



## **E-Book Based Hammer Throwing Training Model at the Age of 13-15 Years DKI Jakarta Province**

**Marini \*<sup>1</sup>, Yasep Setiakarnawijaya <sup>2</sup>, Moch. Asmawi <sup>3</sup>**

<sup>1, 2, 3</sup> Physical Education, Universitas Negeri Jakarta, Jakarta, Indonesia

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### **Abstract**

This research aims to develop a training model for basic hammer throwing techniques at the age of 13-15 years and determine the effectiveness of the training model that has been developed. The problem that is the basis for conducting this research is that several literatures have not found a hammer throwing training model for 13-15 year olds in DKI Jakarta Province using an e-book basis. The method used in this research is Borg and Gall research and development through 10 development steps. Participants involved in the small group test were 15 athletes in DKI Jakarta Province and in the large group test 32 athletes. Then the participants involved in testing the effectiveness of the model were 32 athletes who were divided into 2, namely 16 athletes in the control group and 16 athletes in the experimental group. Based on the results of the N-Gain Score (%) test calculation, it shows that the average value of the N-Gain Score for the experimental group is 81.4321 or 81.43%, which is included in the effective category. Meanwhile, the average N-Gain Score for the control group was 34.88 or 34.88%, which was included in the Ineffective category. From the results of these calculations it can be seen that the use of the training model in the experimental group was effective in improving basic hammer throwing technique skills.



\*Corresponding email : marinithea@gmail.com

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## INTRODUCTION

Sport is one of the necessities of life because through sports activities it can improve a person's physical and mental quality (Malm et al., 2019). A healthy physique will improve performance and make a person mentally strong, because it has been trained through training and competitions in sports (Slimani et al., 2016). Improving physical condition through training programs can include walking, running, jumping or throwing activities (Pplp et al., 2015). Various kinds and types of sports are developing very well and are able to mobilize many people from various elements to exercise well and regularly, both individually and in groups (Gadais, 2020). This is the impact of the success of sport "in popularizing sport itself and cultivating society" which has created a conducive climate and given birth to many talented young athletes with one main goal, namely sporting achievement.

Dozens or even hundreds of sports have been developed from ancient times to modern times. As we all know, there are many types of sports that are known to the public, ranging from sports that can be done individually to those that require many participants, both individual and group (Eather et al., 2023). One sport that has been developed from ancient times to modern times is athletics. Athletics is a sport that was competed in the first Olympic championship in 776 BC (Epstein, 2022). It consists of several numbers that are contested, namely running, throwing, jumping and walking. Apart from that, Athletics is also often called the "mother of all sports" or the mother of all sports because athletics includes all aspects of movement to be developed in that branch (Adzalika, 2019). Measurable sport is a type of sport where the results can be seen from the

distance traveled or the results can be seen directly and accurately. There are various types of exercise that are measurable. Some of them are archery, athletics, gymnastics, weightlifting, paragliding, rock climbing, swimming, artistic, water polo, platform diving, etc. (Adzalika, 2019).

The development of sports in the 21st century is currently very rapid, as is athletics itself. Every country is competing to research and develop various new breakthroughs in the form of training methods or competition methods to support the improvement of athletes' achievements (Acanfora et al., 2023). Talking about sports, we don't think we will and are not biased regardless of the goal, namely achievement, education or just having fun which is often called recreation. As stated previously, the scope of sports is very complex depending on the goals chosen by a society (Taylor et al., 2015). One of the events in athletics is hammer throwing. Some of these factors are internal, for example; talent, emotions, mood, motivation and others (Tur-Porcar & Ribeiro-Soriano, 2020). Meanwhile, external factors include; trainers, facilities and infrastructure, environmental and socio-cultural factors. Achievement in athletic events can be achieved through special and regular training over a relatively long period of time (McKay et al., 2022). An athlete should have potential that is suitable for the sport he is involved in, such as physical condition, technical mastery and other requirements (Johnson et al., 2011). One of the Southeast Asian countries that started having women throwers was "Indonesia" starting in 1998. The first women's hammer throwing championship at the national level was PON XV Gelora Delta Sidoarjo East Java in 2000. In this championship, Yurita Aryani Aryad achieved first place with a

throw of 45.86 m. Based on these results, it can be predicted that the women's hammer throw number has great potential as a reliable sports number. The problem currently is that hammer throwing athletes are not increasing in terms of the number of athletes interested. Number. Hammer throwing is only participated in by a few provinces, namely West Java, East Java, Banten and DKI Jakarta. In order to develop and evenly distribute hammer throwing numbers in Indonesia, it is necessary to develop female beginner hammer throwing athletes throughout Indonesia by providing training methods that can be applied in the future. The development of novice athletes in the regions needs to be given special attention so that the achievements achieved in the future will be better (Mackenzie et al., 2022). Based on these results, it can be predicted that the women's hammer throw number has great potential as a reliable sports number. The problem currently is that hammer throwing athletes are not increasing in terms of the number of athletes interested. Hammer throwing numbers are only followed by a few provinces, namely West Java, East Java, Banten and DKI Jakarta. In order to develop hammer throwing numbers in Indonesia, it is necessary to develop hammer throwing athletes throughout Indonesia by providing training methods that can be applied in the future. So the development of athletes in the regions needs to be given special attention so that the achievements achieved in the future will be better. To achieve maximum performance, all throwers, whether hammer throwers, javelin throwers or discus throwers, must try to improve their abilities. The ability to throw as far as possible with high speed and power. Hammer throwing is influenced by many factors, but many achievements are also achieved by teaching good and correct

throwing techniques (L. W. Judge et al., 2016).

The factors that influence a hammer thrower to excel include physical ability, technique, psychological tactics and theoretical preparation (W. L. Judge et al., 2010). All of these components must be fulfilled for a hammer thrower, because this is a requirement for the thrower to be successful, in this case the researcher will specialize in the throwing number, namely the hammer throw. Therefore, the performance of a hammer thrower can be seen from the throwing distance achieved as a result of the rotational speed. Good regeneration is carried out from a basic age because athletes who excel must be started or prepared from an early age (Sinkovic et al., 2023). If the child is able to carry out physical activities properly, correctly and continuously, the child will have a healthy body and various good forms of movement. Apart from that, varied sports activities really help children in the process of learning movement. With varied forms of learning processes and exercises, children will avoid boredom, reluctance and restlessness which is psychological fatigue so that it can be an attraction for children in various kinds of learning processes form of movement (Aslamiah, 2022).

The need for children to be equipped with various basic movement skills that are good and correct according to their age and abilities will have a positive impact on the child's physical and psychological growth and development (Sutapa et al., 2021). By establishing a good and correct movement learning process, children will be better prepared to carry out more complex movement activities in the future. Improving the ability to master techniques is much more difficult and takes longer, because technical training requires many repetitions to produce

automated technical movements. Apart from that, Bompa stated that training is the process by which an athlete is prepared for the highest performance (Lumintuarso, 2019). So, to achieve an achievement, a systematic training program is needed, so that there is adaptation in the body. Another opinion regarding training is that it is a long-term process and should be enjoyable for both athletes and coaches. Likewise, to achieve success in training, you need a training program that is interesting and not boring. Basically, coaches have the same hopes and desires to form students or trainees who will be able to excel in the future. To get the expected results, of course you have to go through a process, which must be passed in stages from the most basic or simple stages to later moving on to more complex or difficult stages. In line with the teacher's expectations, there are many basic processes that cannot be fulfilled to bring children to a more complex stage, such as teaching various basic forms of movement which are expected to be able to become the foundation for children to move to a more complex stage of movement.

Mastering the correct hammer throwing technique will be more effective and efficient for use in discus throwing competitions, so it will help to achieve achievements. Correct technique from the start will save energy to move so that you can move longer and more successfully, as well as a basic foundation for higher achievements. (Sholafudin, 2017). The process of learning the discus throwing technique needs to be carefully considered in its implementation. Coaches have an important role in providing correct technical movement training to their athletes. In order to get effective and efficient training results, coaches need to create varied technical training models that suit the abilities of

each athlete. In this way, athletes are always in a controlled state and have enthusiasm in participating in training. Basic movement skills are also very necessary for athletes, this is in line with the function of children's development and growth. Children can be said to have good development if their physical and mental growth and development continues to develop well. Like the ability to speak, this movement ability is very important in the movement development phase. With good movement skills, children have the opportunity to be active in further sports (Leberman & Palmer, 2017). Basic movement skills that must be developed at childhood or elementary school age include basic movement skills for moving around (locomotor), basic movement skills in controlling the body and moving a group of limbs without moving (non-locomotor) and controlling an object in its movement. (manipulative).

The training model requires continuous updating so that the training process can be of interest to athletes, especially teenagers, in carrying out the training process. So far, if there are athletes who don't want to practice because they think it's not interesting, too many people just stick to the sport they like and the coaches also don't understand much about basic throwing techniques. This will have an impact on low training motivation, for a coach who teaches basic techniques through training and sports models, it is important to optimize athletic training, especially in adolescence, with the hope that athletes will be motivated to train and can encourage athletes to continue training. When performing the rotating hammer throwing technique, there are several stages of movement that must be carried out, namely starting from the swing phase, rotating phase, acceleration phase, power position phase, hammer release

phase and the follow through movement. Complex movements must be carried out when throwing the discus, this requires special training to make it easier for athletes to master the rotational style discus throwing technique. Maximizing the participation of all youth athletes is important in every training process, namely the athlete's full participation and participation with enthusiastic interest and high athlete motivation to take part in the training process from the beginning to the end of training. This is what determines the effectiveness of the training program carried out at school. After I observed that the hammer throwing event, especially if it was participated in by teenage athletes who in fact did not understand the basic techniques, would result in the teenage athletes not having the will to practice that number. Based on the background above, the author is interested in creating an E-Book-based hammer throwing training model for athletes aged 13-15 years. So that athletes can carry out varied training effectively, efficiently and enjoyable.

The focus of the problem is the development of an E-book-based Basic Hammer Lontar Technique Training Model for athletes aged 13-15 years in DKI Jakarta Province. So the hope is: 1) Developing an E-book based Hammer Lontar Basic Technique Training model for athletes aged 13-15 years in DKI Jakarta Province; and also 2) Seeing the effectiveness of the product results from the E-book-based Hammer Lontar Basic Technique Training model for athletes aged 13-15 years in DKI Jakarta Province.

## **METHODS**

The method that will be used in this research is research and development with a model design from Borg and Gall.

Development research is also research used to create new products and develop existing products based on needs analysis in the field (observations, interviews, initial needs questionnaires) (Tangkudung, 2016).

## **Participants**

This research was carried out in several stages, namely: Small field trials on hammer throwing athletes aged 13-15 years who will be the subjects of this research, namely athletes aged 13-15 years who are members of several clubs in the DKI Jakarta Province area with a total of 15 athlete. Then a large field trial was carried out at the Athletic Stadium, Rawamangun - East Jakarta with a total of 30 athletes.

## **Sampling Procedures**

Determining the number of samples was carried out using a purposive sampling technique. Purposive sampling is a technique for determining samples based on certain considerations, which are considered suitable for the characteristics of the sample that is determined to be used as a sample (Sugiyono, 2017). The sample characteristics that researchers consider suitable for this research are: athletes aged 13-15 years.

## **Materials and Apparatus**

Data collection in the research was carried out using a research instrument, namely training in basic hammer throwing techniques using a Likert scale which was carried out at the Rawamangun athletic stadium which has standard facilities. This instrument has been validated by athletic experts and experts in hammer throwing training programs which are declared valid and can then be used.

## Procedures

The steps in this research were adopted from Borg and Gall's steps, namely: (1) Research and Information collecting; (2) Planning; (3) Develop Preliminary form of product; (4) Pre Military Field Testing; (5) Main Product Revision; (6) Main Field Testing; (7) Operational Product Revision; (8) Operational Field testing; (9) Final Product Revision; and (10) Dissemination and Implementations (Godbout et al., 2020).

## Design or Data Analysis

The data analysis technique for measuring effectiveness uses the t-test (Kadir, 2015). To determine the effectiveness of the results of hammer throwing skills after being given a hammer throwing training model to athletes aged 13-15 years.

## RESULT

After carrying out several series of processes for developing this training model, starting from needs analysis to large group trials and carrying out revisions in stage II, as well as carrying out a series of expert tests and instrument feasibility tests, the next stage is to carry out effectiveness tests. After carrying out small group trials and large group trials, the next stage is to test the effectiveness of the model created. The effectiveness test of this model was carried out to see whether the results of applying the developed model were effective in achieving research objectives. The effectiveness of the model used a true-experiment research design in the form of "two group pretest-posttest design with control group and experimental group". The steps taken are as follows: (1) determine the research subject group; (2) carry out a pre-test; (3) provide an E-book-based trial model of basic hammer

throwing technique training for athletes aged 13-15 years in DKI Jakarta Province; (4) carry out post-test; (5) look for the average score of the pre-test and post-test results, then compare the two; and (6) looking for the difference between the two averages through various statistical methods (t-test) of repeated observations to find out whether there is a significant effect from using the training model that has been created. Based on the data obtained regarding the results of the independent sample t-test post-test for the experimental group and post-test for the control or unpaired group, the results are presented in the following table:

**Table 1.** N-Gain Persen Results Data

Class	N	Mean	Std Deviation	Std. Error Mean
Experiment	16	81.43	10.34856	1.43509
Control	16	34.89	8.62559	1.19615

Based on the table above, it can be described that the data obtained: experimental group with n= 16, average N-Gain Percent = 81.4321, standard deviation = 10.34856, and average standard error = 1.43509, while the control group with n= 16, mean N-Gain Percent = 34.8859, Standard deviation = 8.62559, and Standard error of mean = 1.19615. The next test is to carry out an independent sample t-test for both test results in the experimental group and also the control group. This aims to find out whether there are differences in the results of the basic sprint movement test between the experimental group and the control group. Testing was carried out on the posttest scores for each test in each group. From the results of the t-test, it can be seen that the F value = 0.020 with a p-

value or Sig score. =  $0.888 > 0.05$ , which means it has the same or homogeneous variance. Therefore, significance testing can be seen in the Equal variances assumed and t-test for Equality of Means columns. Based on the results in this column, it can be seen that the calculated t score = 22.310,  $df = 102$  and the p-value or sig score. (2-tailed) =  $0.000 < 0.05$ . Thus, it can be concluded that there is a significant (real) difference in effectiveness between the experimental group and the control group to improve training results in basic hammer throwing techniques for athletes aged 13-15 years in DKI Jakarta Province.

## DISCUSSION

After conducting a series of research based on the research stages of development from Borg and Gall, it can be concluded that the E-book-based model for developing basic hammer throwing technique training for athletes aged 13-15 years in DKI Jakarta Province which was developed and created by researchers is a product that aims to help improve basic hammer throwing techniques, in addition to maintaining joint movement stability in basic technical skills and as a reference training model for basic hammer throwing techniques for athletes aged 13-15 years in DKI Jakarta Province in studying hammer throwing training material. The basic hammer throwing technique training model was created based on the level of need for athletes aged 13-15 years in improving basic hammer throwing techniques in their movement activities. This research also shows the results that there is an increase in basic hammer throwing techniques for athletes aged 13-15 years in DKI Jakarta Province after these athletes implemented the training model developed by researchers. The improvement in basic technique

experienced by athletes occurred because in the training process, the athlete was actively involved in carrying out hammer throwing movements and was guided appropriately by the coach. In this case, the coach serves as an instructor who provides examples of movements, as well as being a facilitator and determining goals and acting in improving the basic hammer throwing technique movements carried out by athletes. The results of previous research show that the direct instruction training model can significantly improve the results of training in basic hammer throwing techniques (Brice et al., 2008).

The results of previous research also show that the direct training model is an approach that is designed in a structured manner and implemented in stages, so that the delivery of knowledge or knowledge becomes effective and efficient (Coman et al., 2020). Judging from the results of the research above, the researcher states that the concept of training which boils down to a basic technique may not be considered a regulatory element of the training process. Because not all sports can be formed into a match that has attackers and defenders in a game (Ashford et al., 2021). Even the incident of playing a game can indeed contribute to managing the learning process by referring to two perspectives: observation/reflection and manipulation of learning by considering problems that arise. Playing a game is an important moment for students in the learning process where students can reflect on their actions and get intrinsic feedback on the performance they show (Chen & Liang, 2022). As mentioned previously, the collection of information is essential for the regulation of learning because it provides material for decision making about what has been achieved and what needs to be done. With regard to team sports, performance rests on: (a) the

correct choice of tactics and (b) reasonable mastery of technique. Technical or tactical performance assessments may also focus on the results of performance (product) or the way that performance is achieved (process) (Kozłowski, 2018). Therefore, information gathered during play and then shared with learners must be results-oriented, based on pre-established skill performance criteria.

Weaknesses in these skills will often be revealed by observational data such as mistakes when jumping, low repetitions/repetitions, reduced learning variety, or reduced number of successful repetitions/repetitions. Far from a predetermined document offering a ready-made learning path, a roadmap is an ever-changing plan of action that is adjusted regularly game by game and debate by debate. This written document chosen by students is, in a certain sense, a plan for the students' tactical and technical learning arrangements. As can be seen, the combined impact of the debate and the resulting roadmap adjustments are at the heart of the learning regulation process shared by the learning community (Dong et al., 2021).

## CONCLUSION

Based on the results of the analysis, it can be concluded that the E-book-based basic hammer throwing technique training model for ages 13-15 years can be used. In this way, athletes who already have these initial basic techniques and apply superior models will more quickly achieve improvements in improving hammer throwing.

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