbers

Class A

Participant Name	Number
	#1A
	#2A
	#3A
	#4A
	#5A
	#6A
	#7A
	#8A

Class B

Participant Name	Number
	#1B
	#2B
	#3B
	#4B
	#5B
	#6B
	#7B
	#8B

APPENDIX K

Attendance Record

Class A

Participant #	Class 1	Class 2	Class 3	Class 4
1A				
2A				
3A				
4A				
5A				
6A				
7A				

Class B

Participant #	Class 1	Class 2	Class 3	Class 4
1B				
2B				
3B				
4B				
5B				
6B				
7B				

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REFERENCES

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