Available online at : http://journal.unj.ac.id/unj/index.php/gjik
Gladi : Jurnal Ilmu Keolahragaan 13 (01) 2022, 98-103
Permalink/DOI: https://doi.org/10.21009/GJIK.131.09

DRIBBLING BASKETBALL LEARNING MODEL BASED ON NEUROSCIENCE

Rahmat Gunawan[1],Yusmawati[1],Fatah Nurdin[1]

[1]Pendidikan Jasmani, Pascasarjana Universitas Negeri Jakarta,
Komplek Universitas Negeri Jakarta Gedung M. Hatta Jl. Rawamangun Muka, Jakarta Timur, Indonesia 13220

Corresponding Email: rahmatgunawan62112@gmail.com

Abstract The aim of this research and development is to produce a learning model of dribbling basketball based on neuroscience for Junior High School students and determine the effectiveness of the resulting model. This study uses Research & Development (R&D) of ADDIE model. The results of the study resulted in a product in the form learning model of dribbling basketball based on neuroscience that had been validated and revised by experts as many as 20 models. And in this application, the research subjects used were 60 male students at seventh grade of Al Fityan Boarding School Bogor. Data collection began with interviewing the Physical Education teacher at the Junior High School, then the initial test was carried out. Test the effectiveness of the model using an observation instrument used to determine the ability to learn a model of dribbling basketball before and after the treatment of neuroscience based. The initial test obtained that the student's basketball dribbling learning outcomes were 82,33. In the significance test of the difference between with SPSS 26, it mean (11,617) the difference between the pre-test and post-test. And the result of t-count (18,824), df (59) and p-value (0,00 < 0,05) which means there is a significant difference between before and after the the treatment.

Keyword: Learning model, basketball dribbling, neuroscience

INTRODUCTION

Education has a very important and strategic, especially in preparing future generation who have integrity, skills and knowledge so that they are able to become the successors and inheritors of sustainable and equitable development. The quality of education is marked by innovation and progress in the fields of research, and technology and in line with improving the quality of learning as well as progress in various sector, including a new sciences as a result of a thought based on scientific studies or research, one of which is neuroscience.

Neuroscience is a part of science that specifically examines the nervous system and the human brain. Neuroscience can be interpreted as a neural science that studies the nervous system, especially studying neurons or nerve cells with a multidisciplinary scientific approach (Pasiak dalam Wathon, 2016). The benefits of neuroscience can be felt if at the beginning the results of his research on the brain were still very limited in implications for the world of education, especially only for dealing with students who have brain dysfunction. However, along with advances and developments in technology, it is now useful to describe how the brain functions when performing mental operations on learning and memory which is very useful for teaching and learning in schools. (Byrnes & Fox dalam Schunk, 2012).

Physical education is a subject in school that is closely related to neuroscience, considering that neuroscience is the study of the brain and the brain's working processes to produce behavior, ways of thinking, acting, feeling or relating to emotions and kinesthetic. Therefore, physical education is an integral part that cannot be separated from the education system as a whole, because it aims to develop aspects of health, physical fitness, critical thinking skills, emotional stability, social skills, reasoning and moral action through physical activities and sports. (Yusmawati, Rihatno, & Rismawanti, 2020). This is in accordance with the purpose of physical education which improves three domains, namely cognitive, affective and psychomotor (Mahendra, 2009).

The first process of the three aspects is the cognitive aspect related to brain development in students. Affective behavior and psychomotor movement

are based on whether or not the brain's performance is through neural responses. This means that it is important for educators to know the performance system of nerve cells to increase psychomotor motion and affective behavior of students (Burhaein, 2017).

Physical education has many components of broad physical activity that can be obtained by students. The components of physical activity are useful in developing motion experiences, shaping physical fitness and the character of students and other aspects. One of the basic components of physical education, sports and health subjects contained in the junior high school curriculum is practicing the ability to play big ball. In the big ball game, one of them is basketball teaching.

This basketball game has the characteristics of a game that requires cooperation, tactics and strategy because it is played in teams and demands physical, mental and concentration abilities as well as quick response movements from each team member. In addition, the game of basketball also demands complex movements, because its activities include movements of the whole body and limbs, namely the feet, hands, and trunks that are all active together. Like when doing dribbling, which functions in defending the ball and building attacks, the feet continue to move in the same direction as the movement of the hands bouncing the ball, the stick serves as a counterweight to the movement of the feet and hands. The movement is carried out simultaneously at one time.

With the characteristics of the basketball game above, it demands a person's ability to develop movement skills based on brain abilities and neural responses (sensory nerves, motor nerves, association nerves) in carrying out their duties so that they can assist the process in making motion decisions, concentration, or movement skills with improve the ability of the brain and the balance of the right and left brain contained in the study of neuroscience. So neuroscience is very relevant to be the basis or basis that supports the learning process in schools that can be integrated through methods, models, approaches, techniques, strategies as well as learning media so that it becomes an innovation in improving the quality and quality of learning in schools. Especially at least the results of neuroscience studies on the learning process of physical education, especially in learning basketball games.

Based on the results of searches or observations made by researchers, especially at Al-Fityan Boarding Junior High School, the physical education learning process regarding basketball game material in which there is basketball dribbling material carried out at school, requires variety and innovation, especially related to the development of learning models. especially those closely related to the concept of neuroscience. From the results of observations in the field, the researchers also saw that efforts were needed to improve student learning outcomes towards improving attitudes in doing basketball dribbling considering that many of the students were not able to do basketball dribbling movements well, such as basketball dribbling with their heads down and their eyes focused on seeing the ball, dribbling. basketball by hitting the ball with the palm of the hand, dribbling basketball with a high bounce beyond the waist and several other errors that require handling to be corrected. So in this study, researchers are interested in developing a learning model in Physical Education in schools based on the application of Neuroscience, which is entitled "A Neuroscience-Based Dribbling Basketball Learning Model". It is hoped that through this learning model it can improve student learning outcomes in dribbling basketball and through a neuroscience-based learning model it can stimulate or stimulate students' brains to develop further. In addition, it also provides contributions or benefits as well as innovations that should not be stopped in improving the quality of learning in schools. This research was conducted on seventh grade junior high school students at Al Fityan Boarding School Bogor.

METHOD

Research on the development of this model generally aims to be designed using research and development (R&D) research, the method used to produce certain products, and test the effectiveness of these products. (Sugiyono, 2010:297). This study aims to produce a neuroscience-based learning model for basketball dribbling for junior high school students. In the process of research and development of this learning model using the ADDIE model which is a development model consisting of five phases starting from (A) analysis, (D) design, (D) development, (I) implementation, and (E) evaluation (Pribadi, 2009). The steps

for developing ADDIE in this study are described as follows:

1. Analysis

At this phase the researchers conducted observations and interviews with initial needs analysis to physical education teachers at Al-Fityan Boarding School and a questionnaire aimed at students to find out how important the neuroscience-based dribbling basketball learning model will be developed by the researchers.

2. Design

The researcher designs a neuroscience-based dribbling basketball learning model that will be developed with the following activities:

a) Make a clear list of product elements to be made including scheduling for its development
b) Determine the person/team who will assist in the product development process by including the rules that must be obeyed by all members
c) Determine the specifications of various basic motion models which contain the media to be developed (either in the form of documentation, facilities, infrastructure, equipment, security, regulations, management, and other procedures).

3. Development

In this phase, making the initial product, researchers made 20 neuroscience-based learning models for basketball dribbling and the researchers validated 5 experts including, 1 expert physical education teacher as well as basketball coach, 1 physical education expert teacher, 1 expert lecturer in basketball and motor skills, 1 expert lecturer in the field of games and 1 expert in the field of neuroscience who works as a doctor.

4. Implementation

This research was conducted at the Al Fityan Junior High Boarding School, Bogor Regency, West Java Province. The research subjects were 20 students of grade seventh A, 20 students of grade seventh B, and 20 students of grade seventh C, so that the total students who were the research subjects were 60 studnets. The time of this research was carried out for 4 months, namely from August to November 2021. The implementation of the neuroscience-based dribbling basketball learning model is carried out in 12 meetings with

a frequency of three meetings a week, Monday, Wednesday and Thursday. While the posttest is carried out after giving treatment, for the frequency of exercise refers to the opinion of Harsono (1988, p. 194) "it is better to practice three times a week". Research 12 x meetings, according to Sarwono's opinion (1999, p.43) that: "The frequency of a good number of repetitions of exercise is done 5-6 per training session or 2-4 times per week" 5 sessions X 2 times per week = 10 times meeting. (minimum); 5 sessions X 3 times per week = 15 meetings. (currently); 5 sessions X 4 times per week = 20 meetings. (maximum).

And according to the research journal "Effects Of A 4-Week Youth Baseball Conditioning Program On Throwing Velocity" it was stated that the conditioning program for 4 weeks with a frequency of three meetings a week was effective and significantly improved the learning outcomes of participants (aged 11-15 years) in the experimental group's baseball throwing skills, while in the control group there was no significant improvement (Escamilla, Rf. et al., 2010). The next stage, after getting input from experts and validated, it is known some errors or weaknesses of the product to be developed. Products that have been revised by getting a "good" rating / predicate, then the product is continued to the next stage, namely implementation.

5. Evaluation

In order for the research to be more concrete, it is necessary to have data. The data was obtained at the beginning of the experiment as initial data and at the end of the experiment as final data. The aim is to determine the effect of the treatment results which is the final goal of the experiments carried out. Collecting data from samples required a tool called an instrument. Research instruments are tools used in research, especially those related to the data collection process. In connection with this study, the instrument used in this study was a test in the form of observing the basic movement ability of basketball dribbling. Measurements were carried out twice, namely the initial test (pretest) and the final test (posttest), the initial test was carried out before giving the treatment and the final test was carried out after the treatment was given. The data obtained from the initial and final tests were then processed by statistical calculations. The results of this processing will be known about the

neuroscience-based learning model of basketball dribbling whether it has a significant effect on improving student learning outcomes on the basic movement ability of basketball dribbling or not. The research instrument is attached.

In the process of processing the data from the results of the pretest and posttest, an effectiveness test is carried out. This calculation uses the Paired Sample Test statistical test on the IBM SPSS Statistict 26 program for windows with a significance level of 0.05 which is then concluded to be described. Paired Sample Test (Test the difference of two averages) is intended to determine the difference in the average ability of students between the results of the pretest and posttest. The criteria for hypothesis testing the difference between the two averages in SPSS with = 0.05 were determined based on the p-value (Sig.) obtained. If the p-value (Sig.) , then Ho is rejected and H1 is accepted. However, if the p-value (Sig.) < , then Ho is accepted and H1 is rejected.

RESULT AND DISCUSSION

The results of the neuroscience-based dribbling basketball learning model are written in the form of a neuroscience-based dribbling basketball learning model guidebook for junior high school students. The results of the initial needs analysis, namely interviews with physical education teachers at Al-Fityan Boarding School Bogor, that the development of a neuroscience-based dribbling basketball learning model is considered very important, and very useful as an innovation and form of variation that is useful for the physical education learning process in schools. especially in basketball dribbling material. And the discovery of novelty because physical education teachers at schools have never carried out neuroscience-based dribbling basketball learning. As for the results of the interview, it was found that the results of dribbling learning that were carried out were only basketball dribbling lessons in general, such as back and forth dribbling and zigzag. The facilities and infrastructure used are only basketballs and basketball courts and are also very limited for the use of basketballs. This often makes students get bored quickly in doing learning.

The results of the validation and revision by experts related to the neuroscience-based dribbling basketball learning model developed by the

researchers obtained 20 final models that can be applied as follows:

First Step Model :

1. Balanced Dribble 1
2. Balanced Dribble 2
3. Balanced Dribble 3
4. Paired Dribble 1
5. Paired Dribble 2
6. Paired Dribble 3

Implementation Step Model :

1. Winning Dribble 1
2. Winning Dribble 2
3. Imagination Dribble 1
4. Imagination Dribble 2
5. Quick Gather 1
6. Quick Gather 2
7. Hand Game 1
8. Hand Game 2

Last Step Model :

1. Cat of Prey
2. Scramble the Tails
3. Quick Response
4. Emergency Response
5. The Winner's Dribble
6. End Game

The model feasibility test involved experts to get input on the design of the neuroscience-based dribbling basketball learning model that was developed. Researchers present 5 experts in assessing the feasibility of a neuroscience-based dribbling basketball learning model. Where the experts are 2 experts in the field of physical education and basketball games, 1 expert in motor skills and basketball games, 1 expert in the field of games and 1 expert who is a doctor and expert in neuroscience. After validation, evaluation and revision of the model based on experts, the results obtained were as many as 20 neuroscience-based dribbling basketball learning models that were valid and worthy of trial in large groups.

Table 1.

Expert Judgment

The expert test conducted on five experts contained several constructive suggestions for improving the neuroscience-based dribbling basketball learning model as follows:

1. The name of the learning model is made shorter and more interesting.
2. Drawings and technical instructions are made clearer so that they are easy to understand.
3. The formations are made more varied
4. The intensity of Dribbling basketball should be more
5. All students must perform activities optimally and equally in carrying out dribbling basketball.
6. Always provide corrections for disciplined students in carrying out basketball dribbling activities on each model.
7. The intensity and amount of basketball dribbling must be balanced between the right and left hands (especially for games that are more specific to train the balance of the right and left brain)
8. Adaptation in the form of games and a fun learning atmosphere.
9. Give rewards and stimuli so that children are enthusiastic about doing movement tasks.
10. Application of learning models from easy to difficult.

No	Expert Name	Expertise
1.	Dr. Sri Nuraini M, Pd	Lecture of Sport Science Faculty Universitas Negeri Jakarta (Game Player Expert)
2.	Dr. Lukmannul Hakim Lubay, M.Pd	Lecture of Sport Education and Health Facult Univeritas Pendidikan Indonesia Bandung (Motor and Basketball Expert)
3.	dr. Nurina Hidayati	Doctor (Specialist Neuroscience) PT. Garuda Indonesia
4.	Raden Juan Suryadi Yusuf, M.Pd	Guru Pendidikan Jasmani & Pelatih C Akademi Bandung Utama, Wasit Lisensi A Nasional 5 on 5, Wasit Lisensi Advance 3x3 (Ahli Pendidikan Jasmani dan Bola Basket)
5.	Pupung Purwadi, S.Pd	Physical Education Teacher of Al-Fityan *Boarding School* (Physical Education and Basketball Expert)

11. Use safe equipment.
12. Activities should not be monotonous, multiply variations and strategies in the learning process.

The product model can certainly be seen by how much effectiveness the product has on improving student learning outcomes on the basic movement ability of basketball dribbling. The effectiveness test of the model was carried out at Al-Fityan Boarding School Bogor Regency. By giving first treatment to 20 students of grade seventh B, 20 students of grade seventh C & 20 students of grade seventh

D, a total of 60 students and conducted for 12 meetings.

Table 2.

Dribbling Basketball Average Score

Based on the table above, the output using IBM SPSS Statistics 26 shows that the average value of neuroscience-based dribbling basketball learning outcomes before being given a learning model is 70.57 and after being treated with a learning model of 82.18, it means that the average value of dribbling basketball has an increase.

Table 3.

Pre-test and Post-test Correlation

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	PRE TEST & POST TEST	60	.571	.000

From the table above, the correlation coefficient of the results before and after being given treatment is 0.571 p-value 0.00 <0.05. This proves that there is a significant relationship between the treatment given (neuroscience-based dribbling basketball learning model) and student dribbling learning outcomes.

Meanwhile, in the significance test of the difference with the IBM SPSS Statistict 26, the mean (11.617) shows the difference between the pre-test and post-test, the results of t-count (18.824), df (59) and p-value (0.00 < 0.05) which

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRE TEST	70.57	60	5.735	.740
	POST TEST	82.18	60	4.094	.529

means that there is a significant difference between before and after the treatment of neuroscience-based dribbling basketball learning model. Based on this information, it can be said that the neuroscience-based dribbling basketball learning model is quite effective and can improve basketball dribbling learning outcomes for junior high school students. The diagram below is a comparison of the average basketball dribbling tests before and after being given treatment.

Figure 1. Result Diagram

The results of the experimental trial can be concluded that the neuroscience-based dribbling basketball learning model for junior high school students is feasible and effective to be used.

CONCLUSION

Based on the data obtained from the results of the study consisting of expert validation and effectiveness testing, it can be concluded that:

1. The dribbling basketball learning model that the researchers produced as many as 20 items, this model can provide innovation to physical education learning in schools, especially in basketball game material.

2. The neuroscience-based dribbling basketball learning model that researchers have produced is effective in improving student learning outcomes on the basic movement skills of basketball dribbling.

3. Through the neuroscience-based dribbling basketball learning model for junior high school students, it is hoped that it can provide learning that can stimulate students' brain cells to become more developed.

This product aims to help students achieve physical education learning goals, especially in dribbling basketball learning materials. After reviewing some of the weaknesses that need improvement, this product is presented with some of the advantages of this product as follows:

a) Provide an understanding of motion for students
b) Students become more active, happy and enthusiastic in learning
c) Physical education learning becomes interesting and fun
d) Train concentration, and stimulate students' brains to develop more
e) Train the balance of the right brain and left brain
f) Cultivating a positive character for students
g) Make it easier for physical education teachers to teach dribbling basketball
h) Students are required to make more use of their brains.
i) The time used can be used optimally.

REFERENCES

A. Pribadi, Benny. (2009). *Model Desain Sistem Pembelajaran*. Jakarta: PT Dian Rakyat

Burhein.E. *Aktivitas Permainan Tradisional Berbasis Neurosains Learning Sebagai Pendidikan Karakter Bagi Anak Tunalaras.*Universitas Negeri Yogyakarta: Jurnal Pembelajaran Olahraga Volume 3 Nomor 1 Tahun (2017) Cet. II (Jakarta: Gramedia Pustaka Utama, 2002), hlm. 25-29.

Escamilla, R.F., Fleisig, G.S., Yamashiro, K., Mikla, T., Dunning, R., Paulos, L. and Andrews, J.R. (2010) *Effects of a 4-week youth baseball*

conditioning program on throwing velocity. Journal of Strength and Conditioning Research 24, 3247-3254.

Harsono. (1988) *Aspek-Aspek Psikologis Dalam Coaching*. Jakarta: P2LPTK Depdikbud.

Idrus, Muhammad. (2007). Metode Penelitian Ilmu-Ilmu Sosial (Pendekatan Kualitatif dan Kuantitatif).Yogyakarta :UII Press Yogyakarta.

Mahendra, A. (2009). *Asas dan Falsafah Pendidikan Jasmani*. Bandung: FPOK UPI.

Sarwono dan Ismaryati (1999:43), dalam Gantara, Ega. (2012). Perbandingan Antara Model Pembelajaran Langsung Dan Model Pembelajaran Kooperatif Terhadap Penguasaan Gerak Lompat Jauh Di Kelas VII SMP Karya Pembangunan Baros Kabupaten Bandung. Bandung: UPI.

Schunk, D. H. (2012). *Learning theories: An educational perspective.* In *Reading* (Vol. 5). Retrieved from http://www.amazon.com/Learning-Theories-Educational-Perspective-6th/dp/0137071957.

Sugiyono. (2010). *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif dan R & D).* Penerbit CV. Alfabeta: Bandung.

Wathon, A. (2016). Neurosains dalam pendidikan. *JURNAL LENTERA: Kajian Keagamaan, Keilmuan Dan Teknologi*, *14*(1), 284–294. Retrieved from https://www.neliti.com/publications/177272/neurosains-dalam-pendidikan

Yusmawati, Y., Rihatno, T., & Rismawanti, R. (2020). Meningkatkan Hasil Belajar Gerak Dasar Melempar Dengan Media Audio Visual Pada Siswa Kelas Iii Sdn 03 Jelambar Baru Jakarta Barat. *Jurnal Segar*, *8*(2), 80–89. https://doi.org/10.21009/segar/0802.04