



Development of Learning Model for Squat-style Long-jump Basic Technique Based on Biomechanics with a Game



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DOI: <https://doi.org/10.33369/pendipa.4.1.31-39>

ABSTRACT

The aims of this development research were to produce a learning model for basic technique of squat-style long-jump based on biomechanics with the game for junior high school students and to know the effectiveness, efficiency and attractiveness against learning model. This research used Deff model adopted from Research & Development by Borg and Gall. The subject used was junior high school students which consists of 45 students. The instruments used were need analysis, expert's evaluation, small and large group test. Effectiveness test was to know junior high school students' jump skill level before being given biomechanic treatment. The Pre-test obtained from the students' jump result was about 540, and Post-test was about 812. The conducted t-test between the experiment group and the control group obtained was $t = 10.152$ and in the n-gain score test between the experiment group (biomechanic treatment) obtained by 76% (effective) and the control group obtained by 43.40% (less effective). Therefore, this game model is effective in increasing students' jump learning. According to the result, it could be inferred that: (1) this model can be developed and applied in physical education, (2) the model proved that there are significant difference in pre-test and post-test between the experiment group (biomechanic treatment) and the control group after the treatment model, based on N-gain test.

Keywords: Development research, game model, biomechanics, long jump.

INTRODUCTION

Physical education in sports and health is one of the subjects taught to students at each level (Sumarsono et al., 2017). Physical education has a strategic role and function in developing students' subjects and focuses on the physical realm (Ilham, 2011; Prasetyo, 2016; Syarifudin et al., 2011).

Athletics is a sport that includes compulsory material in physical education subjects that must be taught in schools because it has an essential role in daily life (Hasan, Winarno, & Tomi, 2015; Lufthansa, 2017; Djumidar, 2004). The students' involvement in athletic learning program is hoped could help to optimize the students' development and growth, increasing the students' body vitality component, such as durability, power, flexibility, agility, balance and motion coordination. Besides developing athletic learning physical aspect, it is also expected that it could develop mental aspects, such as learning motivation, confidence, bravery, discipline, tolerance and cooperation which

means some social aspects, also it is expected to change to the better one. Physical education surely have the objectives to be reached. In order to reach the objectives of the education, it needs learning and teaching process where it is a kind of reciprocal activity between the teacher and students, so that there must be a perfect lesson planned by the teacher. If the education is planned well and the guidance runs well, it will reach the objective of education as well too. In UU RI No. 3 Year 2005 article 1 verse 11 tells about national sports system formulated that sport education is physical education and sports that was conducted as the part of the well-organized and sustainable education process which aims to gain the knowledge, personality, skill, health, and physical fitness.

Innovation in improving learning outcomes is essential (Ahmad, 2018). A kind of innovation that could be done is to increase the students' learning result in physical education subject, which has a lot of ways and method, they are:

innovation in infrastructure of the learning, the approach of learning process and so on. In the process of learning physical education, teachers are expected to be able to provide comprehensive knowledge and knowledge. The application of the modified teaching approach will support the birth of qualified human resources who can compete in the era of globalization (Margono, 2012). In physical education learning process, it is expected that the teachers are able to convey all of their knowledge. In physical education learning process, a teacher should pay their attention on the characteristic of age at every each of education level, because the design of physical education learning refers to the ability that relate to theory of students' developing phases. Simply, motor learning could be interpreted as a motion skill of learning process and refinement of motor skill, also as the supporting or obstructing variable the acquisition or motor skill. Motor learning aspect in education is the aspect which relate to the action or behavior which is done by the students after receiving the material from the teacher. The importance of the health education teacher looking for a motor development learning model that is relevant to the characteristics of students and flexible (Adhy Suroso, Eunike Raffy Rustiana, 2013).

The objectives that will be reached in long jump learning in different school is purposed for the best long jump athlete. Long jump learning at school takes more focus on three aspects as a whole, they are cognitive, affective and psychomotor. Cognitive that will be reached through the long jump learning is to increase the students comprehension on long jump squad style basic technique concept. Moreover, the students' bravery, hard work, confidence of affective could be developed. Psychomotor is expected motion experience is improved and the amount of students' learning activity time also increased so that has a big impact against the students skill.

In elementary school level, long jump learning is usually began with basic movement, because the students is still in motoric motion growth at their age. While in junior high school, the long jump learning is began with basic technique. So, there are some differences in every learning because in junior high school, students must comprehend the long jump basic technique as well. Therefore, the researcher is interesting to

do the development model of learning the basic technique of long jump in junior high school students. Related to the statement above and the result of the observation and the interview between the researcher and teacher of physical education in junior high school. The play method can improve student learning outcomes in participating in learning, where students become active and enthusiastic in following essential long jump motion learning (Djawa, 2017; Ilham, 2011; Suharnoko & Firmansyah, 2018). Game methods are more effective and efficient to increase achievement, interest, and motivation for students in learning physical education (Maksum, 2017; Saputra, 2015; Sudarwo & Yohanes, 2011).

Sugiyono (2011) states that, research and development are research methods used to produce certain products and test the effectiveness of these products (Sugiyono, 2011). So the development of learning models is the result of research oriented to the results of product development. Model development is the result of research oriented to the results of product development (Schmidt & Tatarko, 2016).

It is found the fact that, as follows: model of learning the basic technique of long jump in junior high school students did not run well according to the material of the curriculum and also the students felt so bored and saturated in learning the basic technique of long jump. In order to overcome the learning the basic technique of long jump, it is a must to do the development of learning model with game so it will ease the students in learning long jump basic technique and it also could increase the students' learning result in long jump squat basic technique.

METHODS

Time and Place of Research

This research was conducted in January to March 2019 at SMPN 14, SMPN 5, SMPN 18 and SMPN 2 Bengkulu city.

The approach used in this research is qualitative and quantitative approach, which is an approach to determine to find the answer of the problem through the problem of the research that had been formulated that is based on biomechanics with the game.

The result of this development research is that the researcher will use the development model of learning the basic technique of long

jump squat style based on biomechanics with the game for junior high school students where the product could produce a complexity of the learning method with its effectiveness of the model development created, so that it could improve the students' motivation in learning and also could be used by the teacher as their plan to increase long jump squat style basic technique learning. This research and development in learning using qualitative and quantitative and also using Fedd Model which adopted from the Research & Development of Borg and Gall which consist of 10 steps then it was developed again until 11 steps, as shows by the following diagram:

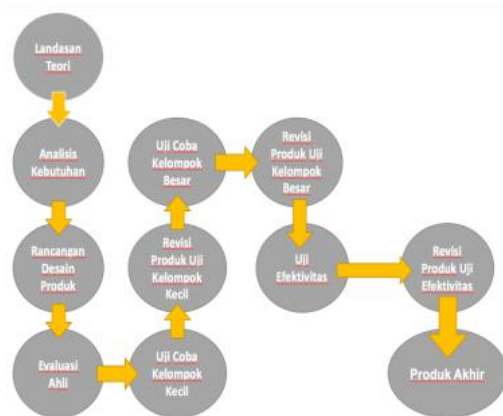


Figure 1. Deff Model (the development of Borg dan Gall Model)

RESULTS AND DISCUSSION

Result

That 20 of 24 development model that had been developed. Based on the expert's test about the development model of basic technique of long jump squat style based on biomechanic with the game. It can be concluded, as follows: 1) the picture need to be cleared so that it is easier to be understood, 2) range of the jump need to be cleared, 3) the cue in model is need to be cleared because it is important for early students' controlling, 4) in order to help the teacher in using this model, it is important for them to have the guidance book with the video also.

Model Effectiveness/The result of the Phase I

A test on small group of students SMP 14 Bengkulu is about 15 students. Basic technique of long jump squat style based on biomechanic with the game in junior high school students that made by the researcher had been evaluated by the

experts, then being revised in phase I. The data is used as the fundamental in revising in the phase and also for the next phase that is phase II.

Based on the test evaluation on small group which is done by the researcher, it can be concluded as follows: (1) Basically all the variations could be implemented, but it must be adjusted from the easiest to the hardest one so that the students skill could be increased. (2) While doing a test on small group, it is a must that all models must be arranged from the easier agility learning model to the difficult one.

The result of the phase II/large group test

After the result of development model of learning basic technique of long jump squat style based on biomechanic with the game in junior high school students is tested with the small group and had been revised. Next, the researcher did it with large group. According to the limited test result (small group test) that had been evaluated by the experts, then the researcher revised the early product and obtained 20 long basic technique of long jump squat style based on biomechanic with the game that is going to be tested to the large group.

Next step, after the model had been revised in phase II by the expert, it comes by continuing the test to the product that is large group and using about 45 students, consists of 15 students of SMPN 2, 15 students of SMPN 18, and 15 students of SMPN 5. From the tabel above, it shows that the result of large group in Pre-Test are obtained as the early test and Post-Test are obtain as the closed test. Before the implementation of learning model is implemented to the students, the researcher conducts a Pre-test in order to know the result of the subject, is there any increasing on the long jump learning result after giving learning basic technique of long jump squat style based on biomechanic with the game treatment. To calculate the effectiveness, the researcher uses T-Test with two different mean as independent sample. As said by Kadir (2010: 198) that independent sample is a sample which is the existance has the correlation. In calculating by using SPSS 16 with paired analysis sample t-test.

Test Normality

According to the output result by using SPSS 16, Based on the output above, it is known the significance value (sig.) For all data both Kolmogorov-Smirnov test and Shapiro-Wilk test>

intensive supervision from the teacher (Musa, 2017; Sumarsono et al., 2017). Teachers must master the teaching material and have the latest references. Teacher knowledge is positively correlated with the process of teaching and learning activities (Zuriah, Sunaryo, & Yusuf, 2016). The importance of improving the quality of education and the quality of education services that can educate and teach while producing quality students and graduates (Muhlison, 2014). Teachers need to increase knowledge to enrich the material to be conveyed and not make students experience boredom. Increasing student interest is very important in the learning process (Budiarti & Muhammad, 2013).

3) The learning model must be arranged based on the level of difficulty to facilitate the teacher in providing material

The teacher must understand the level of difficulty of the learning model before teaching. The level of pain can be analyzed by trying to understand the model associated with the ability of students to be taught. The learning process must be done with clear stages. The process is better done in a row. They are starting from an easy process than to a more difficult learning process. This is done so that students are easy to understand every long jump movement.

Product Discussion

Long jump squat style learning model based on biomechanic with game is made by the researcher to help in increasing long jump squat style result. So, this model is created certainly for a need of junior high school students to persuade them that learning this material is more fun. Therefore, this model is expected become the reference for the teacher, coach and also for the students itself.

After some study, this product has some weaknesses that need to be revamped, however there are some superiority of this product. They are:

1) It is able to increase the basic movement and basic technique of junior high school students.

Based on the results of the trial mode, the model can be used and can improve the student's jump results much better. Teachers are expected to teach a variety of fundamental movement skills, techniques, and strategies for games and sports, internalization of values (sportsmanship, honesty, cooperation), and healthy living habits. The

implementation is not through conventional teaching in the classroom that is theoretical study but involves physical, mental, intellectual, emotional, and social elements (Hartati, 2012). According to research conducted by (Ariawan & Hartono, 2014; Bhayangkara, 2018; Djawa, 2017) that the game increases students' interest in doing basic movements. Middle school students are still in the age category of children, so motor skills are primarily determined by the benefits of these students. Students' interest is due to the play of games that children tend to like. Therefore, the game is considered to be very useful as a learning approach.

2) This model can be conducted in some games approach model

The model contains elements of play and competition, and the majority of students like it. Learning while playing a race is essential to do to increase student interest in learning. According to research conducted by (Ariawan & Hartono, 2014; Bhayangkara, 2018; Djawa, 2017)), students' interests are strongly influenced by the pleasant circumstances in the game. The teacher must have good creativity to attract students' attention in sports. In addition to using games, increasing competitive activity also needs to be done. Competitive activities can be carried out by competition. The competitive atmosphere can increase the enthusiasm of students to show their abilities. Students pay more attention to the competition to do the techniques taught by the teacher.

3) Moreover, it can stimulate the students' psychomotoric, cognitive and affective

With this model applied, students can quickly move actively. Students' active movements can improve children's psychomotor motion, making children more happy to move than to remain silent. Teachers are expected to provide a place and facilities for children to develop cognitive, affective, and psychomotor abilities through play activities that are fun for children. Thus, stimulation for holistic growth and development of children can be appropriately achieved. Through a variety of fun physical activities, children get a positive impact, especially on their growth and development.

4) The students can feel comfortable and safe in learning and teaching process.

Safety and comfort in the learning process are essential to do. A high sense of security in learning can increase student interest in education. There is a sense of insecurity faced by students due to fear of injury. So the biomechanical method using games provides a sense of security for students. Besides, comfort in learning can also be realized along with the knowledge of security they experience. A sense of safety and comfort supports the learning process that is more conducive for students. It is expected that a sense of security and prosperity can be correlated with increasing student competence. Based on research conducted by wisdom (2015) If the physiological needs and the need for security have been fulfilled, then comes the need for love, affection, and a sense of belonging. So that will develop an understanding of respect for the lesson and support the success of long jump learning.

5) The students can be more active and enthusiastic so that they would not be bored

By applying the model, children tend to prefer learning while playing so that the child can master the movement better. According to (Fauziah, 2013), Physical factors come from students during teaching and learning activities. Students experience fatigue or fatigue experienced by the body because of the activities they carry out. Causes the emergence of student learning saturation, including lazy learning, ignoring the task, the concentration decreases so that some of them pay less attention to the lesson. With the application of this model, it is expected that students will not experience saturation due to slowness. The teacher must adjust the capacities of each child's age.

6) It can help the teacher in delivering the basic technique material.

With this model, the teacher feels more helped in the learning process. The model is straightforward to do and applied with game elements.

7) As a motion activity reference, physical activity and teaching material.

The model can be used as a reference because it has an element of movement that is relatively relative and easy to do. So that all changes can be done well. It is used to increase the physical activity of students and become suitable teaching materials to be applied.

8) As a reference and new knowledge especially for physical education and sport in school.

The model can provide more benefits in the field of physical education and sports because it has elements of useful and fun movements.

Limitation of the product

This development research has strived to the maximal level suitable with the researcher skill, however in this researcher still get some limitation that must be admitted. The limitation as follows:

1) The field test in this development research is conducted in limited scope so that this research will be better if there were wide scope.

This research was conducted in a limited scope because it only uses four schools as a sample. It would be better to use more samples for research respondents. The more bear sample, the expected results will be better. Subsequent researchers should use the model in more extensive trials than they did before so that it can see a lot of effects and can be used by many people.

2) The product is used still imperfect.

The products of this study have shown significant results both. But still far from perfect. It is due to various limitations that have been explained before. Although there are deficiencies, researchers hope that the next model will be better and be able to be applied and produce better products. A good model will show good results as well, with an increase in creativity and innovation in the learning model of the game even better.

3) The limitation of Learning facilities and infrastructure

Learning facilities and infrastructure in each school have differences. Teaching facilities in the sample area are considered to be very limited. So that in the process of collecting data affect the model that will be applied. Because of the lack of support from the school, the researchers used the facilities and makeshift tools available at the school and modified the equipment far.

4) The explanation and procedure in this long jump squat style learning model based on biomechanic is still out of perfect.

Material delivery procedures must be very clear. Explanations made to students need to be done well and easily understood by students. Procedures in long jump movements are explained in a way that is easily understood by students. The researcher hopes that in the future

the teacher will be better at delivering the procedure in detail so that students can easily understand the learning model

CONCLUSION

Based on the data obtained, from the result of field trial and the result of this research, it can be inferred that:

1. The learning model that researcher developed that this long jump squat style learning model based on biomechanic with game can make the students more motivated and active in learning and teacher process for the junior high school students.
2. From the observation, the effectiveness of long jump squat style learning model based on biomechanic with the game has good effectiveness. This can be showed by the result of T-Test against the ability of long jump squat style based on biomechanic with the game that there were any significant improvement. So, this long jump squat style based on biomechanic with the effective game learning development model can increase the long jump squat style learning.

According to the result and conclusion above, it has implications on the development model of learning the basic technique of long jump squat style based on biomechanics with the game in junior high school students.

1. The development of model of learning the basic technique of long jump squat style based on biomechanics with the game is one of the effort to help the students in learning basic technique of long jump squat style based on biomechanics become more active, effective, happy and a lot of fun.
2. The development of long jump squat style basic technique learning model based on biomechanic with game has the principle that encourage the teacher to assess the students need in learning, so that the students can learn basic technique based on biomechanic and they are going to think that it is a fun for them and it can increase their quality of multilateral movement such as run, jump, repulsion, landing and others.
3. The development of long jump squat style basic technique learning model based on biomechanic with game principally is an effort to change learning paradigm that the learning

is more oriented to the teacher, become more oriented to the students. Furthermore, pedagogically learning can implicate to the role and teacher's job as the facilitator, mentor and also as an evaluator.

Based on the advantages and the weaknesses of this developed model, the variety of situation and condition of the place, development diversity of the user skill of this developed model, it is a need to be formulated some advices in using this model so that it can run more effectively and efficiently. And some advices as follows:

Utilization suggestion

This development product is a the basic technique learning of long jump of junior high school students is used to help the increasing of long jump skill result. Therefore, it is a must to have suggestions advices of the utilization of the product in reaching the objectives. There are some objectives here. They are:

1. Situation and condition of the school. It means a lot of variation model, so the teacher needs to adapt and choose the suitable variation model based on the situation and condition of the school.
2. Understanding the analysis skill of the students' biomechanic motion. It means that the teacher should choose the suitable variation model for the students so that the movement activities that convey to the students is easily understood.
3. Understanding the students' characteristic. it means by understanding the students' characteristic, the teacher can determine kind of variation model so that in delivering the learning material become more efficient and effective.

Dissemination suggestion

In development dissemination to the wider target, the reseacher give some suggestions, they are:

1. Before dissemination, it is better that this the development model of learning the basic technique of long jump squat style based on biomechanics with the game was redesigned and repaired so that it will come to the better one. For example: change the cover into an attractive cover and with communicative sentences in the product so that it can be easily understood and will persuade someone to read it.

2. The printed book must be produced as much as possible so that the teacher can comprehend and apply this model with perfect or effectively and effieciently.

The further development suggestion

This product also still need more assessment and test intensively and susistainable. Therefore, in order to develop the further research. There are some suggestions. They are:

1. It is better for the subject of the reseach to expand the number of subject or the school itself SMPN 18, SMPN 14, SMPN 5 and SMPN 2 used as the tested group.
2. Considering the subject of the reseachr are SMPN 18, SMPN 14, SMPN 5 dan SMPN 2 students, it is expected for further development that all public school and private school in Bengkulu City can take role on it.
3. The further development model is expected to be more variative, innovative and stimulate the students' enthusiastic in moving.
4. The further development model is much better to provide the basic motion based on the difficulty level (easy, medium, and hard), the it will ease the teacher in delivering the learning material.

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