The Effect of Exercise Method and Hand-Eye Coordination Towards the Accuracy of Forehand Topspin in Table Tennis

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Abstract. In table tennis, an accurate hit should be possessed by an athlete in order to be able to anticipate and counter attack the opponent. A good and accurate stroke is a necessity. The aim of this research is to examine the effect of exercise method and hand-eye coordination towards the accuracy of forehand topspin in table tennis. The learning method applied here is Massed Practice and Distributed Practice, meanwhile hand-eye coordination cover high and low coordination. Experiment and factorial design 2x2 is used as the research method. The research subjects are 8 students involved in table tennis association (UKM) at UPI Sumedang district which is divided into 4 groups. Based on placed, high and low coordination with MPP treatment, high and low motor perceptual with MPDD treatment. As many as 16 meetings were conducted and Mannova analysis showed that there is a difference of accuracy in the forehand topspin strokes between trained students with massed practice and distributed practice. Distributed practice showed better performance. There is a difference between students or athletes who owned high and low hand-eye coordination towards their forehand topspin stroke accuracy in playing table tennis. Higher ability in motor skill has better results and the accuracy of forehand topspin between those who followed massed practice and distributed practice has also different results significantly with those who have higher and lower hand-eye coordination.

1. Introduction
Failure in winning the gold medal in PON 2012 in Riau became a whip for table tennis to not only target a piece of gold at the XIX PON / 2016 when West Java became the host. The data show that the achievement of West Java table tennis is less encouraging at the national level. Many factors could cause the clubs in West Java to be less able to take part in the national scene, some of the causes are: 1) Lack of qualified exercise quality. 2) Supporting facilities are not optimal. 3) The ability of a coach is limited and less follows the development and technological progress.

Technical coach and physical coach are constantly searching for the best method to improve the learning skills and performance in a training place or on one of the teams. Serious problems regarding the distribution of the time allocated for learning certain skills, especially since there are usually a lot of skills that must be learned within a limited period.

In fact, the manner or method of training which is used by a coach to provide technical information, and other strategies to different athletes is rarely carried out by the trainer in the training process to establish the athlete to master the knowledge, skills and attitude. The methods used to motivate athletes to be able to use the knowledge and skills to take on the face using the results of the methods given by coaches in the training process.
Training methods which were used generally in sports can be divided into two types, namely massed practice methods and distributed practice methods. Massed practice method is a method of carrying out a number of activities carried out with specific exercises repeatedly without stopping, for example, to hit a forehand topspin about 200 times without stopping. Improving the quality of the exercises can be done by increasing the number of strokes (training volume), for example of 200 punches to 225 punches, then to 250 punches and so on, or by increasing the frequency of hitting the ball (intensity). Method of distributed practices are doing in a particular exercise activity repetitively, however it is done in a couple of times, for example forehand topspin to do about 200 times but done in 5 repetitions of 40 strokes each. The improvement of the quality of training is similar to the one that is carried out in solid practice methods, which increase the volume and intensity.

Punch technique that is made the object of this research is forehand topspin, based on field observations is that a lot of punches and is often used by high-level players either national or international, as they often contribute to earnings points in the game. On the other hand, it has not been obtained a study about the practice of the fastest forehand topspin results in accordance with the most expected.

Based on the background of the problems raised in this research, it was revealed that support training methods which are supported by the use of the latest technological advances tool products in the world of sport, particularly the sport of table tennis is very supportive to the development of learning or to increase the accuracy to be achieved. The issue is how to motivate the coach to have a genuine willingness to learn and have the ability to use the proper training methods, the ability to improve coordination of the athletes, and the ability to use auto robot and visual recordings as a learning tool or exercise. Based on the fact, countries that are advanced in the field of sport, have the trainers or coaches who have the awareness and the ability to utilize the results of research on a model or method of practice leading on edge of the most targeted, effective exercise to improve the ability to direct the ball into specific targets, as well as utilizing the tools of modern technology, among others auto robot and video recordings in an effort to develop the achievements of athletes.

Based on the findings in the field, most of the table tennis coaches in West Java did not understand in depth about the concept of solid and distribution practice methods. Although in practice many of them already applied.

2. Problem Formulation
Referring to the identification of problems that have been revealed, formulation of research problems is elaborated in the form of the following research questions:
1. Is there a significant difference on the accuracy ability of forehand topspin table tennis between athlete who practice using massed practice method and distributed practice methods?
2. Is there a significant difference in accuracy ability of forehand topspin table tennis among the athletes who have the high and low hand-eye coordination?
3. Is the significance of differences in distributed method and massed method occurred in the significance of differences in high coordination group and the low coordination group?

3. Objective
In particular, this study aims to:
1. Find out a good method to improve the accuracy of forehand topspin table tennis.
2. Find out whether there is an ability to coordinate influence on improving the accuracy results forehand topspin table tennis.
3. Discover the difference the distributed method and the massed method occurred in the coordination group differences in high and low coordination group on the ability forehand topspin table tennis.
4. Theoretical Framework

4.1. Massed and Distributed Practice Method

Practice methods can be divided into two parts: the time-oriented method and teaching materials. Because the methods of teaching materials have been raised, and then discussed here is a method of execution time. The definition of execution time is a period or periods of learning a skill motion by students actively. In this case the time which was provided for teachers to roll and provide tools do not include the use, the implementation of time is in minutes, hours or days.

The benefits of distributed practice compared with a massed practice, namely the influence on distribution practices, found in a study that at first are usually focused on memorizing a list of items with an interval in terms of minutes or hours and is done in the laboratory (Glenberg: 1979; Melton: 1970). In subsequent work distributed practices given a positive effect on the educational environment that is authentic (Seabrook et al: 2005) and a longer time interval (Bahrick & Center: 2005; Bahrick & Phelps: 1987). Bahrick and hallways explain the effect of metacognitive monitoring distribution strategies with students. That is, when the activity is the distribution of study, students will see that they have forgotten some of the material in the intervening period. When they fail, they will tend to use a coding method that will lead to better retention. They can also choose and use strategy to tackle the causes them to forget about the study plan (Benjamin & Bird: 2006).

The practice time like every half hour practices with five minute break or so-called distributed practice. Massed practice according to research less effective in the control of movement compared to the distribution practices for athletes in massed practice will feel fatigue.

Regarding the method of massed practice and the method of distributed practice many experts who have given their arguments. Mahendra (2007: 268) explains that "Practice shows that at least solid rest time between replications or no break at all. Distribution practices require minimal rest between repetitions during the time of implementation."

4.2. Coordination Capability

Coordination is the ability to perform the movements or work with highly precise and efficient. Coordination states the relationship harmonious variety of factors occurring in a movement. Elders experienced the decreasing coordination in performing everyday activities. Aging causes a decrease in sensory perception and motor response in the nervous system. This happens because the central nervous system in the elders undergo morphological and biochemical changes.

Coordination and vision have long been trained in specific table tennis exercises more than any other sports, but the sport itself that ignores the specific exercises, which became a major factor in exercise. Willmore & Costill (2004) in the special principle say "The training program must stress the physiological systems that are critical for optimum performance in the given sport". The vision of the theory became the basis for the supplementary motor skills, training effect on improving the appearance of being debated. "Per se the studies contradicting the positive effect of sports vision training" (Abernethy & Wood: 1991, 2001; Cohn & Chaplik: 1991) have been sceptic as are the studies supporting (Reviem & Gabor: 1981; Mc Leod & Hansen: 1989 ; kluka et al: 1996). Coordination is the ability to combine multiple movements without tension in the correct order and perform complex movements smoothly without excessive outcome energy (Respaty, 2016: p. 36).

Although it is not just one aspect but the ability of coordination and movement skills is a very significant factor in the game of table tennis (limoochi: 2006, Rosum & Gagne: 1994, Toriola & Igbokwe: 2004)). Coordination is one component of physical fitness related to skills (skill related fitness). Other components belonging to the physical fitness related skills are: balance, reaction speed, explosive power, and agility. The other type of physical fitness is a physical fitness relating to health (health related fitness), which consists of general endurance, muscular endurance, strength, flexibility, and body composition. Coordination is the ability to weave some elements of movement into a movement that is consistent with its purpose."(Suharno HP. 1992; 39). Meanwhile, according to M. Sajoto (1995: 9), "Coordination is the ability to integrate a variety of different movement patterns into
a single movement effectively. Hidayat (1997: 138) explains that the coordination of the movement of the body member to each other must work together in a sequence such that each will achieve maximum speed at the same time, in other words.

4.3. Motor Learning

Schmidt (1988: hlm.346) describes the "Motor learning is a set of processes associated with practice or experience leading to relatively permanent change capability of responding". Learning motion is a process associated with training or experience, which leads to a relatively permanent change in its capability to respond to something. Motor learning is a process of change to improve the quality appearance of motion someone gained through experience or training and are settled or permanent.

Based on motor learning concept which has been defined previously, learning can be defined as follows: Firstly, as a set of events or changes that occur when one practices that enable them to become more skillful in performing an activity. Secondly, learning is a direct outcome, because the process of delivering the achievement of behavioural change takes place internally or in human beings and so cannot be observed directly, the exception is interpreted based on behaviour change itself. Third, learning is seen as a process that produces a relatively permanent change. This is in accordance with the opinion of Schmidt (1988), which explains that there are four characteristics of motor learning, namely: a process, a direct result of the exercise, something that cannot be observed directly, and a relatively permanent change.

In the process of learning motor skills, in addition to the physical elements involved, there are also some psychological elements, namely the emotions and feelings. Both the psychological element becomes the driving force in changing behaviour. A student will make a move if you feel the need to do and it there are capabilities.

It can be concluded that the objective of motor learning / skills is the change of psychomotor skills that increase movement and changes that can be interpreted in a motion change in control of the sport. Beside the psychomotor change, there are also changes in the nature of affective and cognitive, because in addition to practice movement patterns, students need to understand the concepts and rules and values that are contained in that movement suits the characteristics of the sport itself.

Stages of Motion Skill Learning: Skill learning is a process that is not visible; which can be seen in the form of a result of increasing performance, where the process occurs in the body and mind. The process of mastering the appearance of motion progresses through several stages. Fitts (1964), Fitts and Posner (1967) in Lutan (1988: hlm.305), said that the stages of motor learning include: the cognitive stage, associative stage, and automatic stage.

4.4. Forehand Topspin in Table Tennis Game

Topspin is a round to the front, in this case is a ball round. Regarding topspin strokes Sklorz (1973: p.26) explains: "... produced by a stroke with the top edge of the bat over the ball (a closed contact) and arm moving forward and upward, from below the ball". About topspin is reconfirmed by Ahmad Jaya (1976: p.32) as follows:

When we swing the racket and attach / hit the ball, by using power, other than the racket we swing forward we also add the large (strong) power to swipe up, then the ball definitely go ahead with a round to the top, this is called topspin.

Forehand topspin is very difficult even cannot be used primarily to restore short balls or short drop shot near the net. Differences in technique forehand topspin in restoring various punch techniques of the opponent is situated on the bet corner or angular movement of the hand holding the bat, for example, to return the ball chop with a lot of rotations, bet corner and angle of motion is more open than the restoring punch technique of push, block or drive. Forehand belongs to the attack punch group as well as smash, flick, drive, loop, drop shot, and flat hit. In reverse, punch techniques which can be grouped into the defensive punch are push, block, chop, defence balloon. In this study, forehand topspin technique that will be studied is the topspin forehand near or over the table.
5. Research Methods
This study employed Quasi Experimental Design (blurred experiment) method that is the type of experiments using the whole subject of the whole (intact group) to be given the treatment.
This study employed experiment with factorial design 2 x 2. The design of the study that will be implemented is as follows:

| COORDINATION  | TRAINING METHODS |
|---------------|------------------|
| HIGH ABILITY  | Metode Latihan (A1) | Metode Latihan (A2) |
| (B1)          | A1B1             | A2B1             |
| LOW ABILITY   | A1B2             | A2B2             |

The subjects were students of UPI that follow Table Tennis Unit whose level skill is not beginner, they all had the experiences of playing with various levels. Some of them have experience of playing in the selection of internal association, between RT-level, inter-village, between district, even the inter-association championship, but there are no athletes of West Java, with the range of age from 18 to 25 years old.

The sampling was based on data that were taken every meeting where the subject did one test of each meeting, the data is about 16 sessions multiplied by one test that is 16 for each subject, this study utilized eight subjects, so the total of entire data is eight multiplied 16 is 128, then the data became the sample in this study.

Instruments that were used in this research are: in getting the data about hand-eye coordination skills, the test of catching and throwing balls against the wall is done, data collection was conducted prior to the implementation of the experiment for the sake of the division of cells in the experimental group. Meanwhile, to obtain data on the accuracy capability topspin forehand topspin tests done through controlled (auto robot) for 30 seconds, the test is carried out on the four experimental groups as post test group.

6. Findings and Discussion

Table 2. Accuracy Test Results Forehand Topspin based on methods of training and coordination group

| METHODS | DISTRIBUTED | MASSED | TOTAL |
|---------|-------------|--------|-------|
| COORDINATION HIGH | X = 3.24    | X = 3.03 | X = 6.27 |
| LOW     | X = 2.65    | X = 2.48 | X = 5.13 |
| TOTAL   | X = 5.89    | X = 5.51 |

Table 2 presents the results of the analysis of the mean and standard deviation when the analysis looks at a group of massed method of high coordination; group of massed method of low coordination, group of distributed method of high coordination, group of distributed method of high coordination and group of distributed method of low coordination. Based on the analysis that has been conducted, the group of distributed method of high coordination group turned out to be the highest overall average that is about 3.236111 compared with other groups, the results mean massed group of high coordination method is 3.027778, the average results of the group of the massed method of low coordination at 2.479167, and the results of group of distributed method of low coordination at 2.649306.

The results of the data analysis also suggest that the group of massed method of high coordination had better results when it is compared with other groups. It is obtained from four groups, the group of massed method of high coordination, the group of massed method of low coordination, the group of
distributed method of high coordination and the distributed method of low coordination with the number of measurement samples about 32 per group with 2 samples for each group.

Based on the results of the calculation of descriptive statistics of the four experimental groups obtained a mean and standard deviation as follows. The data sample test results about 32 samples with two participants in each cell with 16 times of test. Group of massed with high coordination resulted the mean about 3.027778 with the standard deviation about 2.808078. Group of massed with low coordination gained a standard deviation about 2.479167 with the mean about 1395147. The group of distributed with high coordination gained a mean in about 2144705 and standard deviation in about 3.236111. The group of distributed with low coordination gained the mean about 2.649306 with the standard deviation about 3.792701.

Based on the results of this analysis, it can be observed is that the high group result was always the higher either got treated with the massed method or distributed method. If it is compared among the groups, the distributed method of low distribution is better than the massed method.

6.1. Test of hypothesis

Research hypothesis testing is done by using univariate statistical analysis, calculations using SPSS, based on the analysis that has been done shows the result analysis as follows:

| Tests of Between-Subjects Effects | Source                  | Type III Sum of Squares | df | Mean Square | F      | Sig. |
|----------------------------------|-------------------------|-------------------------|----|-------------|--------|------|
| Corrected Model                  |                         | 5.735^a                 | 3  | 1.912       | 49.019 | .000 |
| Intercept                        |                         | 519.144                 | 1  | 519.144     | 1.331E4| .000 |
| Metode (Massed & Distributed)    | .573                   | 1                       | .573| 14.691      | .000   |
| Error                            | 2.340                  | 60                      | .039|
| Total                            | 527.219                | 64                      |     |
| Corrected Total                  | 8.076                  | 63                      |     |

Based on the analysis in Table 3 can be seen that the variable method of exercise that is the exercise of massed method and distributed method resulting significance number of 0.000. The significance numbers can be said that the method of exercise has a significant effect on the accuracy of forehand topspin in table tennis.

So then performed further analysis of that test on the high coordination group and the low coordination group, the data is presented in Table 4.
Table 4. Test of the high coordination group and low coordination group

| Source                  | Type III Sum of Squares | df | Mean Square | F      | Sig.  |
|------------------------|-------------------------|----|-------------|--------|-------|
| Corrected Model        | 5.735\(^a\)             | 3  | 1.912       | 49.019 | .000  |
| Intercept              | 519.144                 | 1  | 519.144     | 1.331E4| .000  |
| Coordination (High& Low)| 5.157                   | 1  | 5.157       | 132.218| .000  |
| Error                  | 2.340                   | 60 | .039        |        |       |
| Total                  | 527.219                 | 64 |             |        |       |
| Corrected Total        | 8.076                   | 63 |             |        |       |

\(^a\) R Squared = .710 (Adjusted R Squared = .696)

Based on the analysis in Table 4 it can be seen that the variable division of the group of high coordination capability and low coordination capability resulted the number of significance. 0000. The significance of the numbers can be said that the method of exercise has a significant influence on the accuracy of forehand topspin in table tennis.

So then the further analysis was done that was the test on the entire group of experiments that will show the results of the overall data analysis completely, the data can be seen in Table 5.

Table 5. Test experimental group

| Source                  | Type III Sum of Squares | df | Mean Square | F      | Sig.  | Partial Eta Squared |
|------------------------|-------------------------|----|-------------|--------|-------|---------------------|
| Corrected Model        | 5.735\(^a\)             | 3  | 1.912       | 49.019 | .000  | .710                |
| Intercept              | 519.144                 | 1  | 519.144     | 1.331E4| .000  | .996                |
| Method                 | .573                    | 1  | .573        | 14.691 | .000  | .197                |
| Coordination           | 5.157                   | 1  | 5.157       | 132.218| .000  | .688                |
| Method * Koordinasi    | .006                    | 1  | .006        | .150   | .700  | .002                |
| Error                  | 2.340                   | 60 | .039        |        |       |                     |
| Total                  | 527.219                 | 64 |             |        |       |                     |
| Corrected Total        | 8.076                   | 63 |             |        |       |                     |

\(^a\) R Squared = .710 (Adjusted R Squared = .696)

Table 4 gives the following picture:
1. In the case of one factor ANOVA test, it is employed to see whether there is a noticeable difference between the use of the exercise method and grouping subject.
2. In the Method line, the value of F = 14.691 with sig = 0.000 <\(\alpha\) = 0.05 (H0 is refused). In other words, the application of both methods gives a real difference. In this case the distributed method (average 2.94) better than the massed method (2.75).
3. The application of different methods contributed as partial eta squared = 0.197 = 19.7% on the result achievement.
4. In line Group, the value of $F = 132.218$ with $\text{sig} = 0.000$. This provides an explanation that $0.000 < 0.05$ so that $H_0$ is rejected. In other words, a way of grouping subjects (KR and KT) significantly gives differences to the final result. It is where the KT group (average of 3.13) is better than KR (average of 2.56).

5. The difference in subject groupings contributed as *partial eta squared* $= 0.688 = 68.8\%$ on the result achievement.

6. Meanwhile on the Anova 2 factors, it is intended to determine whether there is a significant correlation between the two factors, which in this case will be examined whether there was an interaction between the variable selection of methods and means of grouping the subject. In line method * Group, the value of $F = 0.150$ with $\text{sig} = 0.700$. This provides an explanation that $0.700 > 0.05$ so that $H_0$ is accepted. In other words, there is no interaction (combined effects) between the selection of methods and the way of grouping subject to the final result.

7. The effect of the interaction is only about *partial eta squared* $= 0.002 = 0.2\%$ on the result achievement.

Figure 1. This graph shows the methods and group interaction

Although the provision of different treatment between MPP and MPD and grouping KT and KR each has a significant influence but when the effects are combined, the effect of the interaction is not significant at 0.2%. Turns out that the high coordination group has more roles to the results if it is seen from the Partial Eta Squared, the grouping of low coordination and high coordination has greater influence than the provision Massed Practice Method and Distributed Practice Method, but it was not found interaction between the giving of Massed Practice Method and Distributed Practice Method including the grouping of KT and KR.

7. Conclusions
This chapter will discuss the final conclusions of the study about The Effect of Exercise Method And Hand Eye Coordination towards The Accuracy of Forehand Topspin in Table Tennis. The research that has done is an experimental research which tests whether there are differences in the two methods of practicing the ability to hit a forehand topspin. The results showed;

1. There are differences in the accuracy ability of forehand topspin table tennis among students who practice using the method of massed practice and the methods of distributed practice, where the distributed method is significantly better, with regard to the results of a one-way ANOVA test, the difference in utilizing the distributed practice method and MPP gives a significant impact to the result accuracy of forehand topspin in table tennis

2. There is an influence of the difference between the student or athlete who has the high and low hand-eye coordination on the accuracy ability of forehand topspin in table tennis, the one who has a high motor skill has better results.
3. Although the provision of different treatment between MPP and MPD and grouping KT and KR each has a significant effect but when the effects are combined, the effect of the interaction which is not significant is about 0.2%. Turns out that the high coordination group has more roles to the results that is seen from the Partial Eta Squared, the grouping of low coordination and high coordination has greater effect than the provision Massed Practice Method and Distributed Practice Method, but it was not found interaction between the utilizing of Massed Practice Method and Distributed Practice Method including grouping of KT and KR.

8. Recommendations
Based on the research results and conclusions of the discussion, some things are suggested below:
1. For teachers, trainers or coaches in table tennis, it is hoped to keep working to find the best way to obtain an optimal learning outcomes by examining the use of massed or distributed methods that can be used to coach table tennis, in the case of this research is a top spin.
2. In the exercise, it is necessary to note the difference of the hand-eye coordination, it should be considered by trainer before starting the exercise, by doing preliminary tests on the coordination of the athletes who will be trained in any technique, especially in this research is the ability of punch accuracy of forehand topspin in table tennis. It is obvious in this study that it affects the results.
3. A study with a larger sample by reference to the number of existing samples is necessary. Based on the limitations of the study, namely in terms of the limited sample, the limited coverage of all punch technique in tennis table, limited review of all the techniques in a game of table tennis, and inability to reach of the study of tactics and strategy in the game of table tennis, it is recommended to conduct other studies that (a) not only the technique of forehand topspin in table tennis, but also on these another punch techniques like push, drive, block, chop, service, topspin, smash, balloon (lob) defense, flick, my drop, flat, loop, or from the forehead and backhand; (B) In terms of territorial sample, it is not just members of PTM Earth Siliwangi, but also can be done at PTM, students of other schools or expanded up to a broader level as athletes regionally, nationally and internationally, so that it can be assessed by other factors that are assumed to affect learning outcomes such as, the type of play, interest or motivation, ethnicity, geographical circumstances; (C) deeper study of each punch technique specifically, for example, ball spin rate, rate of speed ball, or punch the target level.
4. For PTM managers, principals, managers of educational institutions, or organizer of sports, should be more open to prepare or conduct cutting-edge equipment that can be used to develop methods and media for learning or training in sports, especially table tennis. Based on the results of research that has been done, so it is really needed to set up and procure the latest equipment to develop training methods that will be implemented.
5. This research can provide input for coaches and administrators of table tennis table tennis organizations to provide appropriate training methods in order to improve the athlete's performance in table tennis.

References
[1] Abernethy, B. (1991). Visual Search Strategies and Decision-Making in Sport. International Journal of Sport Psychology, v.22. p. 189-210.
[2] Abernethy, B, Wood, J. M. D. (2001). Do Generalized Visual Training Programs for Sport Really Work? An Experimental Investigation. Journal of Sport Science, v.19. p. 203-222.
[3] Ali, M. (2011). Memahami Riset Prilaku dan Sosial. Bandung. Pustaka Cendekia Utama.
[4] Bahrick, L. E. (1987). Infants’ intermodal perception of two levels of temporal structure in natural events. Infant Behavior & Development, 10, 387–416.
[5] Bahrick, H. P., & Phelps, E. (1987). Retention of Spanish vocabulary over eight years. Journal of Experimental Psychology, 13, 344–349.
[6] Bahrick, H. P., & Hall, L. K. (2005). The importance of retrieval failures to long-term retention: A metacognitive explanation of the spacing effect. Journal of Memory and Language, 52, 566–577.
[7] Benjamin, A. S., & Bird, R. D. (2006). Metacognitive control of the spacing of study repetitions. Journal of Memory and Language, 55, 126–137.

[8] Cohn, T.E, Chaplik, D. D. (1991). Visual Training in Soccer. Perceptual and Motor Skills, v. 72, p. 1238-1240.

[9] Jaya, A., dkk. (1976). Teknik Permainan Tenis Meja. Jakarta.

[10] Kluka, D. A., Love, P. A., Hammaek, G., Wesson, M. D. (1996). The Effect of Visual Skills Training Program on Selected Female Intercollegiate Volleyball Athletes. International Journal of Sport Vision, v. 3, p. 22-25.

[11] Limoochi. S. (2006). A Survey of Table Tennis Coaches’ Opinions of Some Criteria in Talent Identification. International Journal of Table Tennis Science 6: 280-287.

[12] Mahendra. A.(2007). Teori Belajar Mengajar Motorik. Modul. Bandung: FPOK UPI.

[13] Mcleod, B., Hansen, E. (1989). Effect of Eyerosics Visual Skills Training Program on Static Balance Performance of Male and Female Subjects. Perceptual and Motor Skills, v. 69, p. 1123-1126.

[14] Revien, L., Gabor, M. (1981). Sports Vision: Dr. Revien’s Eye Exercise For Athletes. Journal of Sport Science, v. 17. P. 187-200.

[15] Rossum van. J. H. A, Gagne. F. (1994). Rankings of Predictors of Athletic Performance by Top Level Coaches. European Journal for High Ability 5: 68-78. doi: 1080/ 0937445940050107.

[16] Sajoto, M. 1995. Peningkatan dan Pembinaan Kekuatan Kondisi Fisik dalam Olahraga. Semarang : Dahara Prize.

[17] Schmidt, Richard A. (1991). Motor Learning and Performance:from Principles to Practice. Champaign, Illinois: Human Kinetics books.

[18] Schmidt, Richard A. (1988). Motor Control and Learning, A Behavioral Emphasis. Second Edition. Champaign, Illinois: Human Kinetics Publisher Inc.

[19] Seabrook, R., Brown, G. D. A., & Solity, J. E. (2005). Distributed and massed practice: From laboratory to classroom. Applied Cognitive Psychology, 19, 107–122.

[20] Sklorz.(1973). Table Tennis.Translator by Jack Carrington. England.

[21] Suharno HP., 1986. Dasar-Dasar Permainan Bola Voli. Yogyakarta : IKIP Yogyakarta.

[22] Teriola, A. L, Toriola, O. L, Igboke, N. U. (2004). Validity of Specific Motor Skills in Predicting Table Tennis Performance in Novice Players. Journal of Percept Mot Skills 98: 584-586.

[23] Wilmore, J., Costill, D. (2004). Physiology of Sports and Excercise. U.S.A: Journal of Human Kinetics 8: 11-18.