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### **THE EFFECTIVENESS OF SHADOW PRACTICE IN LEARNING THE TABLE TENNIS STANDARD FOREHAND DRIVE**

#### **Abstract**

*The study was conducted in response to the problem on how to develop a practice structure that will promote learning in Table Tennis Physical Education classes even with limited time and inadequate facilities which is a common fixture in Philippine setting. In the present study, the participants (n= 32) were randomly assigned to either one of two subject groups. The experimental group (n= 16) performed the shadow practice while waiting for their turn to practice with multi-balls. The control group (n= 16) practiced with a single ball for each pair of students while waiting for their turn to practice with multi-balls. The commonly used consistency and accuracy skills test was used to determine their pre-test, post-test and retention test scores. The level of significance was at  $P = .05$ . Using descriptive measures, the data revealed that both groups showed a significant change in the scores in the post-test phase of testing. The experimental group's mean = 83.5 while this group's pre and post test  $t = -14.3226$ . The control group's mean = 81.7 while this group's pre and post test  $t = -16.02311$ . However, only the experimental group was able to retain their scores in the retention test phase of testing. The experimental group's mean = 83.4 while this group's post and retention test  $t = 0.04897$ . The control group's mean = 78.3 while this group's post and retention test  $t = 4.6929529$ .*

**Key words:** *table tennis, shadow practice, multi-ball practice, physical education, feedback.*

#### **Teaching P.E. in Philippine Schools**

Two of the most important objectives of P.E. 2 courses are for the students to have improved physical fitness and for them to perform the basic skills with an acceptable degree of proficiency. P.E. classes in many Philippine universities have a two hour session once a week schedule which are divided into two schedules: one hour session twice a week or a two hour session once a week. Most schools in the Philippines especially those in the provinces have limited facilities. Even major universities with a high student population use a maximum of four tables in their P.E. classes. Thus, it is common for classes to have students more than what could actually be accommodated. Ideally, a pair of students should play on a table at a given time. Nevertheless, it would be important to maximize whatever could be accomplished given this situation

#### *Using guidance techniques*

Teaching the skills in table tennis, basic as it may seem is not as simple as it is perceived to be. The standard forehand drive for instance, requires the spatial and temporal coordination of sub-movements. Its' success depends on the timing and spatial characteristics of the back swing, the forward swing, ball contact and follow through. The teaching of motor skills involves the use of guidance techniques. According to Wulf, Shea and Witacre (1998), "guidance techniques guide the learner to the correct response" (p. 368). Lintern and Gopher (1978) also stated that, "guidance techniques provide the learner with a clearer image of the goal movement" (p. 192). The guidance technique used in table tennis is the shadow practice. The shadow practice is executed by

simulating the stroke within the table tennis table, in front of a mirror or in any convenient space. The participants in the study performed the shadow practice within the table tennis table.

#### *Using guidance techniques with feedback*

The uses of guidance techniques include providing feedback. According to Lee, Keh and Magill (1993) "the feedback provided by teachers is typically in the form of positive, non specific evaluative statement." (p. 228). When feedback is used in experimental works it is termed knowledge of results. Schmidt and Wrisberg (2001) defined knowledge of results as the "extrinsic, usually verbal information that tells learners something about the success of their actions with respect to the intended environmental goal" (p. 279). The feedback provided in the study was both verbal as in instructing the subject to swing forward and backward as well as physical as in making the necessary corrections on the angle of the subject's racket and guiding the subject in the execution of the stroke.

#### *The scheduling of feedback*

There are contrasting views on when feedback should be provided in teacher-learning situations. The guidance hypothesis, Schmidt (1991) states that, "too much feedback enhances acquisition performance but degrades retention performance (as cited by Kohl and Guadagnoli, 1996, p. 233). Guadagnoli and Kohl (2001) likewise stated that "support for the guidance hypothesis has been plentiful but not universal" (p.218).

Studies supporting the guidance hypothesis point-of-view (Goode & Magill, 1986; Wrisberg & Liu, 1991) recommend that making feedback more difficult during skill acquisition can be detrimental in acquisition but beneficial in retention. However, studies of more complex task (Guadagnoli, Dornier & Tandy, 1996; Wulf, Shea & Matschiner, 1998; Lai & Shea, 1998) proved contrary to the guidance hypothesis point-of-view.

The present study tried both recommendations; the experimental group had an easier task of performing the shadow practice while waiting for their turn to practice with multi-balls whilst the control group had the more difficult task of trying to keep the ball in play while waiting for their turn to practice with multi-balls.

#### *The purpose*

The purpose of the study was to see the performance of college students in the commonly used consistency and accuracy skills test using shadow practice in learning the standard forehand drive. The study specifically aimed to see the performances among two different conditions; (a) the experimental group using shadow practice in combination with multi-ball practice (b) the control group using one ball per pair of students in combination with multi-ball practice. The other purpose was to compare the significant difference in the two group's pre and post-test and post and retention test scores.

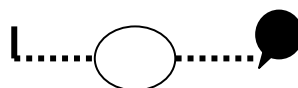
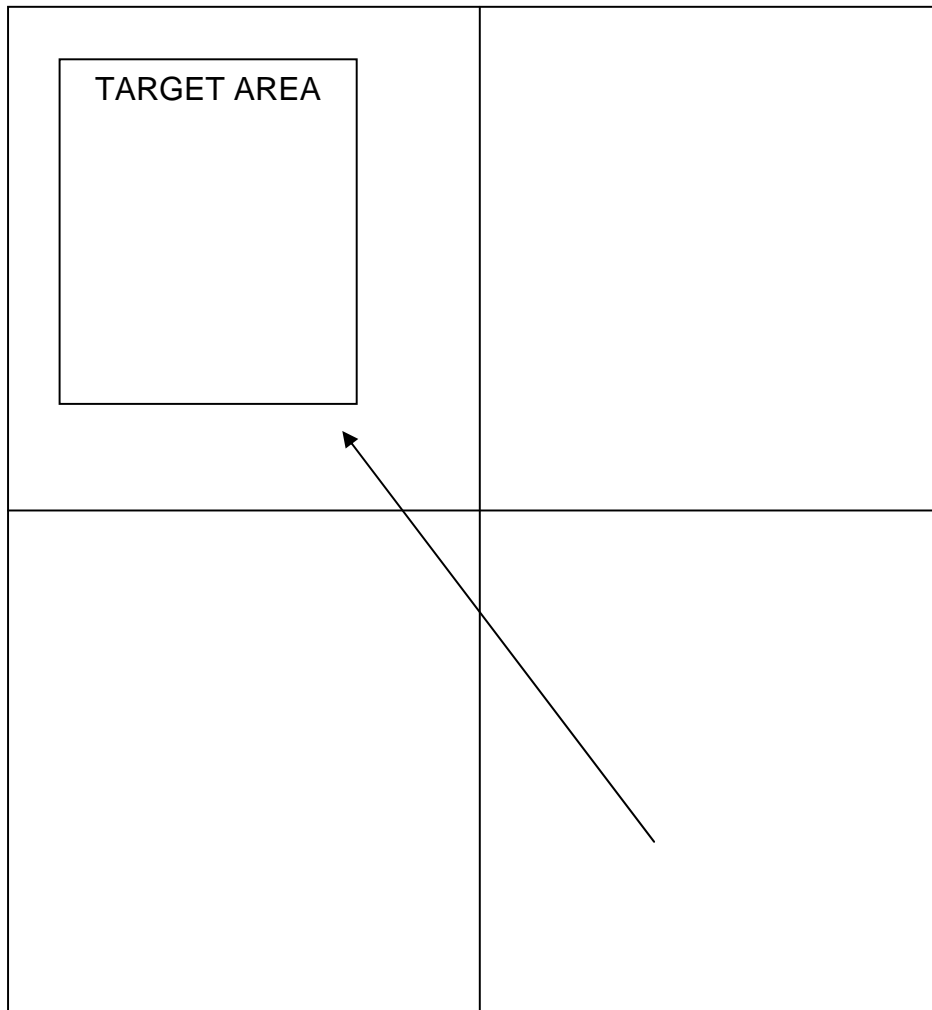
## **Methods**

### *Subjects*

The subjects were female (n=32) volunteer U.P. Baguio female students from the different P.E. 1 Lecture Classes. Only female students were chosen as subjects because of the male and female ratio (1 male = 4 females) in all P.E. 1 classes. Also, many of UP Baguio would be male subjects play table tennis recreationally during their free time. All subjects were considered pure beginners in the sport of table tennis. Those who ever held a table tennis racket were discouraged from volunteering during the dissemination of the study.

*Instrument*

The consistency and accuracy skills test was used to determine the scores of the subjects. A total of one hundred trainer balls were used for the test and two persons, the feeder and the counter administered the test. The test was conducted with one subject at a time. Each subject was instructed to hit as many balls as she could to the designated target area (crosscourt) at the opposite court. The number of balls that hit the specified target area was counted (e.g., 50/100, 70/100, 80/100).



**RIGHT HANDED SUBJECT**

**Figure 1. *The research instrument***

### *Task*

The standard forehand drive was selected as the experimental task. Since this open skill is foundational to the game of table tennis. It is also typically first in the learning sequence in many P.E. classes after the introduction of the basic mechanics such as the grip and the basic ready position.

### *Procedure*

All subjects were briefed that the purpose of the study was to determine their performance in the consistency and accuracy skills test.

*Pre-test.* The subjects (n=32) were taught the basic ready position and the shakehand grip. The subjects were positioned half at arms length from the table's end line. Using the consistency and accuracy skills test, each participant was instructed to hit as many balls as she could to the designated area (crosscourt) at the opposite court.

*Practice sessions.* The participants were randomly assigned to two practice conditions after the pre-testing phase, the experimental group using shadow practice in combination with multi-ball practice and the control group using one ball per pair of participants in combination with multi-ball practice. Each group practiced for a period of one hour a day for five days.

The experimental group were instructed to follow the instructor perform the shadow practice for five minutes after which the instructor proceeded to feed multi-balls to each subject. The instructions were as follows: bend knees and slightly leaned forward for the right handed subject, right foot slightly forward for the left handed subjects, hold racket slightly higher than table height in front of the body, then backswing, then forward swing. One subject practiced with multi-balls at a time while her partner picked balls missed and placed them on a bucket so as not to delay time. Each pair alternated on this task until both finished practicing with multi-balls. The pair then resumed shadow practicing. The rest of the group shadow practiced as they waited for their turn to practice with multi-balls.

Each pair of the control group played with a single ball as they waited for their turn to practice with multi-balls. They were instructed to strike the ball crosscourt or diagonally and try to keep it in play with a controlled action. They were also not allowed to smash the ball even after they had gain some control over their strokes in the course of the five day treatment period.

*Post-test.* Upon completion of the five day treatment period, the participants were given a post-test using the same procedure as in the pre-test. The experimental group were the first to be given the post-test followed by the control group.

*Retention test.* After a period of three calendar days, a retention test was given using the same procedure as in the pre-test and post test.

### *Data Analysis*

Data was analyzed using t-test to determine the significant changes in the two subject group's pre-test, post-test and retention test. Independent samples were use to determine the significant difference between the two subject group's post-test and retention test. The level of significance was at  $P = .05$ .

## Results

Table 1. *The experimental group's scores*

	<b>Mean Score</b>	<b>N</b>	<b>Standard Deviation</b>	<b>t</b>
<b>Pre-test</b>	36.8	16	16.37	
<b>Post test</b>	83.5	16	8.52	-14.3226*
<b>Retention test</b>	83.4	16	10.40	0.04897*

**Sig. at P = .05**

Table 1 shows a significant difference in the mean scores between the pre-test and post-test of the experimental group. It also shows that there is no significant difference between the mean scores in their post and retention test. The findings suggest that the beneficial effect of using shadow practice is not temporary in nature but can positively affect the learning of the standard forehand drive. Shadow practicing enabled the participants to have a pattern of coordination and gave them an idea as to what the "goal movement pattern of striking the ball feel" (Lintern & Gopher, 1978). They had what Schmidt and Wrisberg stated as their own "proprioceptive or kinesthetic information" (p. 93). They may have consciously or unconsciously experienced the movement of their joints and thus develop their muscle memory that eventually became automatic as they shadow practiced (Packer, 2005). The findings also showed that the performers can use the experience of shadow practicing to shorten the learning process, which is to reach a higher level performance in less time.

Table 2. *The control group's scores*

	<b>Mean Score</b>	<b>N</b>	<b>Standard Deviation</b>	<b>t</b>
<b>Pre-test</b>	37.3	16	14.99	
<b>Post test</b>	81.7	16	10.92	-16.02311*
<b>Retention test</b>	78.3	16	12.42	4.625929*

**Sig. at P = .05**

Table 2 shows a significant difference between the mean scores of the pre-test and post-test of the control group. It also shows a significant difference between the mean scores of their post-test and retention test scores as the scores were lower in retention. The control group played with a single ball as they waited for their turn to practice with many balls. They were instructed to play the ball crosscourt or diagonally with a controlled action. They stopped to pick up the ball more often than trying to keep it in play. As studies that have found out that skill learning is positively related to successful practice trials and negatively related to unsuccessful practice, (Ashy, Lee & Landin, 1988; Silverman, 1985, 1990; Hebert, Landin & Solmon, 1996) stopping to pick balls missed reduced the amount of time of actual practice. They were not able to experience the goal movement pattern of striking the ball crosscourt since they had more time picking up the ball than putting it in play. The findings contradicted what could be expected from a guidance hypothesis point-of-view (Schmidt, 1991) that making the practice experience more difficult results in the attenuation of acquisition performance but enhances retention. The control group were able to achieve high scores as shown in their post-test but were not able to retain their scores as shown in their retention test.

Table 3. *Independent sample test*

	<b>T</b>	<b>Sig. (2 tailed)</b>
<b>Pre-test</b>	-0.09016	0.928802
<b>Post-test</b>	0.52639	0.60477
<b>Retention test</b>	1.265308	0.215501

**Sig. at P = .05**

Table 3 shows that there is no significant difference between the experimental group and control group in their post-test and retention test scores. Although the control group had a mean score of 78.3 (Table 2) as compared to the experimental group's mean score of 83.4 (Table 1) in the retention test, the control group's standard deviation of 12.42 (Table 2) is higher than the experimental group's standard deviation of 10.40 (Table 1). Both groups had subjects that achieved high scores in the retention test. Both the experimental and the control group were able to achieve high scores in their post-test. However, the experimental group retained their scores while the control group did not.

## Discussion

The findings that studies on feedback have provided justified its being generalized to practical situations. However, majority of these studies had been conducted in laboratory settings which may have some disparity when compared to sports skills. Hebert, Landin and Solomon (1996) stated that "compared to typical laboratory tasks, sports skills are generally more complex movements, involve the control of a greater number of degrees of freedom, and require more practice to master" (p. 53). In line with Lee, Keh and Magill's (1993) recommendation that "these assertions be tested in Physical Education classrooms" (pp. 228 – 243), this study was conducted to observe the performance of college students using the guidance technique of shadow practice in learning the table tennis standard forehand drive.

Most schools in the Philippines do not have sufficient table tennis tables to address the ideal number of students which is a pair for each table. P.E. instructors experience difficulty facilitating learning in situations where there are more students than what could actually be accommodated and with a limited time. A typical example of this scenario is a major university north of Manila, the Philippine capital. The school has an average of twenty students enrolled in their one hour per meeting table tennis P.E. class. However, this school has only three tables. Even if the school could afford to purchase additional tables, there would still be complications on how these tables would be utilized. The class is conducted at the same time with other P.E. courses, thus they only have an allotted space in the school gymnasium. How learning can be more conducive in this school and in other schools with similar situations is also the concern why this study aimed to see if shadow practice is an effective mode for skill instruction.

A total of 32 female U.P. Baguio volunteer students with a mean age of 16 were used as subjects for this study. All were considered pure beginners in the sport of table tennis. Those who ever held a table tennis racket were discouraged from volunteering during the dissemination of the study to the different P.E. 1 Lecture classes. The subjects were pre-tested (experimental groups' mean = 36.8; control group's mean = 37.3.) and randomly assigned to either of the two subject groups. They were asked to report for five days for their treatment after which a post-test (experimental group's mean = 83.4; control group's mean = 78.3) was administered after three calendar days from the post-testing phase. Data was analyzed using descriptive measures, t-test (experimental group's  $t = -14.3226$ , post and retention test  $t = 0.04897$ ; control group's pre and post test  $t = -16.02311$ , post and retention test  $t = 4.625929$ ).

The study revealed that both the experimental group and control group had a significant change in their scores in the post-test phase of testing. However, only the experimental group was able to retain their score in the retention test phase of testing.

## Conclusion

The findings of the study support studies (Wulf, Shea and Matschiner, 1998; Wulf, Shea and Witacre, 1998) which had similarities in the results. Specifically, the results contradicted what could be expected from a Guidance Hypothesis point-of-view (Schmidt, 1991). The results of the study led to the conclusion that both shadow practicing and using a single ball for each pair led to high scores in the post-test. Statistically treated data revealed that only those who performed shadow practice were able to retain their scores in the retention test while those who practiced with a single ball per pair had a significantly lower score in their retention test as compared to their post test. Thus, the study revealed that using shadow practice is a mode for effective skill instruction. The study concluded that there are no significant difference among the two subject group's pre-test and post-test. Both groups were able to achieve high scores in their post test.

The experimental group using shadow practice did not show any significant difference in their post and retention test. Thus, this group was able to retain their scores in the retention test. However, there was a significant change in the control group's post and retention test scores. The control group using one ball per pair was not able to retain their scores in the retention test.

## Recommendation

Based on the results of the study, students who are waiting for their turn to play in schools which have limited facilities should perform shadow practice. As the findings revealed, even subjects who had the privilege of playing while waiting for their turn to practice with multi-balls were not able to retain their scores in the retention test. How much more for students who would spend considerable time waiting than actually playing?

It would also be recommended that future studies involve male subjects as what Wrisberg and Liu (1991) did in extending the learning of three badminton serves (pp. 406 -412). Their study involved male subjects since Goode and Magill's (1986) study had only females as subjects (pp. 308-314). Their findings showed that there were no disparity between the male and the female subjects' performance. Further studies should also see if it could derive the same results.

Other foundational skills such as the standard backhand drive and a combination of both strokes should also be included in future studies. Studies by Hebert, Landin and Solmon (1986) on "high and low skilled students using the tennis forehand and backhand ground strokes argued that these two skills required different motor responses yet had similar perceptual and timing characteristics" (pp. 52 - 58). Their findings concluded that random practice failed to facilitate learning even for the high skilled students. Further studies should determine if using block practice as what was used by the aforementioned study, still facilitate learning with the addition of the other foundational skills

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