Physical Education Theory and Methodology
Теорія та методика фізичного виховання

ISSN 1993-7989 (print)
ISSN 1993-7997 (online)
ISSN-L 1993-7989

Original Scientific Article

Developing a Target Games-Based Long Service Training Model in Badminton for Beginner Athletes

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Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

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Accepted for Publication: February 18, 2025
Published: March 30, 2025

DOI: 10.17309/tmfv.2025.2.13

Abstract

Background. The development of long service skills in badminton is one of the important components to improve game performance. The low variety of badminton long service training models is considered as a problem in training beginner players, which has an impact on the mastery of this technique.

Objectives. This study aimed to develop and determine the effectiveness of a long service training model based on target games in enhancing the long service skills of beginner badminton players.

Materials and methods. The research design used was a research and development method by following the Borg & Gall model, involving ten stages ranging from needs analysis to effectiveness testing. The research subjects were beginner players at the Faculty of Sport Sciences, Medan State University, with a sample of 42 players divided into experimental and control groups. Data collection used a pre-experimental pretest-posttest design. Data analysis was assisted by the SPSS application and used the paired-sample t-test and independent samples t-test.

Results. Based upon the validation results, 18 variations of exercise models were deemed feasible for large-scale trials with an average feasibility percentage of 77 %. These outcomes were obtained after minor revisions based on suggestions to increase the intensity and duration of the exercises. However, the models were overall deemed feasible without significant changes. The results showed a substantial difference between the group using the target games-based training model and the group using the conventional training model ($p < 0.05$). The target games-based training model has proved to be more effective in improving the long service ability of beginner players.

Conclusions. According to the findings, it can be concluded that the target games-based long service training model provides significant efficacy in improving the long service skills of beginner players. This model is also considered feasible to be applied more widely in coaching beginner badminton players.

Keywords: training model, badminton, long service, beginner athletes, target games.

Introduction

Badminton is one of the most popular sports because it is easily played by children, teenagers and adults (Cabello-Manrique et al., 2022). This badminton game can be played using a racket and a small ball called a shuttlecock either in single, double, mixed double or mixed double (Liu et al., 2020). As according to Ardiantoro & Sunarmi, (2020) that badminton is a sport that is favoured by various levels of society ranging from early childhood to the elderly, both men and women. Then according to Soemardiawan et al., (2019) There are many reasons why badminton is popular, for example, it can improve physical and mental health, has a fairly low risk of injury, is easy to play, the rackets used are very durable and most importantly, all ages can play this sport. It can be played by everyone from children to the elderly, both male and female players (Kusnadi et al., 2019). Furthermore, according to Santoso et al., (2019) stated that Indonesia is one of countries which has achievements in world level badminton sports. Indonesia is one of countries which has achievements in world level badminton sports (Sholicha & Wahyudi, 2022).

Achievements in badminton are achieved because athletes can play badminton well. According to Edmizal & Maifitri, (2021) stated that in order for someone to play badminton well, each individual must be able to hit the shuttlecock from above and from below. The types of shots that must be mastered include service, lob, dropshot, long service, netting, underhand and drive (Ma et al., 2021). Thus, long service and dropshot shots are basic techniques that must be mastered by a badminton player or athlete (Singh & Mishra, 2020). As according to Ayuningrum et al., (2021) that this long service also has an important role in singles play.

Long serve shots are often made by players in competing in singles games (Ruslan et al., 2021). This long service shot is difficult for beginners because they have to hit the shuttlecock as high as possible and fall near the back line of the opponent's court (Suryadi et al., 2023). Efforts made by the coach to master this long service shot by practicing long service with difficult targets and individually and alternately (Aini et al., 2023). So, the visible effect of the results of beginner long service shots is still low, and the variety of training models used by the coach is also still minimal, causing boredom and boredom during training (Bimantara et al., 2022). As said Suryadi et al. (2023) stated that for sports activities that have minimal elements of variation will make athletes quickly feel bored in doing so. Boredom in training will be detrimental to the progress of his achievements. Therefore, to eliminate boredom and boredom when practicing while at the same time being able to improve the results of beginner long service shots must have an element of variation in many training models (Ismik, 2022). The variety of training models to be created must also be interesting, easy to implement and can eliminate boredom (Herman, 2019). Variations of training models for long service hitting abilities planned by researchers in the form of training models based on target games (Gultom, 2019). The target game that will be delivered has a new nuance that aims to improve the ability of basic techniques of long service shots for beginner players (Ruslan et al., 2021).

Thus, the variation of badminton long service training model based on target/target games is believed to be suitable to be trained in badminton long service training for students who practice badminton at FIK Unimed. As said Ramadhan & Hidasari, (2020) that there is an effect of target games training on the accuracy of the backhand short serve of badminton extracurricular participants. Likewise according to Hromčík et al., (2019) Target games have an influence on the accuracy of forehand style serves. Thus, the target games-based badminton long service training model can be used as a solution to overcome the above problems. Variations of the training model will be packaged by considering the knowledge and abilities of beginners. Based on this background, this research is focused on researching the development of a target game-based badminton long service training model (target games) to improve the ability of beginner players' badminton long service shots.

Materials and Methods

Study Participants

The target population for this research is all students who practice badminton, especially taking badminton courses. The research subjects for the small-scale test were 12 people and 34 subjects for the large-scale trial. The Effectiveness Trial was 84 subjects consisting of 42 subjects for the experimental group and 42 subjects for the control group.

Table 1. Sample in research

Group	Number of Subjects	Indicator
Small Scale Test	12	1th Semester Students
Large Scale Test	34	1th Semester Students
Experiment Group	42	3th Semester Students
Control Group	42	5th Semester Students

Organization Studies

The design used in this research is the Research and Development (R & D) method (Purba et al., 2024; Tanri et al., 2023). The development of the long service training model is based on 10 (ten) stages, consisting of the results of needs analysis, planning, expert validation, small scale test, small scale test revision, large scale test, large scale test revision, effectiveness test, effectiveness test revision, and dissemination of research results.

In practice, the development of the badminton long service training model developed has 3 stages, namely: (1) an easy category stage training model consisting of 6 training models with floor value and the shuttlecock must pass through a rope stretched 2.05 metres high using 2 (two) poles placed parallel to the front service line; (2) a medium category stage training model consisting of 6 training models with a floor value target and the shuttlecock must pass through a rope stretched 2.30 metres high using 2 poles placed 1.5 metres from the front service line; (3) a difficult category stage training model consisting of 6 training models with a floor value target and the shuttlecock must pass through a rope stretched 2.55 metres high using 2 poles placed 3 metres from the front service line. The following is a picture of the field design in conducting the initial test and final test for long service and dropshot shots.

Instruments

The instrument to test the ability of badminton long service, the researcher uses a badminton long service ability test which is guided by the opinion of the researcher Singh & Mishra, (2020), namely by doing 10 long service shots. In addition, researchers collected data using questionnaires, interviews and documentation.

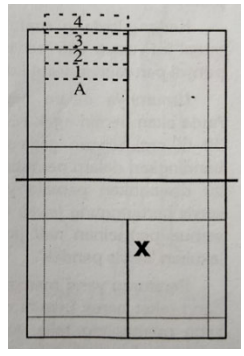

Fig. 1. Initial test and final test for long service

Table 2. Scoring of badminton long service test assessment

Badminton Long Service Test Scoring						
Name	:					
Class	:					
School	:					
Keterangan : Berilah Tanda Centang (√) pada Kolom Nilai Jatuhnya Shuttlecock						
No	**Long Service Test**	**Shuttlecock Fall Value**				**Acquisition Value**
		1	**2**	**3**	**4**	
1	Long Service Test 1					
2	Long Service Test 2					
3	Long Service Test 3					
4	Long Service Test 4					
5	Long Service Test 5					
6	Long Service Test 6					
7	Long Service Test 7					
8	Long Service Test 8					
9	Long Service Test 9					
10	Long Service Test 10					
Total Value						

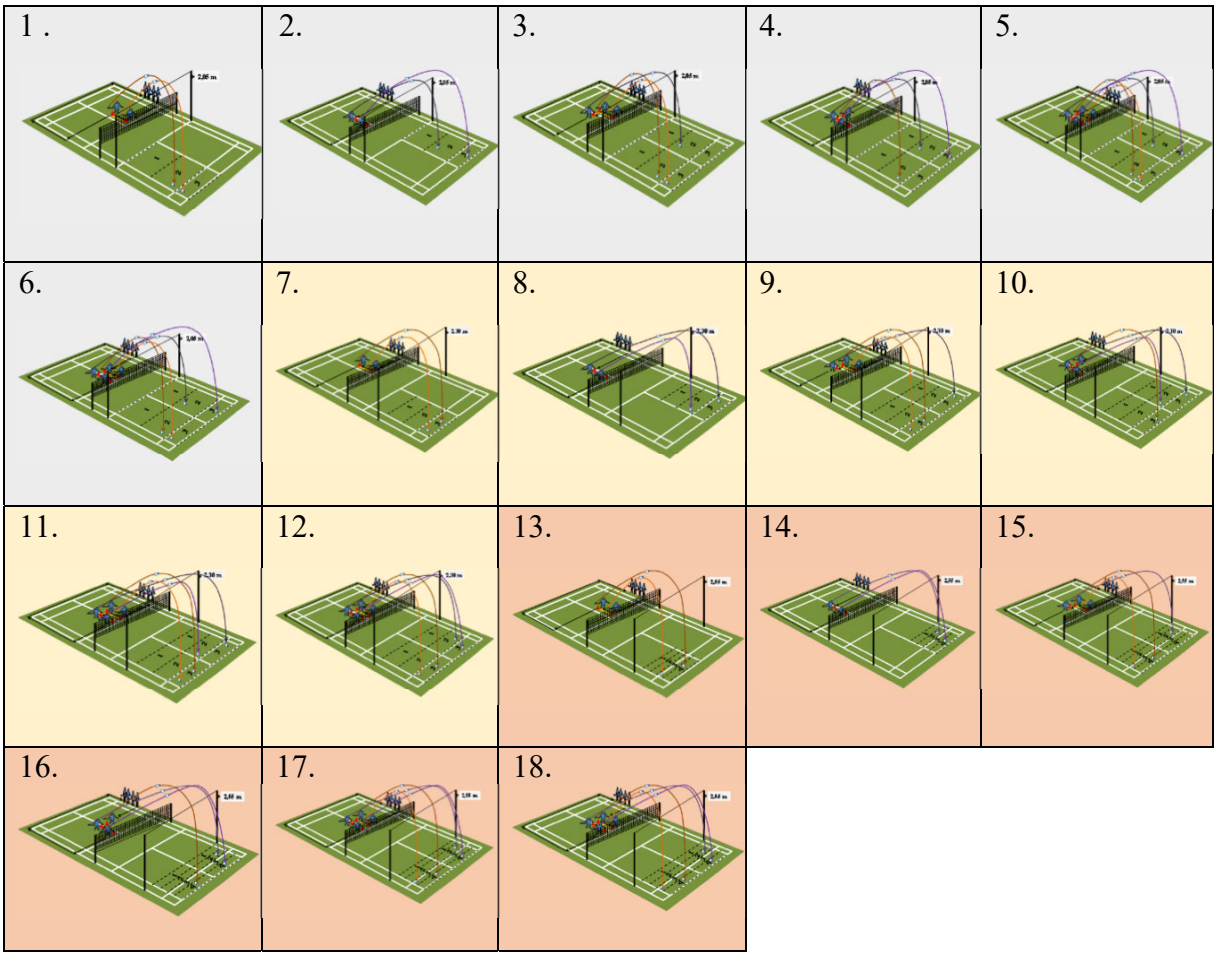

Fig. 2. 18 variations of long service training models

Table 3. Recapitulation of expert assessment results

Badminton Expert					
No	**Indicators**	**Σx**	**Σxi**	**%**	**Description**
1	Feasibility	56	72	78	worth
2	Ease	55	72	76	worth
3	Safety	57	72	79	worth
4	Attractiveness	57	72	79	worth
Total		225	288	78	worth
Coaching Expert					
No	**Indikators**	**Σx**	**Σxi**	**%**	**Description**
1	Feasibility	54	72	75	worth
2	Ease	54	72	75	worth
3	Safety	55	72	76	worth
4	Attractiveness	56	72	78	worth
Total		228	288	76	worth
Game Expert					
No	**Indikators**	**Σx**	**Σxi**	**%**	**Description**
1	Feasibility	55	72	76	worth
2	Ease	55	72	76	worth
3	Safety	56	72	78	worth
4	Attractiveness	56	72	78	worth
Total		218	288	77	worth
Overall Assessment Category				77	worth

Data Collection Technique

This research includes questionnaires, observation, documentation, and badminton long service ability tests. The questionnaires were given to media experts, material experts, teachers, as well as students taking General Physics courses, in accordance with the opinions of the teachers Sa'adah & Wahyu, (2022). Observations were made non-systematically without using observation instruments, while documentation was in the form of photographs during the research. Badminton long service ability test was conducted based on the opinion of Singh & Mishra, (2020) by hitting 10 long service shots. Researchers also collected data through interviews and additional documentation.

Analysis Statistics

This study uses the research and development (R&D) method of the Borg and Gall model with 10 stages. The target games-based long service training model consists of 18 variations with different levels of difficulty. The requirements needed in variance analysis are data normality test and homogeneity test. As for further tests, the t-test was used using the Independent Sample Test. The analysis was assisted with the SPSS 22 application.

Results

The target games-based badminton long service training model for beginners was developed using the Borg & Gall model which consists of 10 stages, including needs analysis, planning, expert validation, small-scale test, revision, large-scale test, revision, effectiveness test, revision, and dissemination. Interviews with coaches and questionnaires to students at the Faculty of Sport Sciences, Medan State University revealed that coaches find it difficult to train long service due to the lack of variations in training models. As many as 85% of players agreed to be given additional training variations. Based on the results of the needs analysis, a three-stage training model was developed, (1) Easy category: 6 training models with shuttlecocks passing through a rope as high as 2.05 metres, (2) Medium category: 6 training models with a 2.30 metre high rope, (3) Difficult category: 6 training models with a 2.55 metre high rope.

Researchers developed an initial draft of a long service training model based on target games, involving one badminton expert coach and two expert lecturers. The validation results showed that 18 variations of the training model were declared feasible to be tested on a small scale, with an average feasibility percentage of 77%.

At the small group trial stage on FIK UNIMED students conducted on 12 novice players, the results showed a feasibility percentage of 75%, and the model was declared feasible to be tested to a large-scale group after minor revisions.

Table 4. Evaluation results and feedback from badminton experts

Easy Items	Medium Aitem	Difficult Items	Description
Model I Lefteasy Long Service (I LeLS)	Model I Leftmedium Long Service (I LmLS)	Model I Leftdifficult Long Service (I LdLS)	Can be implemented
Model I Righteasy Long Service (I ReLS)	Model I Rightmedium Long Service (I RmLS)	Model I Rightdifficult Long Service (I RdLS)	
Model Leasy Long Service (LeLS)	Model Lmedium Long Service (LmLS)	Model Ldifficult Long Service (LdLS)	
Model Jeasy Long Service (JeLS)	Model Jmedium Long Service (JmLS)	Model Jdifficult Long Service (JdLS)	
Model Ueasy Long Service (UeLS)	Model Umedium Long Service (UmLS)	Model Udifficult Long Service (UdLS)	
Model Neasy Long Service (NeLS)	Model Nmedium Long Service (NmLS)	Model Ndifficult Long Service (NdLS)	

Table 5. Recapitulation of data from small group trial results

No	Indicator	Σx	Σxi	%	Description
1	Ease	678	864	78	worth
2	Attractiveness	647	864	75	worth
3	Usability	619	864	72	worth
4	Security	656	864	76	worth
Total		2600	3456	75	worth

Revisions to the results of the small-scale trial were made to improve the training model based on suggestions during the trial to better suit the research objectives. Furthermore, a large-scale group trial was conducted on 34 beginner players using 18 variations of the training model, and the results showed that the model could be applied well. After the large-scale test, minor revisions were made based on suggestions to increase the intensity and duration of training, but overall the model was declared feasible without major changes. The effectiveness test using a pre-experiment design with pretest-posttest showed that the long service training model based on target games was effective in improving the ability of novice players, as evidenced by the t-test on pretest and posttest data.

Table 6. Data recapitulation of large group trial results

No	Indicator	Σx	Σxi	%	Description
1	Ease	1925	2448	79	worth
2	Attractiveness	1890	2448	77	worth
3	Usability	1837	2448	75	worth
4	Security	1834	2448	79	worth
Total		7586	9792	77	worth

To measure the effectiveness of the model, a one group pretest-posttest pre-experiment was conducted on 42 novice players (experimental group) who used the new training model, and compared with 42 players in the control group who used the long service training model. Data from the pretest and posttest results were analysed using normality tests and t-tests.

The pretest and posttest data for both groups were tested using the Kolmogorov-Smirnov test to ensure normality, as well as the Levene test to test data homogeneity. The normality test results showed that the data were normally distributed with a significance value greater than 0.05. Meanwhile, the homogeneity test showed that the data of both groups were homogeneous with the following results:

Based on the Kolmogorov-Smirnov test results, the data from both groups were normally distributed with a significance value greater than 0.05. While the homogeneity test shows that the data from both groups are homogeneous, so it can be used in parametric statistical analysis. Results can be seen in table 8 and 9.

The Paired-Sample T-Test results for the experimental group showed a significant increase in badminton long service ability. The score difference between the pretest and posttest was -19.57, with a t value = -114.529 and Sig. (2-tailed) = 0.000. This indicates that the new training model

Table 7. Description of the analysis results of long service ability

Data Description	Experimental Group		Control Group	
	Pretest	Posttest	Pretest	Posttest
N	42	42	42	42
Mean	7.79	27.36	7.83	21.36
Standart Deviation	3.61	2.63	3.635	2.63
Variance	13.05	6.918	13.215	6.918
Skor Minimum	1.00	22.00	1.00	16.00
Skor Maksimum	15.00	33.00	16.00	27.00
Total Score	327	1149	329	897

Table 8. Long service ability data normality test results

No.	Variables	Kolmogorov-Smirnov			Description
		Statistics	df	Sig.	
1	Pretest Experimental Group	0.094	42	0.200*	Normal
	Posttest Experimental Group	0.102	42	0.200*	Normal
2	Pretest Control Group	0.122	42	0.125	Normal
	Posttest Control Group	0.102	42	0.200*	Normal

Table 9. Results of homogeneity test of long service ability data

Levene Statistic	df1	df2	Sig.
0.000	1	82	1.000

makes a positive contribution in improving long service skills. As for the control group, the difference in pretest and posttest scores was -13.52, with a t value = -77.470 and Sig. (2-tailed) = 0.000. Although there was an increase in ability, the results were not as great as the experimental group. Results can be seen in table 10 and 11.

Furthermore, the results of the Independent Samples T-Test showed that the target games-based long service training model was more effective than the old training model, with a t-value = 10.454, df = 82, and p-value <0.05. This indicates that there is a significant difference between the two groups. Results can be seen in table 12.

Then the effectiveness test was carried out on the target games-based badminton long service training model using the N-Gain test. After the effectiveness test, the long service training model based on target games was declared quite effective, with the results of the N-Gain test showing an average score of 0.61, which is included in the category quite effective in improving the long service skills of novice players. This final product is declared feasible without the need for further revision and is ready for dissemination. As a final step, this training model has been disseminated in the ICIESC international forum and published in the national journal Sports Science, so that it can be used more widely by coaches and beginner badminton players.

Table 10. Results of the paired-sample t test for the experimental group

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre test data long service kel eksprimen – Post test data long service kel eksprimen	-19.57143	1.10747	0.17089	-19.91654	-19.22632	-114.529	41	0.000

Table 11. Results of the paitred-sample t test for the control group

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre test data long service kel kontrol – Post test data long service kel kontrol	-13.52381	1.13133	0.17457	-13.87636	-13.17126	-77.470	41	0.000

Table 12. Differential test results of experimental group and control group

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Long service post test results	Equal variances assumed	0.000	1.000	10.454	82	0.000	6.0	0.57396	4.85820	7.14180
	Equal variances not assumed			10.454	82	0.000	6.0	0.57396	4.85820	7.14180

Discussion

This study aims to develop and test the effectiveness of a target games-based badminton long service training model for beginner players. In the context of sport, long service is an important technique that greatly affects the quality of badminton play. By improving players' long service ability, it is expected to contribute to their overall performance on the court. Through the development of this model, the researcher wants to provide a solution to the challenges faced by coaches in training long service, as well as providing more interesting and effective training variations.

The findings showed that the target games-based long service training model, when combined with players' motor skills, significantly improved the long service ability of beginner badminton players (Wacono & Janiarli, 2021). The second hypothesis states that players trained using a target games-based training model will show better long service skill improvement compared to players trained using a conventional training model. This hypothesis is supported by the average long service skill score achieved by players in the experimental group. In line with the research results Ismik (2022) structured and varied training methods such as target games can contribute to the improvement of basic badminton skills, including long service.

The variety of exercises presented allows players to train in a more enjoyable and less monotonous way (Rossi et al., 2022). This is important to maintain player motivation and interest, especially for beginners who often experience boredom. In addition, the model is designed with varying levels of difficulty in mind, so coaches can tailor the exercises to each player's ability (Ichsan et al., 2023). As such, players can experience more significant development and feel more confident when playing.

In addition, the application of a long service training model based on target games has a positive influence on both players and coaches (Liang, 2022). For players, the use of this model not only improves their technical skills, but also

improves tactical understanding in the game. Players trained with this model will be better able to control the shuttlecock well and provide more strategic service. On the other hand, coaches also benefit from the development of this training model. With clear and structured guidelines, coaches can more easily design effective and efficient training sessions, as well as maximise training time (S. Ma et al., 2024).

It is hoped that this training method can be an effective tool to improve their skills. Players are expected to not only see it as a physical exercise, but also as an opportunity to learn and develop. By applying varied and fun exercises, players can enjoy the learning process and love badminton even more. This expectation aims to create a generation of players who are not only skilled, but also have a deep understanding of the game. Overall, this research makes a significant contribution in the world of badminton, particularly in the development of more innovative and effective training models. With proper implementation, this training model has the potential to improve the quality of training and overall performance of beginner badminton players.

Conclusions

This study successfully developed and evaluated the effectiveness of a target-game-based training model for improving badminton long serve skills in beginner players. Through a series of trials and refinements, the model demonstrated its ability to enhance long serve techniques in an engaging and varied manner. The findings revealed that the newly developed training approach significantly improved players' long serve abilities and proved more effective than traditional training methods. Additionally, novice players not only showed increased proficiency in executing long serves but also displayed greater motivation to practice. The structured design of the training model provides clear guidance for coaches, enabling them to tailor the intensity and difficulty levels according to the individual needs of players. This approach fosters a more effective and enjoyable learning environment. The study aspires for this training model to be widely adopted by coaches and players across different skill levels. Furthermore, it aims to serve as a foundation for future research exploring innovative badminton training techniques. By offering practical solutions for coaching, this research contributes to the cultivation of higher-quality badminton talent and encourages the continued advancement of training methodologies.

Acknowledgments

We would like to express our appreciation to the authors for their outstanding contributions in finalising this manuscript.

Conflict of Interests

There is no conflict of interest.

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Розроблення цільової ігрової моделі тренування довгих подач у бадмінтоні для спортсменів-початківців

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Реферат. Стаття: 9 с., 12 табл., 2 рис., 25 джерел.

Історія питання. Розвиток навичок виконання довгих подач у бадмінтоні є однією із важливих складових покращення ігрової результативності. Проблемою підготовки гравців-початківців у бадмінтоні вважається низька різноманітність моделей тренування довгих подач, що впливає на рівень оволодіння цією технікою.

Мета дослідження. Мета дослідження полягала у розробленні та визначенні ефективності моделі тренування довгих подач на основі цільових ігор щодо поліпшення навичок виконання довгих подач бадмінтоністів-початківців.

Матеріали та методи. У рамках даної наукової праці застосовано методологію досліджень і розробок за моделлю Борга і Галла, що передбачає десять етапів, які включають в себе аналіз потреб і тестування ефективності. Суб'єктами дослідження були гравці-початківці, які навчалися на факультеті спортивних наук Меданського державного університету, вибірка складалася з 42 гравців, розподілених на експериментальну та контрольну групи. Для збору даних використовувався метод передекспериментального претест-посттестового дизайну. Аналіз даних проводився за допомогою програмного забезпечення SPSS із застосуванням t-критерію парних вибірок та t-критерію для незалежних вибірок.

Результати. Ґрунтуючись на результатах валідації, 18 варіацій моделей вправ було визнано доцільними для проведення широкомасштабних випробувань із середнім відсотком здійсненності 77 %. Такі показники отримано після внесення незначних змін на основі пропозицій щодо збільшення інтенсивності та тривалості вправ. Однак загалом визначено доцільність застосування зазначених моделей без суттєвих змін. Результати показали істотну різницю між групою, у якій застосовувалась цільова модель тренування на основі ігор, і групою з традиційною моделлю проведення тренувань ($p < 0,05$). Доведено ефективність застосування цільової моделі тренування на основі ігор щодо покращення вміння виконання довгих подач гравців-початківців.

Висновки. Згідно з результатами дослідження, можна стверджувати, що цільова модель тренування довгих подач на основі ігор забезпечує значну ефективність з точки зору вдосконалення навичок виконання довгих подач гравців-початківців. Доцільним також вважається ширше застосування зазначеної моделі у тренерській діяльності з підготовки бадмінтоністів-початківців.

Ключові слова: модель тренування, бадмінтон, довга подача, спортсмени-початківці, цільові ігри.

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Cite this article as: Hasibuan, N., Siregar, S., Ginting, A., Samosir, A. S., Ratno, P., Suganda, M. A., Suryadi, D., & Haidar, M. D. (2025). Developing a Target Games-Based Long Service Training Model in Badminton for Beginner Athletes. *Physical Education Theory and Methodology, 25*(2), 322-330. https://doi.org/10.17309/tmfv.2025.2.13

Received: 11.01.2025. Accepted: 18.02.2025. Published: 30.03.2025