Tennis training model to improve groundstroke skills in children

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ABSTRACT

The purpose of this study is to develop an effective training model for practising basic tennis groundstrokes for children aged 8-12 years old based on the action method coaching framework. Adopting the research and development stages as suggested by Borg and Gall (2003), this study included such stages as conducting preliminary research, identifying the theoretical bases for the model, designing the model, developing the components of exercises, and validating the finished model. The present study employed several methods including in-depth interviews, literature studies, as well as Delphi method to seek experts' judgement. The data were analyzed by considerations of data reduction and thematic coding before the results were presented and conclusions were drawn. Additionally, this study also incorporated some close-ended questionnaire items and analyzed them by means of descriptive statistics to further confirm the findings. The findings suggest that the groundstroke training model based on the action method developed is declared feasible and approved for future small-scale field testing.

Keywords: training model, tennis forehand, tennis backhand, basic tennis groundstrokes, action method

INTRODUCTION

Forehand and backhand groundstrokes are the basic techniques in tennis which are the most difficult for children to learn, especially those aged 8-12 years, but these techniques are the first basic techniques of playing tennis to be trained. These two techniques are the first and main basic stroke techniques that must be mastered by a child before they can master other basic stroke techniques. Therefore, this forehand and backhand groundstroke must be taught from the beginning for someone who will learn to play tennis because these two tecniques are the dominant in tennis (Risa et al., 2020; Ngatman, 2020). Cam et. al. (2015) stated that based on the results of computer statistical analysis reporting from the quarter-finals to the semifinals during the tournament tour in 2005 (the results of a series of championships at the Australian Open, Dubai Open, Doha Open and China Open) the world's top tennis players such as; Federer, Nadal, Agassi, Hewitt, Roddick, Coria, Davydenko, Ljubcic, Ferrero used more forehand techniques by 37.78% and backhand groundstroke 48.7% of the total game. Looking at the results of the statistical records, it turns out that 86.48% of the forehand and backhand groundstroke are very dominant techniques used in tennis. Nevertheless, the reality often coaches find it difficult to practice both techniques. Based on observations when observing the training process at tennis schools throughout in the Yogyakarta Province some of the problems faced by the coaches include: the ability to master the methods of coaches in tennis schools concluding basic technical teaching is still lacking, the level of understanding of coaches in tennis schools on the level of basic technical ability possessed by the trainees, the lack of knowledge and level of understanding of coaches in basic technical models which corresponds to the actual situation of tennis, beside coaches doesn't understand the condition of each individual in providing training so that the trainees faced difficulties in learning basic forehand and backhand groundstroke.

Referring to the problems above, the authors observed the process of practicing at several tennis associations and tennis schools in the Yogyakarta Province. The author sees several coaches practicing forehand and backhand groundstroke with the same training model for all age levels of tennis players (children, teenagers, adults, and the elderly) regardless of their level of basic technical ability, the training models they use given to trainees is less in accordance with the actual situation of playing tennis, when children practice forehand and backhand groundstroke in several tennis schools, the percentage of failure is still very high. The next fact that is found is that the trainer does not understand the condition of each child being trained in practicing the basic forehand and backhand groundstroke so that the child has difficulty learning these two techniques.

Exploring the problems above, the author proceeds by conducting a needs analysis by distributing questionnaires and conducting interviews with 10 coaches from tennis schools in Yogyakarta Province. From the analysis of needs obtained results: (a) in the opinion of the coaches a new method is needed, especially in practicing basic forehand and backhand groundstroke that are in accordance with the characteristics of the real tennis playing situation especially for children aged 8-12 years with a percentage of 20% in need and 80% in dire need (b) opinion about the need for an exercise model in training basic forehand and backhand groundstroke with an action method approach, the coaches stated that 30% needed and 70% said they really needed it, (c) the trainer's opinion about the need for a basic forehand training model and backhand groundstroke which is in accordance with the characteristics and basic movement abilities, the trainer's opinion states that 10% need and 90% really need it.

An exercise model that is in accordance with the child's basic skill movement is fundamental and indispensable in the game of tennis. This is because the game of tennis requires complex basic movement skills. According to Bahri et al. (2021), there are two main variables that affect movement skills, namely: (1) environmental variables which consist of: feedback sub-variables, training conditions, and (2) individual variables which consists of the sub-variables of perceptual skills and motor skills. Furthermore Bahri et al. (2021) stated that there are other variables that can affect movement skills, such as: motivation, combination of holistic and partial learning methods, transfer of skills, training conditions, feedback, reinforcement, and individual differences. Thus, it is necessary to develop basic movements as early as possible for training children. A similar view was expressed by Lestari and Ratnaningsih (2016) who said that children's motor skills should be optimized as early as possible because in addition to playing an important role in the interaction process, it also helps various other aspects of development. One way that can be used to develop children's motor skills are: innovative training models or game modifications. In this stage of developing athletes at the age of children and juniors, it is very important to develop basic movement elements about physical and psychological attributes. Skills that are important during this phase of training include natural movements such as running, jumping, and throwing. If we pay attention to these natural basic movements are widely used in tennis. Based on this opinion, it can be concluded that it is important for children aged 8-12 years to learn the basic forehand and backhand groundstroke techniques.

Basic movement development for children aged 8-12 years can simply be done through training models with an open skill system. The training model with an open skill system through teaching the right technique combined with a tactical approach will familiarize children with learning to solve problems in dealing with situations and environmental conditions that are always changing according to the characteristics of the sport. This is in line with the opinion of Kolman et. al. (2018) which says that teaching tennis that prioritizes a tactical framework system if trained from the beginning children learn to play tennis, it will help train children to form knowledge structures that can help improve tennis performance. Based on the characteristics of the tennis game, in training tennis in children, a training method is needed that is in accordance with the characteristics of the tennis game. This basic provision of knowledge and understanding of training methods according to the characteristics of the tennis game and the level of ability of the children to be trained is what a tennis coach must possess.

According to Unierzyski and Crespo (2007) if the coach uses the tennis teaching method by considering the special characteristics of the game, it will have several advantages, including: (1) it will be a structuring catalyst in the application of strategies and tactics from the beginning of learning to play tennis, (2) can improve the overall performance of players because it directly combines tactical awareness and execution of skills (technical mastery), (3) accuracy of hitting tennis players in decision making, and (4) having a higher level of specific knowledge than tennis players who are trained using traditional methods. This opinion is also in line with what was conveyed by Wright et. al., (2005) who said that training using modified real game situations would engage students cognitively, stimulate student interest, allow students to play more games, and give students the opportunity to transfer concepts from one game to another. One of the appropriate training methods to meet the demands of these criteria is the action method. According to Crespo (1998) the action method is a tennis teaching method that provides a framework for integrating and developing each stage of the open skill process. The open skill process consists of: perception, decision, execution, and feedback. Actions method is a tennis teaching method that focuses on learned centered. The advantages of using the actions method in teaching the basic techniques of tennis according to Turner (2003) are: beginner tennis players, especially those under the age of 12 who are taught/trained using the tactical-based action method, have shown a better performance in hitting punches and making decisions on the ball while playing tennis. In line with this opinion Zetou et. al. (2014) said that a 12-year-old tennis player who is trained based on a real tennis game situation will not only develop motor skills but also inculcate simple tactics and strategies in playing tennis.

Based on the description of the background of the problem and needs analysis as described above, the author has the basic idea of research as a solution to solve these problems. As an answer to the problems above, the author creates a concept to develop a basic forehand and backhand groundstroke training model based on the actions method for boys aged 8-12 years in tennis.

METHOD

The research and development method of Borg and Gall (2003) is used in this study consists of three stages of activity, namely: (1) conducting preliminary research, (2) drafting the model, and (3) validating the draft exercise model that has been designed. The research is carried out using activities, including: conducting preliminary research to observe the conditions of training carried out in tennis associations/schools throughout the Yogyakarta Province, the need for an effective training model to teach basic forehand and backhand groundstroke techniques, and literature studies to get the basics. theoretical basis to develop an exercise model that is relevant to the characteristics of tennis and children's motor skills. The preliminary study used as the basis for developing the training model was carried out through interviews with coaches in tennis associations on the training models that had been used so far, providing questionnaires to tennis coaches throughout the Yogyakarta Province. Ten coaches were selected as respondents to be given a questionnaire and followed by in-depth interviews. The basic technique training model developed refers to the opinion of Crespo and Reid (2009) by considering the stages of perception, decision, execution, and feedback from the open skill process to practice basic forehand and backhand groundstroke techniques in tennis. The expert validation stage uses the Delphi technique where experts provide assessments, suggestions, and input on the developed model through filling out a questionnaire that has been provided by the researcher.

The model development phase begins with the researcher collecting initial data. This stage starts from identifying needs, conducting theoretical and empirical studies to take an inventory of various aspects so that the products produced are in accordance with the needs and problems. Researcher conduct analysis and collect information related to the exercise model to be developed. The next stage is to develop the initial product draft. Expert validation to review the exercise model developed is carried out by related sports coaching experts, including: (1) field tennis experts, (2) motor learning or motor development experts, (3) exercise planning experts, (4) game learning experts, and (5) expert coaches in tennis. The purpose of expert validation is to obtain input on the product draft of the training model developed so that it is of high quality,

accepted by the audience of users, and the level of effectiveness of the model. The results of expert validation were analyzed using the *CVR* (*Content Validity Ratio*):

$$CVR = \left[2\, \frac{Mp}{M} \right] - 1$$

Information:
Mp = $\sum$ experts who give good grades (evaluation $3 - 4$)
M   = Number of experts
1   = The results of the experts
(Kutlu et. al. 2014)

FINDING AND DISCUSSION

Findings

The basic forehand and backhand groundstroke technique training model based on the actions method is an exercise model that can develop perception, decision, execution, and feedback abilities that are indispensable in playing tennis. These four abilities if simultaneously trained from the start when teaching forehand and backhand groundstroke techniques will provide convenience and effectiveness to improve tennis playing skills.

Preliminary study

Tennis coaches in tennis schools have the same view of the components that affect the performance of tennis players in order to achieve optimal performance, including: technique, tactics, physical, and mental. The four components in the view of the coaches must be a single unit that can simultaneously contribute to improving the performance of a tennis player aged 8-12 years. Tennis coaches have the right view of the paradigm of the long-term athlete coaching concept. However, technically it cannot describe in detail the goals that are the goals at each level of long-term development based on the age group of players. In general, tennis coaches aged 8-12 years have not been able to describe the targets for the technical, tactical, physical, and mental components that will be carried out from each stage in the long-term athlete development process. Tennis coaches agree on the concept of long-term coaching at the learning to train stage on developing technical skills and inculcating simple tactics in playing tennis. Instilling playing techniques for children aged 8-12 years is a very vital foundation for tennis players to be able to develop advanced technical skills that are more complex so that there is no stagnation in the abilities of tennis players at the above age level. Planting play tactics also needs to be done in the early stages of training children to learn techniques for the first time. This is because cultivating the application of playing tactics will hone the thinking skills of children who train in the accuracy of decision making when playing or competing. The coaches assume that long-term coaching of athletes can not only help the growth and development of athletes but also avoid premature peaks of achievement and the emergence of boredom in athletes.

The real condition of the training process in tennis schools in the Yogyakarta Province has been done but the training but not done well. The training carried out is not planned systematically. The curriculum used by tennis schools is not well organized, the training program given to training children is not well structured, and the majority of the training methods used are still using the conventional approach. Periodic evaluation of the progress of the skill level of the trained children has also not been carried out. Seeing the real condition of the training that has been carried out, it is necessary to arrange the coaching program in a targeted and well-planned manner so that the achievements obtained can be maximized. Based on the results of interviews related to the coaching conditions for tennis players aged 8-12 years, 8 coaches (80%) said it was not good, 2 coaches (20%) said it was good. Based on this opinion, it is necessary to organize the coaching and training process so that it becomes more systematic and programmed.

According to the perception of the coaches from 10 respondents, 9 coaches said they were **not good** (90%), while 1 trainer said (10%) was **good**. Thus, it is necessary to innovate tennis teaching methods for children aged 8-12 years so that tennis training methods can facilitate learning the basic forehand and backhand groundstroke techniques in playing tennis to be easier and more

fun for children to train. The coaches also expect that the training methods used in teaching the two basic techniques are adapted to the child's basic movement abilities. The opinion of tennis coaches aged 8-12 years in tennis associations/schools throughout Yogyakarta Province about the need for basic forehand and backhand groundstroke training models in developing the perception ability of trained children obtained results of 50% **really needing** and 50% **needed**. The coaches assume that training models to hone the ability to analyze situations, read the ball's trajectory, the ability to control the ball, and the right positioning before making a shot should be trained from the beginning to children aged 8-12 years when learning basic forehand and backhand techniques for the first-time groundstroke. Therefore, this child's perceptual ability needs to be honed through training models gradually so that children can train to have sharpness in reading game situations. Opinions of tennis coaches aged 8-12 years in tennis schools throughout Yogyakarta Province about whether a basic forehand and backhand groundstroke training model is needed that can develop the students' decision-making abilities. Decision making is one of the most vital and necessary skills in playing tennis. Based on the results of interviews related to whether or not the training model for this decision-making ability, the coaches stated that 60% **really needed** it and 40% **needed it**. The coach assumes that in making a stroke it is necessary to have the ability to make decisions as quickly as possible according to the characteristics of the tennis game. Therefore, the basic forehand and backhand groundstroke training model for children aged 8-12 years that is developed should facilitate the training children to be able to practice sharpening skills in decision making. As well as the ability to develop perception and decision, the ability to develop in every stroke is also an important element in the game of tennis that must be instilled in children to train from the start. Based on the opinion of the tennis coaches of the tennis associations/schools in the Yogyakarta Province, 40% **really needed it** and 60% **needed** the basic forehand and backhand groundstroke technique training models that are able to hone the ability to hit according to the decisions that has been made previously.

Feedback ability relates to the ability to evaluate the strokes that have been made. In the game of tennis, especially in performing basic forehand and backhand groundstroke techniques, the ability to get feedback on the results of the stroke is very important for training children. This can be used as feedback to see how far the strokes have been made in or out of the field, the strokes made in accordance with certain targets or targets previously targeted. By looking at the urgency of the feedback ability, it is necessary to carry out each stroke, the training model developed must be able to facilitate in order to be able to hone the feedback skills of the trainees. Based on the trainer's perception, 40% **really need** it and 60% **need** training models that can develop feedback skills. Reception and projection skills are fundamental abilities that must be possessed by children aged 8-12 years in playing tennis. By having these two abilities, it is expected that in every shot, the trained child can justify the ball correctly and be able to develop the right technique of hitting the ball when hitting the target. Therefore, the designed forehand and backhand groundstroke technique training models can hone reception and projection skills. Based on this study, tennis coaches in the Yogyakarta Province stated that 50% really needed it and 50% **needed** it.

The ability to integrate the stages of the open skill process which is the characteristic of the action method is indispensable in performing forehand and backhand groundstrokes. Based on interviews with tennis coaches, the results obtained 50% **really need** and 50% **need**. An approach based on the game when practicing basic forehand and backhand groundstroke techniques will familiarize children with the practice of implementing their techniques into actual playing situations. Based on this concept, 70% of the coaches said they really needed it and 30% needed it. All coaches of tennis schools in Yogyakarta Province stated that they were willing to use the training model veloped by the researcher. This is because the model developed by the researcher is predicted to provide convenience in learning forehand and backhand groundstroke techniques. On the basis of this consideration, the manuscript, product draft document of the stages of the training model is asked for opinions, suggestions, input, and considerations from its main users. Table 1 presents some suggestions, inputs, and considerations conveyed by most coaches of tennis associations/schools in Yogyakarta Province in order to be able to improve basic forehand and backhand groundstroke techniques for children aged 8-12 years in tennis associations/schools with an exercise model that will be developed.

Table 1. Description of the tennis coach's opinion about the training model plan

No.	Description of the suggestions on the draft training model
1.	The training model developed should be made simple and the stages (syntax) of the exercise are easy for the children to train.
2.	A brief description of the terminology of perception, decision, execution, and feedback from the action method is made.
3.	The training model can be done individually or in groups, but it cannot be done with a large number of trained children.
4.	It is necessary to analyse the effectiveness of the action's method (long practice vs skill level).
5.	Further innovation and modification of the basic forehand and backhand groundstroke techniques based on the actions method is needed to make the exercise more fun and exciting.
6.	An easy-to-understand exercise manual book is made to practice basic forehand and backhand groundstroke techniques based on the actions method.
7.	Tennis school coaches in Yogyakarta Province are given video tutorials to practice basic forehand and backhand groundstroke techniques based on the action's method.

Drafting the model

Some theories identified as the basis for developing the basic technique training model. Based on the theoretical framework offered and considering the considerations in designing an effective training model to develop perception, decision, execution, and feedback abilities to practice basic forehand techniques and backhand groundstroke in tennis, the researcher developed a prototype model of the basic forehand and backhand groundstroke technique based on the actions method described in table 2. Next, the researcher designed the stages of the training model which consisted of: eight stages of training in model I, six stages training in model II, six stages of training in model III, six stages of training in model IV, and six stages of training in model V. At the end of each training stage, the children are given a mini game to implement the basic techniques that have just been trained.

Tabel 2. The training model

Forehand and backhand groundstroke basic technique practice training model			
1. Theoretical concept			
1.1. Action method-based training model aims to teach basic forehand and backhand groundstroke techniques through the stages of the open skill process (development of perception, decision, execution, and feedback abilities) to train children to suit the characteristics of the tennis game.			
1.2. The theory underlying this model consists of: training theory, actions method, open skills, motor learning, taxonomy of psychomotor domain, growth and development, and tennis.			
2. Training stages			
In detail, the systematic process, and stages of the I-V stage of the training model to practice basic forehand and backhand groundstroke techniques based on the action's method are carried out as follows:			
Exercise Activities	Content/Exercise Material	Strategy	Time
Warmup	Warm-up activities, consisting of: run around the tennis court 3-5 laps, static and dynamic stretching starting from the muscles of the arms, trunk, and legs, and warming up in the form of games	Guided activities from a coach or assistant coach	10 – 15 minutes
Stage I Exercise	The implementation of the eight stages of the exercise model in stage I and the mini game (designed by the researcher.	Implementing the stages of basic forehand and backhand groundstroke techniques based on the actions method stage I, playing mini games, providing corrections, evaluations and reflections, as well as providing direction and motivation to trainees.	60 minutes
Stage II Exercise	The implementation of the eight stages of the exercise model in stage II and the mini game (designed by the researcher.	Implementing the stages of basic forehand and backhand groundstroke techniques based on the actions method stage II, playing mini games, providing corrections, evaluations and reflections, as well as providing direction and motivation to trainees.	60 minutes

Stage III Exercise	The implementation of the eight stages of the exercise model in stage III and the mini game (designed by the researcher.	Implementing the stages of basic forehand and backhand groundstroke techniques based on the actions method stage III, playing mini games, providing corrections, evaluations and reflections, as well as providing direction and motivation to trainees.	60 minutes
Stage IV Exercise	The implementation of the eight stages of the exercise model in stage IV and the mini game (designed by the researcher.	Implementing the stages of basic forehand and backhand groundstroke techniques based on the action's method stage IV, playing mini games, providing corrections, evaluations and reflections, as well as providing direction and motivation to trainees.	60 minutes
Stage V Exercise	The implementation of the eight stages of the exercise model in stage V and the mini game (designed by the researcher.	Implementing the stages of basic forehand and backhand groundstroke techniques based on the action's method stage V, playing mini games, providing corrections, evaluations and reflections, as well as providing direction and motivation to trainees.	60 minutes
Cooling	Relaxation exercises in the form of static and dynamic stretching to lower body temperature.	Guided activities from a coach or assistant coach	10-15 minutes

3. Social System
    The Social System consists of:
    a. Warm-up activities (including: coaches, assistant coaches, and trainees).
    b. The Core Activities of the Training Model Phases I – V (includes: coaches, assistant coaches, and trainees).
    c. Cool-down Activities (includes: coaches, assistant coaches, and trainees).
4. Reaction Principe
    Instructional activities and interactions between coaches, assistants, and trainees when carrying out the basic forehand and backhand groundstroke technique training models based on the action method stages I – V can be described as follows.

Stages of Exercuse Activities	Coaches Activities
Warmup	The trainer provides an explanation of the exercises, guides the warm-up process so that the trained children are ready to take part in the core exercises of the training model stages I – V.
Stage I Exercise	The trainer guides the eight stages of training that have been designed in stage I, provides individual and group corrections, diagnoses difficulties and errors made by the trainees, provides motivation, and provides mini games at the end of the stage I training session.
Stage II Exercise	The trainer guides the six stages of training that have been designed in stage II, provides individual and group corrections, diagnoses difficulties and mistakes made by the trainees, provides motivation, and provides mini games at the end of the stage II training session.
Stage III Exercise	The trainer guides the six stages of training that have been designed in stage III, provides individual and group corrections, diagnoses difficulties and errors made by the trainees, provides motivation, and provides mini games at the end of the third stage training session.
Stage IV Exercise	The coach guides the six stages of training that have been designed in stage IV, provides individual and group corrections, diagnoses difficulties and mistakes made by the training children, provides motivation, and provides mini games at the end of the stage IV training session.
Stage V Exercise	The coach guides the six stages of training that have been designed in stage V, provides individual and group corrections, diagnoses difficulties and errors made by the trainees, provides motivation, and provides mini games at the end of the stage V training session.
Pendinginan	The coach guides the cooling exercise to return the child's body temperature to normal, closing the exercise by praying.

5. Supporting Factors:
    Situations and conditions needed to implement the teaching/training process, action plans for each meeting, and learning resources in other training processes, such as: handball or mini volleyball, mini tennis ball, tennis ball, stopwatch, wristwatch, whistles, ball baskets, cones, hoops, tennis ball cans, used cardboard and others.
6. The Effect of the Exercise Stages Model:
    a. Direct influence/instructional influence of the planned exercise objectives.
    b. Indirect influence/follow-up impact caused by the learning process and the stages of training given to each model.

Validation stage

The next research stage is expert validation with the Delphi technique. Expert validation is carried out so that the training model designed is ready for field testing. The results of the assessment and suggestions from experts are very important for the refinement of the draft, so that it can be tested in the field. The experts who were asked and willing to validate the draft were the expert appraisers who were selected consisting of experts in Sports Pedagogy, Sports Coaching, Field Tennis Coaching, Academic and tennis practitioner, and tennis coaches. Comprehensively the results of the first round of expert validation are presented in Table 3.

Table 3. Summary of suggestions, inputs, and considerations on the first-round expert validation

No	Suggestions, Feedback, and Considerations
1.	The training model developed at each stage is given a hierarchical description of the picture, for example: picture 1: exercise model ..... , picture 2: exercise model ....., and so on to clarify the stage model carried out by the user.
2.	The training model for stage I (points A and B) explains how to hold the racket, it is better to use numbers 1-8 (according to the number of sides on the racket handle).
3.	Give an explanation of the meaning of the color of the direction the ball is hit, for example: straight or cross.
4.	Add a description that each training model can be done not only on the tennis court but can be done in the courtyard, hall, meeting hall of RT, RW, badminton court, and others.
5.	Add a picture of the trainer's position waiting for their turn to strike to train the group.
6.	Give the direction of the arrow rotation that must be done (to the right or left) after the practice child makes a stroke.
7.	Make a model of the stages that are easy for children to understand and easy for coaches to apply on the tennis court.
8.	Add variations of mini games at the end of each stage of the training model to further hone the students' perception, decision, execution, and feedback abilities.
9.	Provide a systematic allocation of time used for each stage of the exercise model developed, for example: warm-up, core training, mini games, how many minutes each cool-down.
10.	Sentences need to be summarized so that it is easy to understand the meaning. If there is a foreign language term that is a specific language in tennis, it is better to use it than to translate it but it doesn't really convey the meaning.
11.	Add one stage of the training model (stage V) which can develop the ability of the child to train comprehensively to practice the open skill process of basic forehand and backhand groundstroke techniques simultaneously and rhythmically so that the trained child can build awareness if he makes a stroke mistake.

In the second round of expert validation, the researcher asked the opinion of experts to provide suggestions and provide an assessment of the substance of the material and the content of the draft model and the stages of the exercise developed. The results of the validation in the second round, especially in the form of suggestions, are presented in table 5, while the results of data analysis that can be used to identify whether the product of the training model is declared feasible for field testing can be seen in table 4. The questionnaire given to the expert assessors includes two aspects an assessment consisting of 1) The quality of the content of the draft material for the basic forehand and backhand groundstroke technique based on the action method contains 10 statements/questions, 2) The acceptability of the content of the basic technical training model based on the action's method contains 10 questions that must be justified by the expert assessors.

Table 4. Summary suggestions, feedback, and considerations on the second-round expert validation

No.	Expert appraiser's advice on second round exercise model draft
1.	For an explanation of how to hold a racket/grip, should use numbers 1-8 (according to the number of sides on the racket handle).
2.	The movement/rotation of the trained child when making a forward stroke is very varied, so it is necessary to give a direction of rotation after making a stroke.
3.	It is necessary to add a description of the image/image code so that it is easier for users to understand the stages of the exercise through the images displayed.
4.	Warm-up exercises in the form of games at each stage of the training model need to be added to warm-up other forms of play in order to further add to the excitement of the training children.
5.	Add a description of the meaning of the direction of the yellow and red strokes when the child is practicing hitting the forehand or backhand groundstroke.
6.	It should be summarized that the use of sentences that are too long, if there is a foreign language that is specific and clear enough to mean, it can be used instead of being translated, it means that it is not quite right.
7.	It is necessary to provide additional concept definitions and operational definitions of the "Basic Engineering Exercise Model" based on actions method
8.	Add definitions of basic forehand and backhand groundstroke techniques so users can better understand these terms.
9.	Each stage of the exercise model needs to be clarified how many times the frequency of exercise should be carried out.
10.	The stages of the syntax motion need to be clarified so that the user understands each stage of the exercise.
11.	Before the stages of the training model are described, it is necessary to highlight/emphasize the critical points so that users with limited knowledge levels can be helped.
12.	Describe each need for tools used in performing each stage of the exercise.
13.	The game model in the mini game at the end of the training model stage can be complemented by using more varied targets/targets (hoops, cones, reduced targets, score cards, etc.).
14.	It is necessary to pay attention to the steps of the movement stages and an explanation of the developed exercise model.
15	The provision of motion correction needs to be given between stages of the training model.
16.	The color combination settings for each exercise model illustration need to be graded so that the image display becomes more attractive.
17.	It is necessary to add a bibliography to the draft of the developed exercise model.
18.	Add a description of the training zone to the picture when the child is practicing the movement stages so that it becomes clearer.
19.	The flow of the movement so that it is easy for the user to understand the image can be separated between the position of the hitting motion on the right (forehand groundstroke) and left (backhand groundstroke).
20.	It needs to be equipped with an integrated assessment (skill test, performance test, and soft skill test) on the developed training model draft.
21.	Make sure that the basic technique training model developed must be truly open skill, not an exercise model that uses drills.
22.	It is necessary to reaffirm the products developed in the form of training models or training model guidebooks.

Referring to the expert judgments of the first and second rounds, the researcher refined the draft of the forehand and backhand groundstroke basic technique training models based on the actions method and the expert judgments can be used as a basis for deciding whether the exercise

model draft product is declared feasible for field testing. The results of the expert's assessment showed an average value of 4.46 out of 5.00 (89.29%), meaning that the training model design can be declared feasible for field testing.

Table 5. Summary of assessment results from expert appraisers

Aspects Assessed (20 item)	Expert Assesment Results							Average Score
	Expert 1 (V1) Ndaru	Expert 2 (V2) Tomo	Expert 3 (V3) Sis	Expert 4 (V4) Alim	Expert 5 (V5) Hari	Expert 6 (V6) Yovi	Expert 7 (V7) Joko Sur	
Average Score of Each Expert Validator	4,70	4,10	4,30	4,75	4,35	4,30	4,75	4,46
Percentage of Total Score Obtained from Maximum Score	94%	82%	86%	95%	88%	87%	95%	89,29%

Discussion

This study aims to develop an effective training model to train basic forehand and backhand groundstroke techniques based on the action method for children aged 8-12 years. In developing the training model, it is carried out through three stages, consisting of: conducting preliminary research, drafting assessment instruments, and validating the draft training model that has been designed whether the exercise model is feasible to be tested in the field. The main theories that form the basis for developing an exercise model include: exercise theory, actions method, open skills, motor learning, taxonomy of psychomotor domains, growth and development, and theory of tennis.

Exercise is an activity that aims to improve sports skills by using various equipment according to the goals, functions, and needs of the sport (Sukadiyanto & Muluk, 2011: Bompa & Carrerra, 2015). In carrying out exercises to have an impact on improving performance, it must be done through a structured training program. Exercise programs can be made into daily, weekly, monthly, yearly, and long-term exercise programs. In sports coaching at various age levels, the ability of trainees can be improved through planned training and supported by a systematic training program. One of the important tasks of a coach is to develop an exercise program. Without a systematic training programs the coach will not be able to work optimally. The exercise program is generally translated into various daily exercise models tailored to the goals set at each training stage. A good training model is a model that has clear goals and is able to provide convenience for trainee- to do exercises according to the level of motor skills of children. On the basis of these considerations, in designing the training model, it must be guided by the principles of organizing the training process. According to Sharkey (2006) the principles of the training process consist of: 1) readiness, 2) individual response, 3) adaptation, 4) overload, 5) specification, 6) progressive, 7) variation, 8) multilateral development, 9) warming -up and cooling down, 10) long term training. In addition to being guided by these principles, if the coaching is done at a young age (8-12 years) then the sports training activity model must be oriented to the paradigm of long-term athlete development. The coaching phase for children aged 8-12 years is in the final phase of learn to learn towards the learn to train phase (Balyi and Way, 2013). According to Ford et. al. (2011), from the proposed LTAD models, it is important to emphasize that whichever model is used, it must be realized that the most important component of an effective exercise program is the concept of individualization. Any development program must have a holistic approach that includes some of the key interdisciplinary perspectives for the

development of sport in general and tennis in particular. In developing an exercise model, in addition to paying attention to the principles of the training process and the paradigm of long-term athlete development, it must also be supported by the level of accuracy/validity of the model.

In the implementation of one training session at each stage of the basic forehand and backhand groundstroke technique training models based on the action method, they are divided into three, namely: warm-up, core exercises accompanied by mini games, and cool-down. Each stage of the exercise model is carried out by considering the principles of frequency, duration/time, intensity, progressive, and type of exercise (Bompa & Haff, 2009: Bompa & Carrera, 2015). Thus, the training model designed has met the requirements of the training methodology. The process of training in sports including tennis can be described in three situations and conditions. The three conditions consist of: (1) how information is conveyed to athletes, (2) how training is structured, and (3) how feedback is given to athletes. The three questions of the tennis training program must be answered, tested, and ensured its effectiveness to improve their skills when competing in the match (Reilly, 2006). The training model developed aims to provide convenience for children aged 8-12 years in learning basic forehand and backhand groundstroke techniques. Therefore, the material, content, and stages of the training model must consider the theory of learning motion to suit the level of basic movement abilities of the trainees.

Since movement activities carried out by children will affect the development of movement skill competencies, increased movement activity will provide more opportunities for children to experience increased neuromotor development which in turn will develop their basic movement skills (Stodden et al., 2008). The process of mastering movement skills takes place through stages. The critical stage is a stage where movement development must be carried out—if movement coaching is not carried out, the student's movement skills will be late or underdeveloped. It is important to develop basic movement skills at elementary school age (6-12 years). At this time period, the enrichment and development of movement skills should be emphasized. More exposure to basic movements will in turn improve the students' skills in performing other movement skills (Bahri et al., 2016). To be able to learn basic movement forehand and backhand groundstroke techniques, children must go through learning stages or phases. According to Huber (2013) there are three stages of learning, namely: 1) cognitive stage, 2) associative stage, 3) autonomous stage. At the cognitive stage, children try to understand the idea or concept of basic forehand and backhand groundstroke techniques by listening to verbal explanations or seeing movement visualizations. To get the concept of motion that is understood by the trainees correctly, it is necessary to demonstrate the correct basic technique movement model. The demonstration must be clearly observed by the child so that it will be stored in memory. Based on the understanding of the basic technical movement concepts obtained, the child then thinks in the form of a motion plan and the sequence of a series of movements that will be displayed. The movement plan is then carried out in the activity of practicing basic technical movements. At the beginning of the child's practice of movement, cognitive activity is still very dominant in the process of implementing the movement. Thoughts about the concept of basic technical movements are still more dominant than thinking about the implementation of the movements, so that the response to the basic forehand and backhand groundstroke techniques is still not correct and not smooth.

After the child is trained to practice basic technical movements repeatedly, the process of learning motion will enter the associative stage. The associative stage is a stage where in performing movement skills, the concepts that have been stored in his mind are increasingly easy to implement in response to movements. Cognitive activity has been well associated with the response to movement. Thus, the child is easier and more correct in carrying out the concept of basic forehand and backhand groundstroke techniques. Children increasingly master the movement skills learned. By doing the repetition of the movements made, the child will reach the autonomous stage.

The autonomic stage is the culmination of the achievement of movement skills. Children can perform basic technical movements autonomously and automatically. Autonomous movement is a movement that can be done even though at the same time the actor is carrying out cognitive activities other than the movement being carried out. For example, a tennis player can

make a good passing shot while paying attention to the opponent's position in front of the net and looking for an empty area. While the automatic movement is a movement that is done as if by itself. For example, a tennis player who can spontaneously return the ball between the legs. Autonomous and automatic movements can be formed through a process of practice or practice repeatedly over a relatively long period of time (Magill and Anderson, 2013). Repetition of technical skills is needed to solve problems in sports competitions. In the game of tennis, consistency and anticipation of movement is needed because the response to movements made by the opponent is never the same. Repetition of technical skills is required to solve problems in sporting events. A tennis player needs consistency of movement in anticipating the opponent's dynamic movements. In addition to the need for consistent technical ability, movement skills must be as efficient as possible and be done with lots of variety. Although organized training is not the only way to solve problems, organized training can be an alternative solution to improve skills (Myers et al., 2013). Therefore, the movement learning stages are taken into consideration in designing the basic forehand and backhand groundstroke training models that are developed to effectively improve the technical skills of children aged 8-12 years.

Activity sport often has a close relationship between perception and action. To achieve success in sports, athletes need advantages in perceptual abilities, one of which is advanced visual perception (Christenson & Winkelstein, 1988). Visual perception skills are also very necessary in playing tennis because tennis is a sport with fast characteristics such as rockets (Basiri et. al., 2020). Tennis is a sport that falls into the open skill category. Thus, in designing the training model, it is necessary to pay attention to the stages of the open skill process (Crespo & Miley, 1998). The open skill process consists of: 1) perception, 2) decision, 3) execution, and 4) feedback. With an action method-based training model, the training process will provide a framework to integrate and develop each stage of the open skills process. Playing tennis really requires sharpness of perception and anticipation before making a shot. Perception is a tennis player's skill in anticipating (Williams et. al., 2010). Based on the theory of perception of action tennis player must extract a more valuable source of visual information and then use the extracted source to receive information to trigger and initiate the motion system to produce the appropriate reaction (Knoblich & Flach, 2001). Capability to identifying and understanding the characteristics of the arrival of the ball through the speed of reacting or anticipating is very necessary before deciding.

Skills perception is the basis for producing a successful performance and has more practical benefits in sports that use balls with fast characteristics such as tennis. Tennis players must understand and interpret information quickly and in an effective manner so that they have sufficient time to plan, initiate, and perform a successful return stroke (Williams, et. al., 2010). Stimuli are initiated by movement of the body or body parts and carried through afferent pathways to the brain (Harrow, 1977). Therefore, the perceptual ability of the trainees needs to be trained from the beginning to learn basic techniques so that they have anticipatory skills. Each stroke of tennis is always limited by the time to respond to the stimulus and requires the player to extract the most important sources of visual information. In hitting the ball requires continuous eye convergence, assessing ball speed, predicting ball path, fast and saccadic eye movements to detect ball position, eye ability to change accommodative state, ability to adjust hand and eye movements (eye-hand coordination) simultaneously, and detect ball on speed, distance, and visual reaction time (Magil & Anderson, 2013).The relationship between perception and action is very close because the different functional streams of sub-information processing serve perception and action. The ventral stream flowing from the striated cortex to the inferotemporal area is thought to be important for visual perception and object identification. The dorsal stream that runs from the striated cortex to the posterior parietal lobe is responsible for visual control of the actions of Milner and Goodale (1998). By extracting this visual information source, the player will use to anticipate the opponent's movement to take action/stroke quickly.

In the game of tennis, decision making is a cognitive process that results in choosing an option to meet the playing demands of the game situation at hand. Therefore, in designing the training model, it is necessary to facilitate the trainees to develop the decision abilities of them. The decision-making process is based on the demands of the tactical and technical aspects of the

game. In other words, in any game situation, the situation must be evaluated according to the style of play and the style of the opponent being faced (style of opponent). Style of play and opponent of play in tennis consists of styles, namely: 1) players who do not like to take risks, and 2) players who like to take risks. The player then decides "what to do" tactical aspect review) and how to properly achieve what has been decided/technical aspect review (Crespo & Miley, 1998).

The decision-making skills needed to achieve tactical and technical goals are very important in playing tennis because the playing environment is very dynamic. Thus, players must be able to adapt in making technical decisions quickly to changing environmental conditions and difficult to predict beforehand. For example, variables about the ball, such as: speed, direction of trajectory, spin, altitude, distance, or variables about the opponent being faced, such as his position, desire, are all constantly changing. This changing or dynamic playing environment demands a flexible decision-making process and requires a level of player training. Effective decision making can only be developed through matches or in simulated practice situations. However, even by controlled game situations, this dynamic aspect reflects the actual conditions of tennis.

In a playing situation all components (physical, technical, tactical, and mental) of the player are demanded and all influence decision making. For example, physical fatigue can force players to play bravely to take more risks to finish points quickly, or just push/hit the ball to the back (baseline) without using power, anxiety/tension can make players play by taking more or more risks or safe, inadequate analysis of how opponents play can lead players to choose the wrong tactics. Therefore, through various training models and game/match simulations, it is the best training system to teach the right way of making decisions (Novick, 1988a).

After the plan to execute the stroke has been made, the steps that the player must do is to execute the blow (execution). The selected execution is based on the player's skill in using the racket and body so as to obtain comfort and effectiveness according to the game situation at hand. In carrying out execution while playing tennis there are four key terms that must be emphasized in the action method, including: 1) technical action/referring to the method of action, 2) skills(referring to open skills and four player components consisting of: technique , tactical, physical and mental which are the basis of a full understanding of execution skills), 3) game situations (reinforce the key concept of the method of action in which "what to do"/ tactical context and objectives) must be identified before attempting a shot/technically), 4) efficient (identical with conformity/comfort) and effective (refers to success in task accomplishment and is the basis of established goals and the term ball control).

Choosing the right time to provide feedback is very important because feedback is most effective if it is given immediately during the performance. Sometimes the coach will provide feedback before and after a player makes a stroke. Giving feedback in a positive way has clear benefits, but coaches can sometimes give feedback in a negative way. The negative side occurs if it is communicated through the chosen words, the correcting tone is given to the player through body language. It's very easy to fall into the trap of telling the trainees "What not to do" rather than "what to do." For example, "don't use your wrist like that" instead of " try to keep your posture straight/parallel to the ball". The coach must provide feedback in a constructive manner. Constructive feedback will tell the student in a very positive way what he did wrong, how it will affect the player and how the information provided by the coach will be very helpful (Novick, 1988b).

Finally, the model developed is derived from theoretical and empirical data based on observations of several learning processes carried out in several tennis associations/schools that already have an adequate scientific basis. The design developed at this time has a five-step training model that is complete with basic forehand and backhand groundstroke techniques based on the action method, but still needs to be validated by experts and practitioners before field trials. In this regard, Leung (2006) suggested that internal validation be carried out to assess the stages of the model and the substance of the material content of each exercise model. As with internal validity, external validation is needed to strengthen the impact of implementing the model. Therefore, both types of validation have become an integral part of this research and development

to determine whether the design of the forehand and backhand groundstroke based on the action method is valid or feasible to be tested in the field.

CONCLUSION

This research produced a training model which in later stage was declared feasible for small-scale trials. The action method-based basic forehand and backhand groundstroke training model has been designed according to the conditions of the training process that occurs in tennis associations/schools since it is supported by several theoretical studies and research results. Thus, it is hoped that tennis coaches of trainee aged 8-12 years throughout the Yogyakarta Province can implement this action method-based basic technical training model as the training model in tennis schools.

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