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Volleyball passing model through game-based approach

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ABSTRACT

Passing in volleyball is highly significant to support the game. Good passing will determine the course of attack and defense in the game. This research aims at creating volleyball passing models to improve students' passing skills. It uses the method of ADDIE (Analyze, Design, Develop, Implement, and Evaluate). The analysis stage is to identify the source of the cause of the performance gap. The design stage is, verifying the desired performance, and the appropriate test method. The develop stage, namely, conducting, and validating learning resources. The implementation stage is preparing a learning environment and involving participants. The evaluate stage, namely, assessing the quality of learning processes, and products, both before and after implementation. Participants in this study are elementary school students who are in the fifth grade, as many as 64 people. The instrument used in this study is a test of passing up and passing down volleyball. This research found: (1). Based on the analysis carried out, passing is a crucial skill in volleyball games, however, students still experience various obstacles in their learning and motor skills. (2). The design stage is to inventory the tasks that students will do related to volleyball learning. (3). The develop stage has produced 13 games of volleyball passing model content which were validated by experts, and the proper media was chosen to help learning volleyball passing. (4). At this stage, the passing model is applied to the participants. (5). The evaluation results show significant results from the volleyball passing model through a game-based approach to volleyball passing skills. Therefore, it can be concluded that the volleyball passing model through game-based approach can be used in volleyball learning to improve the underhand and overhand passing skills.

Keywords: Model; volleyball; passing; game-based models

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INTRODUCTION

Passing is a highly important technique in playing volleyball. Passing is pivotal especially when receiving serve and is considered the most critical skill in the game (Lopez, 2013). Without an effective pass, it is very difficult to attack. So, it is very necessary to have a good mastery of passing (Dearing, 2019). For the receiving team, passes are their first chance to set up their offensive system and put them in a position to score points. A good pass will allow the setter to distribute the ball across multiple hitters and prevent blockers from crowding individual hitters. Poor passing makes it difficult to set up with accuracy and limits the available hitters to attack (Hebert, 2013). This makes it easier for defenses to get into positions that

increase their chances of winning the rally (Schmidt, 2016). Learning the basics of volleyball can be a lot of fun. Volleyball is a unique and exciting game that requires solid teamwork and consistent individual execution (Purnomo & Hariono, 2020). Unlike many other team sports, players are rotated to different positions on the field, so all players must be prepared to play various roles on the team (Dearing, 2019).

Professionals agree that basic volleyball skills such as passing, serving, and hitting will be closely related to game performance that can affect success in volleyball (Silva, Lacerda, & João, 2014). Therefore, the development of playing skills is seen as an important component in volleyball learning and coaching (Casebolt, Zhang, & Brett, 2014). Ball handling ability turns out as the important technique in a game. It happens because one-and-half up to two-thirds in playing a game is doing passing skills (McManama & Shondell, 2013). Ozawa, Uchiyama, Ogawara, Kanosue, and Yamada (2019) found that one of the important passing skills is overhand pass. In addition, Satria (2019) Overhand passing is very important in volleyball because it is the first step to organize an attack. The success of the smasher or other players in carrying out attacks is determined by mature passes through the overhand passing. By considering this, it is clear that overhand passing is very important in playing volleyball. Based on some of the opinions above, it is clear that playing volleyball is strongly supported by good basic technical skills. Good basic technique will be one of the determinants apart from playing skills. In addition, appropriate learning is also needed so that all basic skills and playing skills can be developed. Volleyball learning must be designed in such a way that it can have a positive impact on students (Mushofi, 2017). One of the steps that can be taken is to do learning through various games or Game-Based Approaches (GBA). In GBA lessons (Jarrett & Light, 2018), it is theoretically possible that knowledge construction occurs through active student involvement in games and games that raise problems, questions, and discussions and reflection on games and developments on games to develop these. Through this, students continue to build and to reconstruct knowledge about the problems presented. In addition, the game must be designed with media that supports the game. The structure of the game involves components such as equipment, number of players required to play the game, restrictions, rules, and skills required to be successful at the game (Zirawaga, Olusanya, & Maduki, 2017). In addition Foulkes et al. (2017) suggest that playing game should be done in long period of time and frequent so that it could be more effective. Learning passing techniques are important as it determines the success in performing volleyball game. Less proficient students' ability in performing passing skills, however, can interfere the game and the worst result it might cause loss for the team. Passing plays a pivotal role in performing volleyball game. Well-performed passing skills, however, they could support the game particularly in carrying out the attack and defense aspect in game. Thus, by having insufficient passing skill, it would harm the team's performance.

In fact, at the age of children, playing is a very important part. Children will interact physically, psychologically, and socially. They will learn to understand each other's tasks, work together to attack and defend, also understand each other's characters. According to Englebright (2020) while playing a game, children tend to involve their experiences to create their own game - creating the rules of the game, and actively involved. According to Frost et al. (2012) prefrontal cortex will be developed through physical activity, as well as children's games. Wang and Ha (2013) acknowledge that the teachers are aware of this potential impact of playing games. Some of its potential impacts are: (1) playing games facilitate children's technical and tactical development; (2) it also makes them (the children) become more independent and responsible individual; (3) furthermore, they (the children) are able to tactically play in a whole game; (4) last but not least, games, however, could increase children's happiness. Many Researches was carried out concerning to underhand pass development. Widarto, Pardjono, and Widodo (2012) studied on the development of exercise models variation using direct teaching in its implementation. In addition, Mushofi (2017) studied on the exercise models development on underhand pass using both movement variations and direct teaching. Besides, Hary (2019) studied on the development of overhead pass of Junior High School students ages. It focused on the technique and direct teaching. Furthermore, Pratiwi and Anggara (2021)a did the study on volleyball underhand pass model of novice athlete in Universitas Islam Kalimantan, Banjarmasin. This study created at least ten exercise models of volley ball underhand pass, including passing attitude, strategy, exercise model, and exercise variations. Some of previous studied exposed earlier

were focused on various models of exercise that implemented in direct teaching. Meanwhile, in this study, the writer implemented the passing models through games. Those games aimed at accustoming the players in any volley ball game situation.

Through the creation of a volleyball learning model based on a game approach, it is expected that it can improve basic technical skills and playing skills in elementary school students. This research focuses on creating volleyball passing models by using media that customized to the students' ability development. It is aimed at facilitating students in learning volleyball passing techniques.

METHOD

The research method used in this research is research and development by following the ADDIE steps (Analyze, Design, Develop, Implement, and Evaluate) (Branch, 2009). The steps taken are as follows:

1. The analysis stage is to identify the source of the cause of the performance gap.
2. The design stage is verifying the desired performance, and the appropriate test method.
3. The develop stage, namely, conducting and validating learning resources.
4. The implementation stage is preparing a learning environment and involving participants.
5. The evaluate stage, namely, assessing the quality of learning processes and products, both before and after implementation.

The participants in this study are elementary school students in the district. Bandung with a total of 64 people consisting of 34 male students (average age ± 10.8 years) and 40 female students (average age 10.9 years) all of the participants involved have received good permission from parents and school principals. Total sampling technique was administered to the third-grader to determine the sample. This research was conducted from March 2019 to December 2019. The instrument used in this study was the forearm and overhead pass instruments (Nurhasan, 2005). The data obtained will be tabulated and processed using SPSS 20.

RESULTS AND DISCUSSIONS

The research was conducted by following the research and development steps with ADDIE. The results of this study are:

Analyze Stage

This stage is conducted to identify possible causes of performance gaps. The results of the identification that have been carried out are as follows:

Table 1. Identification of Desired Performance and Causes of Performance Gaps

Desired Performance	Primary Causes
Learning volleyball is carried out through several stages Bompa and Buzzichelli (2019) explained that the initial stage of practicing volleyball can be done starting from the age of 10-12 years, then the specialization stage at the age of 15-16 years and can achieve the best performance at the age of 22-26 years.	The results of observations conducted Pamungkas, Rahayu, and Rahayu (2019) on volleyball learning for SDN 6 students showed that: (1) the low level of mastery of students' basic passing techniques; (2) student volleyball learning outcomes were low and did not meet the minimum completeness criteria (KKM) set by the school, namely 73. Only 31.03% of students reach the KKM
Passing is very important in volleyball. Passing is used in receiving serves and is often considered the most critical skill in the game. Without an effective pass, it is very difficult to carry out an attack (Dearing, 2019).	Based on observations and interviews Ajayati (2017) it showed that in the passing learning process, not all the material mandated by the curriculum could be implemented, the methods taught in learning were still conventional, indicators of the adequacy of learning objectives have not been achieved by the unfulfilled movement of students, and students' motor skills have not been achieved, not in a good category, volleyball learning facilities and infrastructure were still lacking, volleyball learning programs applied to activities still referred to volleyball program achievements.

Desired Performance	Primary Causes
For the receiving team, passing is their first chance to set up their attacking system and put themselves in a position to score points. A good pass will allow the setter to distribute the ball to several hitters and avoid opposing defenders (Schmidt, 2016).	The following situations were identified as difficulties, in the observation process carried out, namely: building attacks, occupying space on the field, looking for empty spaces, touching the ball, and directing serve (Dao & Nguyen, 2021).

Design Stage

The purpose of the design stage is to verify the desired performance and appropriate test methods. Upon the completion of this stage, it is intended to be able to prepare a set of functional specifications to cose performance gaps due to a lack of knowledge and skills. The results of the design stage are as follows:

a. Conduct an inventory of tasks that will be carried out by students. In this study, the task that must be done by students is to practice various games in learning volleyball. And apply the attitude of responsibility, cooperation, and mutual respect.
b. Writing performance goals, namely writing test items that will be carried out, objectives, and tasks that must be carried out by students, are as follows:

Table 2. Performance Goals

Test Items	Goals	Tasks
Overhand and underhand passing test	To find out the ability of overhand and underhand pass	Conducting overhand and underhand passing test

Develop Stage

The purpose of the develop phase is to generate and validate the selected learning resources. The general procedure related to the Develop phase is as follows:

a. Making Contents

This study aims to improve passing skills in volleyball games. As for supporting the objectives of this research, some content will be made in the form of volleyball learning stages, namely as follows:

Table 3. Contents of Volleyball Passing

No	Contents
1	Play the ball individually
2	Play the ball with other people
3	Control the ball with one hand and with the forearm individually
4	Basic stance and underhand pass with footwork
5	Underhand serve and reception
6	2-on-2, 3-on-3, 4-on-4 games lead with underhand passes and one-handed passes
7	Passing from catch and throw
8	Passing with footwork
9	Leadership Game (2-on-2, 4-on-4) using overhand passes and underhand passes
10	The game (2-on-2, 3-on-3, 4-on-4) uses passing with attack
12	Lead play (2-on-2, 3-on-3, 4-on-4) using passing and setting
13	2-on-2, 3-on-3, 4-on-4 games lead with underhand passes and one-handed passes

At this stage, validation is also carried out on the content that has been created with the following results:

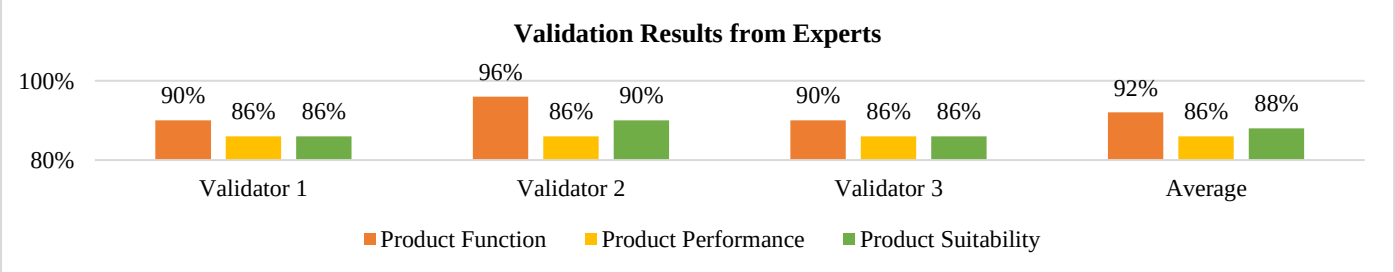

Figure 1. Validation Result of Contents

The validation results from validators 1, 2, and 3 show an average product function of 92% which means it is very suitable, the appearance of the product is 86% which means it is very attractive, and the suitability of the product is 88% very suitable. The validation results show that the development product is very good and ready to be used in the implementation phase.

b. Choosing supporting media in learning

The media in this study are chosen to support the learning so that the research objectives can be successful. The supporting media used in this study are as follows:

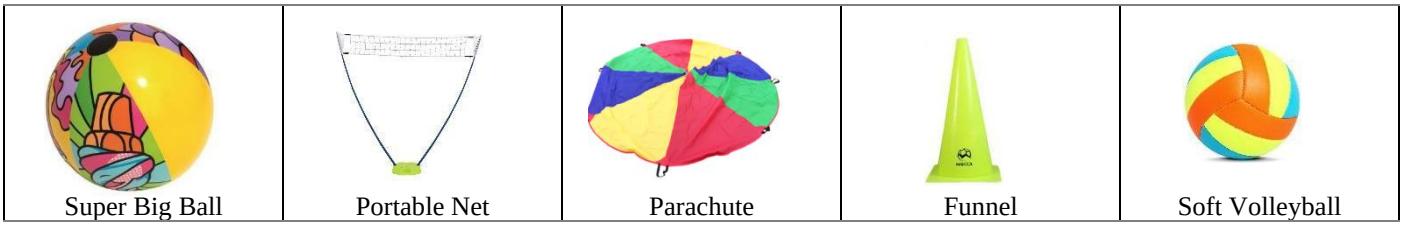

Figure 2. Supporting Media

c. Conducting a Test

In making product revisions, the researchers conducted tests on non-respondents. At this stage, the researcher tried to see the weaknesses of the product made, through a small group trial with a sample of 8 to 20 people (Branch, 2009). This trial will determine the level of reliability of the product made. The results obtained at the trial stage are as follows:

Table 4. Test Results

Paired Sample Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	S td. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Overhand Pass	4.201	3.012	.801	2.831	5.211	8.959	19	.000
Pair 2	Underhand Pass	4.365	3.780	.896	2.568	5.412	8.658	19	.000

The table above shows that at the trial stage, students saw significant changes in overhand and underhand pass.

Implement Stage

The implementation stage is the stage of applying the content that has been created to the experimental group and control group. The implementation design uses a pretest and posttest control group design (Fraenkel, Wallen, & Hyun, 2012).

Table 5. Research Design in Model Effectiveness Test

Treatment	R	O	X	O
Control Group	R	O	C	O

Evaluate Stage

The last stage in the ADDIE approach is the evaluation phase, this stage which will be carried out through overhand and underhand passing tests. The results of this study are as follows:

Table 5. Pired Sample Test of Experiment and 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	Posttest_Eks - Pretest_Eks	3.93469	2.83859	.37301	2.99945	3.89542	8.991	33	.000
Pair 2	Posttest_Con - Pretest_Con	2.23333	1.50930	.22652	1.38709	2.27957	4.093	29	.000

The paired sample test table shows that the experimental group who is given learning using the passing model through a game-based approach shows significant results and shows better results than those given conventional learning. This can be seen from the average development of the experimental group with a value of 3.9 which is greater than the control group which is only 2.2. By looking at the previous studies, the study on underhand pass in volley ball learning (Widarto, Pardjono, & Widodo, 2012), the study revealed that all the learning models are feasible and applicable. It was proven by the result of students' learning in the first and second trial, and the result of data analysis. In addition, Mushofi (2017) deduced from his research that overhead passing models development that administered to high school students in Malang, he found that the part of 'organizing class or learning procedures' and 'learning evaluation' in a form of book were feasible and applicable as it includes the criteria that can be used as learning guidelines for both teachers and students. Furthermore, Hary (2019) acknowledge that according to the development's result, it can be deduced that: (1) by implementing volleyball overhead pass for junior high school student ages, students learn effectively and efficiently. (2) by implementing the models that had been developed by the researcher, the students are actively motivated in participating the learning process. Pratiwi and Anggara (2021) carried out the study on underhand pass in volley ball novice athlete. From the study, they gathered not only the positive response and the models that are applicable to the novice athlete, but also found that this revealed that it impacts positively to the students. In addition, this study provides variety games equipped by safe and new media that could motivate the students to learn better.

This means that the volleyball passing model through a games base approach significantly improves volleyball passing skills. According to Butler and Griffin (2010) learning through playing games, students would begin to apply their own fundamental skills based on the needs, situation, and problems encountered. Perhaps, it might occur in any situation in any games and it is one of physical literacy principle. Playing games, however, could encourage them to interact, work collaboratively, and develop teamwork. Besides, it also can be implemented in warming up and cooling down activities in order to increase excitement in doing physical activity (Ministry of Education Republic of Singapore, 2013). The game model has the following potentials: (1) facilitating the development of technical skills and tactical knowledge; (2) empowering children to learn independently and responsibly; (3) assessing tactical transfer across games; and (4) increasing fun and enjoyment in playing games (Wang & Ha, 2013). The game approach is loaded with teaching tasks given to students, stimulating students to think and find out for themselves the reasons that underlie their performance. This approach provides a lot of understanding to students about the benefits of each action and behavior. Thus, students are given the widest opportunity to assess themselves and their abilities during the learning process (Singgih, 2012). Games provide opportunities to gain knowledge about something, train imagination, provide opportunities to interact with the surrounding environment, and to express oneself in socially acceptable ways (Ginanjar, Suherman, Juliantine, & Hidayat, 2019). Beiter et al. (2015), children engage in types of games that reflect their level of cognitive development: functional games, constructive games, symbolic/fantasy games, and games with rules. The details are as follows:

1. Functional game is the use of body movements, with or without objects, such as running and jumping, sliding, collecting and throwing, manipulating and stacking objects, and informal game without rules.
2. Constructive game uses objects — blocks, Legos, Tinkertoys, or other materials (sand, clay, paint, blocks) —in an organized, goal-oriented way to make things.

3. Symbolic/Fantasy games are role-playing or belief games, such as pretending to be a baby, firefighter, superhero, or monster, and performing acts of belief, such as driving a car by driving a pretend steering wheel, or using a block of wood as a mobile phone.
4. Games with rules are games with peers controlled by predefined rules, such as tag, Mother-May-I, checker, Duck-Duck-Goose, and so on.

Playing games is a great way to help children enjoy practicing certain motor skills. Group games and relays require children to interact with their peers and encourage them to work together and develop teamwork. Games can also be used to inject fun and enjoyment and add variety to warm-up and cool-down activities. Enhancing children's fundamental skills including agility, balance, coordination, and speed are enormously important to be developed in their growth period. It is necessarily developed in fun way; i.e., through playing games.

Various sports such as gymnastics, diving, skating need special skill in young ages. Whereas, another special skill in other sports like football, basketball, and volleyball must be owned at the age of 12 to 15 (Byl & Kloet, 2014). Good education includes game activities in the learning process (Suhaedi, 2016). Roach and Keats (2018) acknowledged that game-based learning offers more advantages on the children's fundamental skill development. It is evidence that involves actively in playing game could develop fundamental skills. Besides affected by the physical activity, the development of fundamental skills also affected by gender. Jarvis et al. (2018) identified that there are differences between girl and boy in their fundamental skill development. All of these fundamental movement skills could be developed through playing games. In addition, it can be developed by doing simple games. Through this activity, the students were encouraged to comprehend the tactical skills. The teacher asked not only "how", but also "what", "where", and "why". It is expected that there will be interactions and coordination during the game played. Therefore, the concept of learning had been shifted in the last decade. Nowadays, the approaches tend to be student-centred learning that problem-based and not teacher-centred (Tan, Chow, & Davids, 2012).

In addition, Frost et al. (2012) suggested that children enjoy these group activities and sports, are proud of their uniforms, and look forward to the games and performances. If handled properly by adults, exercise can have positive effects, including the social experience of being part of a group. However, sports activities are organized and led by adults and physical activities are limited to those related to sports. Karisman (2020) found that game-based approach could improve students' skills in volleyball. By playing, children are actually practicing skills and they get satisfaction in playing, which means developing themselves. In playing, children can develop gross and fine muscles, improve reasoning, and understand the existence of their environment, form imagination, fantasy, and creativity (Rana, 2017). Play voluntarily, seriously, and happy are the indicators of game-based approach. By implementing this approach, it is expected that it could highly motivate the students to learn (Musthofa, Subroto, & Budiana, 2016). Paramitha and Anggara (2018) argued that the implementation of educative games model could develop children's psychomotor, cognitive, and affective skills. Their psychomotor were developed through body movement activities. Their cognitive were developed as they were urged to solve the problems individually and collaboratively. While their affective were developed through mutual help and assistance attitude that they did during the activities. Through the games made in this study, hopefully it is able to improve students' volleyball passing skills. This research is expected able to give contribution in passing learning in volleyball games. Volley ball passing mastery, however, plays pivotal role in performing attack and defense in volley ball game. This study limited to the variation of models that have not been digitalized that could facilitate both of teachers and students in learning the passing materials. It is suggested to the further researchers who are interesting to the similar research, to digitalize the whole variation of passing models in a form of application media or other digital forms.

The model creates through the ADDIE stage has gone through a series of processes to create 13 variations of the game. The variety of games implements through the games base approach has been implemented significantly to improve the underhand and overhand passing skill in volleyball games. This research is limited to the sample quantity involved at the primary level. Thus, it is considerable for further researches to involve more samples at various levels. Besides, it is also suggested for further researchers to

develop volleyball passing models. The development might be in its learning media. Perhaps, it can be used and customized to the modern era (for instance by developing it into downloadable application) so that it will be easier to be learned.

CONCLUSION

This research results thirteen models. Those models then are validated and piloted. In the step of the implementation, it shows that volleyball passing model through game-based approach significantly affected the improvement on students' passing skills in performing volleyball game. Besides, the created learning-media can support the students' performance in their volleyball-passing learning. It is considerable for other researchers who have the same interest to develop this research into digital and interactive media. Thus, the development can support technology-based learning and might help students to learn volleyball passing.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest associated with this manuscript. We know of no conflicts of interest associated with this publication, and there has been no significant financial support for this work that could have influenced its outcome. As corresponding author, I confirm that the manuscript has been read and approved for submission by all the named authors.

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