GUSTA Exercise Model: A Tennis Skill for Beginners

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ABSTRACT

The purpose of this research and development is to generate a tennis skill exercise model for beginners. Moreover, this research was conducted to obtain deeper information about the development and application of GUSTA tennis skill model exercise for beginners and to recognize the effectiveness and efficiency of the created model. This research employed a Research and Development research method (R&D) proposed by Borg and Gall. The subjects were the students of Physical Education, Health and Recreation of Universitas Negeri Siliwangi, Tasikmalaya, West Java. Model effectiveness test applied a Modified Timers Forehand and Backhand Volley Test and Hewitt's achievement test to recognize the subject's tennis skill level. The data were analyzed using t test with the significance level of 0.05. The data analysis revealed that the average score of the pretest and posttest were 46.4, and 80.4 respectively, while the pretest standard deviation was 18.98 and 19.22 respectively for the post test. Moreover, the average of pretest and posttest was -34 and the deviation standard was 4.49. The t score was -58.6, significance (2-tailed) 0.000 with significance 0.05. Thus, H0 was rejected. Based on the information above, it can be concluded that the developed GUSTA exercise model, tennis skill for beginners was effective and could improve tennis skill for beginners.

Keywords: Model, Tennis, and Beginners

INTRODUCTION

Physical fitness is important for human life as it allows people to perform a productive life and adapt to physical loads. According to Widiastuti & Pd (2011), physical fitness is a physical condition describing physical ability, or somebody's ability to perform certain jobs well without suffering from fatigue.

Physical fitness could be improved by engaging in sports, both recreation, education, and achievement (Nomor, 3AD). Sport does not only improve physical fitness, but also make the nation famous. Sports are a part of daily life that could not be separated, and is a part of community, also one of the important physical needs for human life.

According to (No, 14AD), teacher is a professional whose main job is to educate, teach, supervise, direct, train, assess, and evaluate the students of early children education in both formal, basic, and secondary education. Based on the definition mentioned above, it can be concluded that training is one of the abilities that should be mastered by a teacher in supervising and directing students who are potential in sport achievements by conducting extracurricular activities at school.

According to Tangkudung & Wahyuningtyas (2012), exercise is a systematical process that should be done repeatedly, and the load should be more intense day by day. In developing athletes' skills, scheduled exercises are required in addition to other factors, such as physical and mental conditions, technique, tactics, etc.

Basic technique is a process to develop skills and proof a practice as good as possible to finish certain task in any sports. Basic techniques in tennis court include forehand groundstroke, backhand groundstroke, forehand volley, backhand volley and service. Moreover, tactics is also important, since it is a strategy or mindset about how to apply conquered techniques in playing to defeat the rival supportively to win the game. In other words, tactic is a strategy used to break the rival's defense supportively based on an athlete's capability.

In addition, mental match, as one of the psychological factors, plays an important role for an athlete to win a match. Increasing or declining athlete performance is largely determined by the mental readiness of athletes, and then also determined by the athlete's mental match endurance. It was more realized that personality traits and psychological abilities play important roles in increasing the athlete's performance. Mental readiness could be improved by conducting mental skill training, or skills that prepare people to bear the mental burden. Mental burden can take in the form of obstacles that come from the athlete himself; and from outside such as lack of confidence, feel not ready to do the match, overcome emotional turmoil, audience pressure, and so on.

Tennis is one of the open skill sports. The game conditions are always changing; this makes tennis included in one type of motor skills. Basic technique mastery has to be given in the beginning of the exercise. Tennis basic skills cover forehand groundstroke, backhand groundstroke, forehand volley, backhand volley and service. Some basic techniques in tennis were taught to the sportsmanship students in order to train prospective teachers or trainers.

Based on the teaching experience in tennis subject at Physical Education, Health and Recreation (PJKR, *Pendidikan Jasmani, Kesehatan, dan Rekreasi*) Study Program, FKIP, Universitas Siliwangi, Tasikmalaya, West Java, the fifth semester students are obliged to take tennis subject. The followings are some findings based on oral questions in every beginning of the lecture each year: 1) no more than 2% of the students ever played tennis before college; 2) 98% of the students have not recognized both basic techniques and the role of tennis game. 3) 98% of the students taking tennis subject had first experience on holding the racket and tennis ball when introduced by the lecturer; 4) Based on the final exam, the average score of tennis basic techniques subject was only around 40 and 50%.

Based on those four findings, students taking tennis subjects were categorized as beginners. It is not beginner in terms of the age, but stage of skills due to their first time experience in recognizing and learning tennis and its stage of skills.

The observation reveals that some tennis coach in certain regions did not prioritize systematic basic techniques in teaching tennis because for them, the most important thing is to hit the ball to the court and make points. In the beginning,

the trained beginner players could master backhand but many of the trainers did not notice the way players held the racket, feet position when hitting the ball, body position, swinging the racket back, applying the ball with the racket until the final stroke. All of those sets should be conquered by the beginners, so that it could be developed based on the function of body anatomy.

It has been observed that the given exercise models were not varied hence causing lack of understanding in: (1) developing basic technique of tennis; (2) understanding the movement and basic technique of tennis; (3) feeling comfort and security in doing tennis exercise; and (4) resulting optimum tennis exercise

Need analysis has been conducted by doing field observation during the exercise on the tennis court. The wrong basic movement would make the next movement difficult to develop. For example, in the 1990s, the tennis coaches provided a basic stroke technique using a flat type. If the movements were divided, then it began in a ready position. Turning the waist towards the forehand followed by the shoulder on the first count. On the second count, the hands holding the racket swinging backwards with the racket head stay perpendicular and elbows bent. Finally, on the third count, shift the opposite leg with the hand holding the racket forward and the count of four rackets were swung forward with the ball being aligned with the foot in front. The final movement was standing up straight, the hand holding racket stay perpendicular, and the racket head was front of the head. In today's development, the coaches directly teach western grips, which is suitable for top spin hit. It means that the coach teach one type of ground stroke, namely spin or top spin. The weakness of this technique is that the player would find it hard when receiving low bounce under the knees. It is different to an athlete who learns tennis for the first time with a simple basic movement set with flat hit, either forehand or backhand ground stroke. By conquering those basic movements, it is easy for the athlete to develop into spin or top spin hit. Based on those two examples, in fact, the ball's height and rotation coming from the rival always changes, so that the ball return should adjust; it does not always employ spin or flat hit, but depends on the coming ball's height and spin. A good athlete or player has to conquer various hits, not only one of them.

Need analysis in this research was aimed at developing basic techniques exercise models for beginners, namely the students of PJKR FKIP *Universitas Negeri Siliwangi Tasikmalaya*, who took tennis subject. In the end, these models were expected to enrich knowledge about sports achievement, especially tennis exercise in colleges. Helping the process of delivering materials to students and helping the process of mastering tennis skills for students effectively and efficiently allow the students to not only become an educator but also a trainer after graduating. According to Bompa, an exercise model is a continual and fluctuating long term process because it would develop in terms of the athlete's development. Model development is an intensive process related to the previous model (Bompa & Buzzichelli, 2018). A model is an imitation from of the original aims at obtaining something ideal by taking into account the potential physiological factors, facilities, and social environment. Exercise is a systematic and long term sport

activity, improved step by step and personally to form humans who function physiologically and psychologically to fulfill task guidance (Sukadiyanto & Muluk, 2011).

In this present research, an initiative was taken to give naming to the development of exercises developed under the name of GUSTA model of tennis practice to develop tennis skills training for beginner. Considering the abovementioned background, this research is entitled *GUSTA Model Exercise: Tennis Skills for Beginners*.

METHOD
Research Place and Time
The research was conducted at Department of Physical Education, Sports, and Health, FKIP Universitas Siliwangi Tasikmalaya in three months. This research and development, which refers to that of Borg and Gall, was done with the following set of activities: (a) Need analysis, (b) Model development plan, (c) Exercise model design development, (d) Expert validation and model revision, (d) Small group trial and revision, (e) Court trial and revision, (f) Effectiveness trial and revision, (g) Dissemination. As explained by Nusa, research and development is a term used to describe some activities related to creation or new invention, method, and new products or new services by employing new knowledge discovered to fulfill market needs or demand (Putra, 2012).

Approach and Research Method
According to Sugiyono (2008), there are some educational products, such as specific curriculum for certain education needs, exercise method, exercise media, textbooks, module, educators' competence, evaluation system, competency test models, classroom arrangement for certain exercise, etc.

The approaches used in this research were qualitative and quantitative, which allow to solve problems based on the formulation of the problems mentioned in Chapter I, namely *GUSTA*, a tennis skill exercise model for beginners. The research and development is this exercise employed a *Research & Development (R &D)* models suggested by Borg and Gall, which consists of ten steps (Gall, Borg, & Gall, 1996).

The first step done in this research was conducting a preliminary research, namely analyzing the development needs and preliminary observation about tennis exercise for beginners. The observation was done by monitoring the process of tennis exercise for the students of Physical Education, Sports, and Health Department of Universitas Siliwangi, Tasikmalaya. The development of tennis exercise models was expected to improve tennis ability for beginners.

The second step was a model development planning. An outline of the planning of the tennis skills training model is as follows: (a) GUSTA exercise model by combining various movements, (b) GUSTA exercise model by combining the elements of physical exercise, (c) GUSTA exercise model with various distance, (d) GUSTA model exercise with target, (e) GUSTA model exercise, both individually and in pairs, (f) GUSTA model exercise with games, (g) GUSTA model exercise which was arranged with the part and whole concepts,
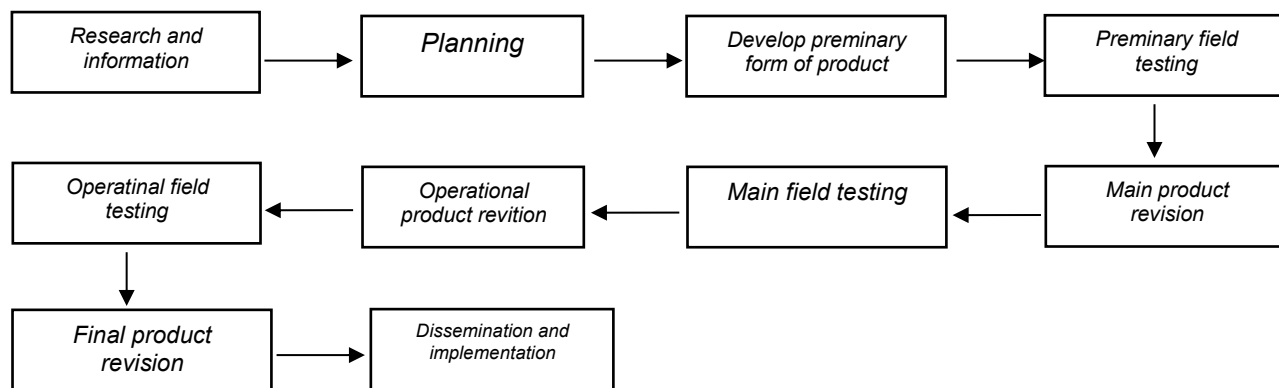
Figure 1. *Instructional Design R and D*

(h) GUSTA model exercise from the basic level, variation, combination, and movement complexity, (i) GUSTA model exercise with a drill approach, and (j) GUSTA model exercise by combining physical component formation exercises. **The third step** was conducting Design Validation, Evaluation, and Model Revision. Experts involved in this R and D research were those in the field of tennis, motion learning experts, and development experts. The result of experts' evaluation was made insight in perfecting the design of GUSTA tennis skill exercise model for beginners, before being examined to the small group. **The fourth and five steps** were try-out and field try-out.

Implementation Model
The next step was effectiveness test. This test aims at (1) investigating whether the model design has been applied properly, and (2) knowing how effective the result of model application towards the aims of this research. Therefore, a quantitative approach was applied to find the effectiveness with pre-experimental research design in the form of the one group pretest-posttest design (Ali, 2012).

Table 1. Research Design in Model Effectiveness Test

Subjek	Pres-Test	Perlakuan	Post-Test
R	O1	P	O2

The research hypothesis on the effectiveness of the developed model was whether there is a significant influence of tennis skills before and after treatment with GUSTA exercise models? The steps taken in this trial were listed as

the followings; (1) determining subjects of the research; (2) conducting *pre-test* (O_1); (3) trying the developed model; (4) conducting *post-test* (O_2); (5) determining and comparing the average score of *pre-test* and *post-test*; (6) determining the difference between the two average scores using a statistical method (t-test) to recognize whether there was a significant effect of using formula model for data processing of whole trial subjects using t-test procedure and using *SPSS 22* application. The applied test instruments have been standardized and have high level of validity and reliability. The followings are test instruments used in the research on the development of GUSTA exercise model of tennis skills for beginners: (1) Forehand and backhand drive ground stroke test (Verducci, 1980), (2) Service test (Verducci, 1980), (3) Voli Forehand and Backhand test (Collins, Kietzman, Sutton, & Shapiro, 1978).

RESULTS
Testing Requirements of Treatment Group Analysis
Data analysis for hypothesis testing in this research employed a parametrical statistics, namely t-test (*paired t-test*). The pre-requisites to fulfill before conducting the t-test are: (1) normality test; and (2) with homogeneity test.

Normality Test
The calculation of a variable normality test of pretest for GUSTA tennis skill exercise model of the students of Universitas Siliwangi Tasikmalaya (X_1) and posttest (X_2) were summarized in the Table 2 below:

Tabel 2. Test results of *pretest* dan *posttest Variables* Normality test

One-Sample Kolmogorov-Smirnov Test				
			Sebelum	Sesudah
N			60	60
Normal Parameters[a]		Mean	46.4000	80.4000
		Std. Deviation	1.89899E1	1.92285E1
Most Extreme Differences		Absolute	.143	.140
		Positive	.143	.140
		Negative	-.083	-.091
Kolmogorov-Smirnov Z			1.104	1.088
Asymp. Sig. (2-tailed)			.175	.187

Table 2 above shows that the kolmogorov smirnov score was obtained as tennis skills pretest data of Universitas Siliwangi Tasikmalaya students (X_1) was as much as 1.104 with Asymp. *Sig. (2-tailed)* = 0.175 > 0.05, which means a normal distribution model. While the score of *kolmogorov smirnov* for tennis skills post test data of Universitas Siliwangi Tasikmalaya students (X_2) was as much as 1.088 with Asymp. Sig. (2-tailed) = 1.187 > 0.05, which means a normal distribution model. The analysis showed that those two variable data were normally distributed.
The calculation of a variable normality test of pretest for exercise model of the tennis skill control group, the students of Universitas Siliwangi Tasikmalaya (X_1) and posttest (X_2) were summarized in the Table 3 below:

Tabel 3. Test results of *pretest* dan *posttest Variables* Normality test

One-Sample Kolmogorov-Smirnov Test				
			pre	pos

N			60	60
Normal Parameters[a]		Mean	39.3500	56.7167
		Std. Deviation	1.62406E1	1.57244E1
Most Extreme Differences		Absolute	.119	.115
		Positive	.119	.115
		Negative	-.098	-.057
Kolmogorov-Smirnov Z			.920	.891
Asymp. Sig. (2-tailed)			.366	.405

Table 3 above shows that the kolmogorov smirnov score was obtained as tennis skills pretest data of UNSIL students (X_1) was as much as 0.920 with Asymp. *Sig. (2-tailed)* = 0.366 > 005, which means a normal distribution model. While the score of kolmogorov smirnov for post test data of UNSIL students' tennis skill (X_2) was as much as 0.891 with Asymp. Sig. (2-tailed) = 0.405 > 0.05, which means a normal distribution model. The analysis showed that those two variable data were normally distributed.

Variant of Homogeneity Test

Statistics analysis employed to examine the variant homogeneity is an F Test (Levene's Test for Equality of Variances). The analysis result on GUSTA group was presented briefly in the following table:

Tabel 4. The result of GUSTA Varian Homogeneity Test

Test of Homogeneity of Variances			
Levene Statistic	df1	df2	Sig.
2.845	14	24	0,12

Based on the summary of the homogeneity mentioned above, it was found that Sig = 0.12, which was larger than the significance level of 5%, shown by Sig > 0.05. Since the Sig = 0.12 > 0.05, it can be concluded that there was not any difference between data variants of pretest and posttest of tennis skills of Universitas Siliwangi Tasikmalaya, which means homogeneous.

Statistics analysis employed to examine the variant homogeneity is an F Test (*Levene's Test for Equality of Variances*). The analysis result on control group was presented briefly in the following table:

Tabel 5. The result of Conventional Varian Homogeneity Test

Test of Homogeneity of Variances			
Levene Statistic	df1	df2	Sig.
2.845	14	24	0,10

Based on the summary of the homogeneity mentioned above, it was found that Sig = 0.10, which was larger than the significance level of 5%, shown by Sig > 0.05. Since the Sig = 0.10 > 0.05, it can be concluded that there was not any difference between data variants of pretest and posttest of tennis skills of UNSIL students, which means homogeneous.

Discrimination Test (t-Test)
Average Score
Tabel 6. GUSTA Average Score

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error
Pair 1	*Pre Test*	46.4000	60	18.98992	2.45159
	Post Test	80.4000	60	19.22851	2.48239

Based on the output using SPSS 22, it was found that the average score of tennis skill before given tennis skill exercise model was 46.4, and 80.4 respectively after the model was given. It means that there was an improvement of the average score of tennis skill in the treatment group.

Tabel 7. Conventional Average Score

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pre	39.3500	60	16.24059	2.09665
	pos	56.7167	60	15.72442	2.03001

Based on the output using SPSS 22, it was found that the average score of tennis skill before given tennis skill exercise model was 39.3 and 56.7 respectively after the model was given. It means that there was an improvement of the average score of tennis skill in the control group.

Correlation Coefficient

Tabel 8. Result of GUSTA correlation coefficient

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	*Pre Test & Post Test*	60	.972	.000

Based on the output result mentioned above, it was found that the tennis skills coefficient before and after given tennis skill exercise model was 0.972 with p-value of 0.00 < 0.05. Thus, it could be concluded significant.

Tabel 9. The Result of Conventional Correlation Coefficient

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	*pretest & postest*	60	.973	.000

Based on the output result mentioned above, it was found that the tennis skills coefficient before and after given tennis skill exercise model was 0.973 with p-value of 0.00 < 0.05. Thus, it could be concluded significant.

a) **Group Discrimination Significance Test**

Tabel 10. The Result of GUSTA Significance Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	*Pre Test - Post Test*	-3.40000E1	4.4910	.57979	-35.160	-32.83	-58.64	59	.000

(Header: "Paired Samples Test" spans the table)

The discrimination significance test with SPSS 22 obtained the t-count = -58.64, df = 59, and p-value =0.00 < 0.05, which means that there was a significant difference between tennis skill before and after given GUSTA exercise model tennis skill for beginners.

Tabel 11. The Result of Conventional Significance Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	*pretest - postest*	-1.73667E1	3.76409	.48594	-18.33903	-16.39430	-35.738	59	.000

(Header: "Paired Samples Test" spans the table)

The discrimination significance test with SPSS 22 obtained the t-count = -35.73 db = 59, and p-value = 0.00 < 0.05, which means that there was a significant difference between pretest and posttest.

Variant of Homogeneity Test
Statistics analysis employed to examine the variant homogeneity is an F Test (Levene's Test for Equality of Variances). The analysis result was presented briefly in the following table:

Tabel 12. The result of Varian Homogeneity Test

Test of Homogeneity of Variances			
Levene Statistic	df1	df2	Sig.
2.845	14	24	0,10

Based on the summary of the homogeneity mentioned above, it was found that Sig = 0.10, which was larger than the significance level of 5%, shown by Sig > 0.05. Since the Sig = 0.10 > 0.05, it can be concluded that there was not any difference between data variants of pretest and posttest of tennis skills of UNSIL students, which means homogeneous.

**Figure 2.** Effectiveness Bar Chart (Treatment Group)
Figure 3. Effectiveness Bar Chart (Control Group)
Based on the information above, it could be concluded that the treatment group given, the GUSTA exercise model tennis skills for beginners, could develop and improve tennis skills for beginners more effectively compared to that of the group that was not given GUSTA model or conventional model.

DISCUSSION
Product Completion
Based on the obtained number of effectiveness test, it could be concluded that GUSTA exercise model of tennis skills for beginners was appropriate to be applied in tennis skill exercise for beginners, and was effective to improve tennis skill. The results of the research that are relevant with the development of exercise model were listed as follows: First, research and development by Kusworo (2016), which is entitled *Groundstroke model exercise for beginners*. His research focused on groundstroke skills by using a multilateral approach, where the development result created innovation and update towards groundstroke model exercise for beginners, and it was effective to improve groundstroke skill of the beginner athletes. Second, Gontara (2016)
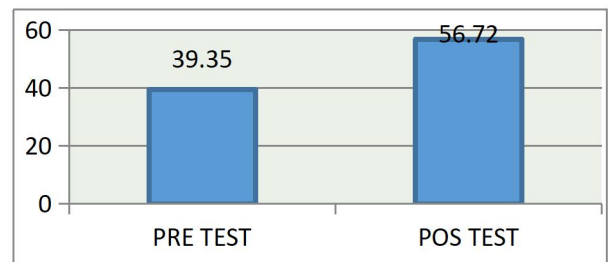
conducted research entitled *Groundstroke Forehand Learning Model of Circuit Based Tennis for Beginners.* His research generated a product in the form of learning model, namely *Groundstroke Forehand Circuit Based Tennis for Beginners*, a circuit based learning with several learning models, consisting 10 circuits. This research produced model of data effectiveness developed by conducting pretest and posttest. Second, a research conducted by Sulistyowati (2014) entitled *Exercise Model of Dribbling Basket Ball for Beginners*..
Considering the strength and weakness of the product, there
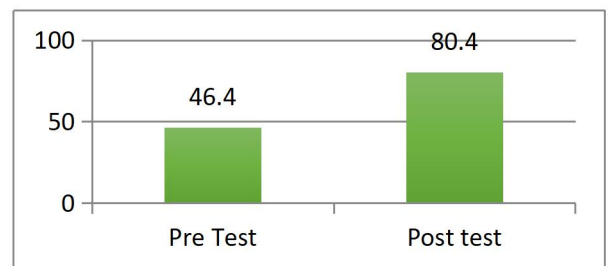
are several recommendations for product completion, which were listed as the followings:
a) Since it was a model, a movement adaptation is required towards the participants, as well as practice subject to arrange the movements.
b) A lot of repetitions would help to conquer tennis skill movements.
c) Pay attention to safety factors when doing exercise to stay secure and avoid injury when doing exercise.

Product Discussion

GUSTA model exercise of tennis skills for beginners, which was developed and created in this research, is a product whose aim was to assist coach, lecturer, and teacher in training tennis skills, and as an exercise model reference. GUSTA model exercise of tennis skills for beginners was made based on the needs in practicing activities.

After being examined, this product has several strengths and weaknesses that should be improved. Some strengths of this product are as follows:

a) As a reference of tennis exercise model for beginners;
b) Combination of various movements;
c) The movements starts from the easiest to the hardest;
d) In various movements, it combines skill and physical practice; among others are coordination between eyes and hands, balance, strength, speed, agility, and body defense.
e) The students are passionate in conducting exercise;
f) Getting more passionate about listening to the trainer's instructions;
g) The developed GUSTA model exercise is effective and efficient in terms of time and cost;
h) Assisting coach in improving movement mastery; and
i) Contributing to the science and knowledge especially tennis training.

Meanwhile, some weaknesses of the product are:

a) Field trial of this research would be better if it was done in the larger scope;
b) The product used is still developing;
c) Facilities and infrastructure used are still limited; and
d) The explanation and regulation of GUSTA exercise model of tennis skill for beginners have some rooms of improvements.

CONCLUSION

Based on the data obtained, the result of field trial, and discussion of research result, it can be concluded that:

1. GUSTA model exercise of tennis skill for beginners could be developed and applied in tennis exercise.
2. From the developed GUSTA model exercise of tennis skill for beginners, it was obtained the effectiveness data and the result of GUSTA exercise model development of tennis skills for beginners was able and appropriate to be applied in tennis exercise.

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