



Implementation of Educational skills through Smash Tool Development in Volley Ball

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ABSTRACT

Purpose: Education and sports are linked together as in all major schools and universities of Indonesia as an essential part of the curriculum. Sport education, particularly volley ball, gives an excellent opportunity for students to get outside, be active, and work on a variety of skills. This study attempted to discuss the impact of tool development in smash volleyball games and how such tools or aids he influence the students' skills and overall development and character building. **Method.** For this purpose, a mixed method research design was adopted. Data was collected through questionnaire and interviews from 108 respondents. The data collected was synchronized to find out how the abilities acquired though volley ball sport affected students' life-long skills.

Findings: The trial results show that on average the students from the three schools have a very good smashing ability. This data was then synchronized to find out whether there is an effect of student responses on student abilities. The results showed that there was an effect of positive student responses to the ability to hit the ball in the volleyball smash game in education sports. **Implications for Research and Practice:** According to the findings, the volleyball smash tool is able to replace the feeder position in the process of coaching volleyball training, this is intended for success in doing smash training.

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Introduction

In 2019, UNESCO introduced a Values Education through Sport (VETS) program aiming at supporting active learning, complementing cognitive skills, making students feel the responsibility and accountability, and enhancing their focus and concentration (Singh, 2010). UNESCO is not only the United Nations' lead agency to promote "educational, cultural and social dimensions" and upliftment of the universal masses, but it also specifically endorses sports and physical education. It works towards aiding and advisory services to all member nations to strengthen their sports policies. VETS program is one of such services that aims at increasing flexibility and having a strong cross-curricular potential among students. The sports taught under the VETS program not only reinforces existing curricula in schools and is reflected across various disciplines including nutrition, health and civic and moral education (Kaźmierczak, 2018). Sports taught in the garb of education ultimately helps students imbibe values which get reflected in their interaction with the communities. Sports education taught through curriculum also help students grow into mature citizens, make informed decisions, be sensitive to others as well as the environment. It develops their self-confidence and understanding of their rights and assists them in their growth into adulthood.

Education and sports are linked together as in all major schools and universities; sport is an essential part of the curriculum (Ministry of National Education, 1999). Sport education is essential to the formation of personality as well as the person's holistic development. Sport has a very important role in human life. In today's modern era, humans cannot be separated from sports activities, both to increase performance and the need to maintain a healthy body condition. One of the sports that is popular with both men and women today is volleyball. Volleyball is a sport that requires simple equipment. At school, volleyball sports have been played by students starting from elementary, junior high, high school and even college. While many sports are played exclusively at schools, volleyball gives an excellent opportunity for students to get outside, be active, and work on a variety of skills.

This study attempted to discuss the impact of tool development in smash volleyball games and how such tools or aids influence the students' skills and overall development and character building. For this purpose, the data collected was synchronized to find out how the abilities acquired through volleyball sport affected students' life-long skills.

Literature Review

As a part of its sports development programs, UNESCO has developed several tools that aim at instilling sport values among students. The aim is to impart value education through sport and support children and young adults to develop lifelong skills as well as become global citizens involved in sport activities and in their communities. Initially in 2013, UNESCO instituted a partnership program with other international organizations for enhancing sport values in children. As a part of this partnership, a universal curriculum was developed for teachers to teach three core sport values: equity, inclusion, and respect. A pilot phase in 13 countries was carried out and the curriculum was launched on 29 October 2019. Several experts and practitioners exchanged on the importance of sport values education on this platform (Kaźmierczak, 2018; Singh, 2010).

The volleyball sport has a distinctive feature at the team level as it requires special skills (Aspi & Syahrani, 2022). The volleyball is found not only among adults, teenagers, and children, but it has penetrated every section of society. Owing to its popularity, volleyball is the sport that has developed a naïve interest especially in junior high school children. At junior high school level, however, players must also master the basic techniques of serving properly. Even though there are several types of service techniques in volleyball, including smash, passing, underhand serve, overhand serve, and jump serve, it is recommended that students at the Junior High School level be able to master the smash technique. Smash technique is a punch or attack technique that aims to make the ball land in the opponent's area, without being able to block or hold it (Nugrahani & Anam, 2022; Srinto, 2018).

The game of volleyball necessitates that players learn to make passes and executing smashes properly and correctly, so that the hits can be maximized and successfully kill the opponent's defense and they can get a score in the game (Montowska et al., 2019; Syahril et al., 2022). The smash technique is a technique in playing volleyball and many even say it is the most effective technique to win points. Smash is a form of attack against an opponent that is carried out from the center line or front with the characteristics of a dive, sharp and fast (Damanik, Nasution, & Suprayitno, 2015; Hidayat, Wahyudi, & Rahayu, 2022; Islam, 2019; Komaini et al., 2022; Parlindungan, 2018; Sin, Nopianto, & Fardi, 2020; Suhadi, 2022). It aims to dismantle the opponent's defense. Smash can be repeated and alternated regularly by involving automatic feeders. So we need an innovation that will be more leverage in volleyball smash training.

Innovation is a form of invention that is different from what already existed or did not even exist before, such as tools. There are many things that can be done in making an automation system in volleyball training, namely by designing a feeder. The intended design is to design and manufacture a feeder volleyball smash tool which has the priority function of changing the feeder position with a semi-automated volleyball smash tool. The designed volleyball smash tool has one ejector tube that can be directed at an angle of 90° so that it supports directing the ball according to the use of smash bait. With this tool, it can increase the potential of students in playing volleyball.

There are several research studies that deal with various aspects of the different sport, namely, Listina (2012) conducted a research to investigate micro-sensors in bowlers in volleyball game; Parlindungan (2018) discussed how this game evolved technologically; and researchers like Sin et al. (2020) and Yulianti (2017) have examined the use of leg and muscle power and various actions in the volleyball game including smash shots. These research studies have helped to understand the benefits of the tools that have been made for students' games at school. A few studies have also discussed student responses or reactions during learning the volleyball sport (Asmawi, 2020; Islam, 2019; Komaini et al., 2022; Yudi & Anggara, 2021).

Student responses are in the form of learning processes, learning evaluations, and assignments given by the teacher. Physical Education of Sport and Health (PJOK or Penjasorkes) is implemented with a social dimension, in schools allowing many advantages and disadvantages to be obtained by students during learning. There are studies that have highlighted the benefits of technology used in education (Nurkholis,

2013). The use of technology in the field of physical education, sports and health (PJOK) is currently more developed as a repository of knowledge, as well as a tool for learning. PJOK is an educational process that involves physically which produces a change in individuals both physically, mentally, and emotionally (Budiman, 2016; Prakoso, Graha, & Gusdernawati, 2022; Suhadi, 2022; Yudiana, Slamet, & Hambali, 2020).

Based on the discussion, the following questions were formulated for this study, to get a focused study on small stools in the volleyball game:

1. How do students respond to smash tools in volleyball games?
2. What are the results of the students' smash game after using the tools?

Method

• *Research design*

A mixed method research design was used in this study, which is an approach that combines quantitative and qualitative methods into a single study to provide a broader and more complete vision of a problem. Mixed methods is the accepted approach as a statistical paradigm to inform our thinking about the new concept of interactive strategy that includes such as study specific, thus bringing methodological discussion and practice closer (Sugiyono, 2012). From the methodological point of view, the mixed method has been developed from a simple research design to a complex framework with three existing paradigms: dialectical stance, critical realism, and pragmatism (Schoonenboom, 2019).

• *Sampling*

The participants in this study were sampled from three schools, A, B and C with 36 participants from each school. The total sample size was therefore 108 participants, with 68 male students and 40 female students. Sampling was carried out using the purposive sampling technique, which is also known as judgmental, selective, or subjective sampling, and is one way to achieve a manageable amount of data (Campbell et al., 2020; Crossman, 2020). The purposive sampling technique also helps in determining certain considerations and criteria that had to be met by the sample used in this study.

• *Research Instrument*

Research instruments are tools used by researchers in collecting data so that their work is easier, and the results are better, in the sense that they are more thorough, complete, and systematic so that they are easier to process, in this study using Instruments smash and response questionnaire. After the preparation of the instrument, the researcher tried out the instruments at the training ground. This test aimed to determine the validity and reliability of the instruments used in the study.

• *Data analysis*

In this study using quantitative data analysis with SPSS 25, to look for descriptive statistics. This research uses purposive sampling with surveys or questionnaires to a small group of people (called a sample). identify tendencies, attitudes, opinions, behaviors, or

characteristics of a large group of people. Then proceed with conducting interviews intended to strengthen the results of quantitative data. In this study, before carrying out the regression test, a prerequisite test was first carried out. The prerequisite tests carried out in this study were the normality test and the linearity test.

Results

- **Quantitative Results: Questionnaire**

Right at the outset, validity and reliability tests were conducted to test the degree of accuracy between what happened to the object of research with data that can be reported by researchers. Meanwhile, reliability relates to the degree of consistency and stability of data or findings in past volleyball skill tests. In the volleyball skills test aged 13-15 years, the following steps were prepared and implemented:

The destination of smash shots was measured for accuracy and skill of doing the smash. The tools, equipment and other specifications required were: Net height of players: 2.30 m for men and 2.15 m for women; a normal size volleyball court complete with poles and net, and lines drawn that limit the target scores. The test officer team comprised two examiners, with Examiner I would stand near the net and act as a feeder; the Examiner II would stand not too far from the target area and calculate and record test results. During the test execution, the test taker would stand on the attack line, the feeder in the middle near the net and tosses the ball to the opponent. At the same time the test participant would smash while jumping and aim at the highest target. Such smashes will be made six times, if the hull ball is not perfect, it can be repeated. The tools used in this test were a volleyball, a meter, chalk, net, field, form for writing results, a whistle and recording results. The results were recorded based on the ball falling on each target correctly six times. Table 1 presents the statistical results for student responses to the volleyball smash tool:

Table 1

Descriptive statistical results of student responses to the volleyball smash tool

Student response	Intervals	F	Percentages	Categories	Mean	Med	Min	Max
A school (n=36)	5.0 -8.75	5	13.9%	Very Not Good	2.35	2.00	2.30	4.00
	8.85 -12.5	10	27.8%	Not Good				
	12.6 -16.25	10	27.8%	Good				
	16.35-20.0	11	35%	Very Good				
B school (n=36)	5.0 -8.75	5	13.9%	Very Not Good	2.86	3.00	2.00	4.00
	8.85 -12.5	6	16.7%	Not Good				
	12.6 -16.25	14	38.9%	Good				
	16.35-20.0	11	30.6%	Very Good				
C school (n=36)	5.0 -8.75	8	22.2%	Very Not Good	2.47	2.00	2.45	4.00
	8.85 -12.5	12	33.3%	Not Good				
	12.6 -16.25	7	19.4%	Good				
	16.35-20.0	9	25%	Very Good				

Table 1 depicts that the response of junior high school students to the volleyball game aids in hitting high school. Students in schools A and B have a pretty good response to the tool.

Likewise, Table 2 shows the result of the normality test of the student's test on SMASH hitting in sports learning:

Table 2

Results of the normality test of students for the smash tool.

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	Df	Sig.
A school	.136	25	.200	.921	25	.053
B school	.145	25	.185	.970	25	.644
C school	.140	25	.167	.943	25	.632

Based on the results obtained in the research that has been done and has been presented in tables 3 and 4, the normality test is shown in the Kolmogrov-Smirnova cross-section table. Then a linearity test was carried out using the IBM SPSS Statistics software. Data from the attitude questionnaire linearity test results and student physics learning outcomes can be seen in Table 3.

Table 3

Data on Linearity Test Results of students' responses to the smash tool.

	Sig	Conclusion
Student response to the smash tool	.853	Linear

Based on the data from the linearity test results, a data significance value of 0.853 was obtained. This shows that the significance value obtained is greater than the significance level value (α), where the significance level value is 0.05. Because the sig value $> \alpha$ or $0.872 > 0.05$, it can be concluded that the data is linear. Table 4 presents the results of the regression test and collect students' responses to the smash tool in the PJOK learning volleyball subject.

Table 4

Regression test of students' responses to the smash tool

School	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	std. Error	Beta		
A school	64,386	12.116		5.314	.000
	.126	.166	.122	.760	.042
B school	65,142	11,223		5,804	.000
	.101	.154	.106	.656	.016
C school	65,142	11.217		5,321	.000
	.101	.160	.117	.735	.034

From Table 4, it was found that there was an influence between student responses to the smash tool in the PJOK learning volleyball subject. This is proven by the sig value (2-failed) < 0.05 .

- **Qualitative Results: Interview**

In the results of interviews with teachers who taught PJOK subjects in secondary schools in schools in Muaro Jambi Regency, some of them were found applying learning using assistive devices. The School A had the accreditation, because it had adequate tools and all were accessible to students, while School B and C did not have the accreditation. It was found that teachers in School B and C did not fully use assistive devices due to inadequate facilities. In the absence of tools, they used makeshift tools to assist the learning process, especially in PJOK learning at school. The interviews with students yielded similar results. Students in School A, which had accreditation, used tools in playing volleyball, while students who were in School B and C, without accreditation, found it difficult to learn volleyball. This was due to the lack of facilities, tools and infrastructure required in the learning process.

Discussion

The results of student responses to smash tools in volleyball games based on school table A obtained a minimum score of 2.30 and a maximum score of 4.00 with an average of 2.35. Based on the response proportion, 27.8% had a good response and 35% had a very good response using the smash tool. For School B, a minimum score of 2.00 and a maximum score of 4.00 was obtained, the average was 2.86, and the median was 3.00. Based on these proportions, 38.9% had a good response and 30.6% had a very good response to using smash tools. School C obtained a minimum score of 2.00 and a maximum score of 4.00, an average of 2.86, and a median of 3.00. Based on the proportion of responses, 38.9% had a good response and 30.6% had a very good response to the use of smash aids in volleyball games.

In the normality test, the scores provided information about the distribution of data, namely whether the variable data obtained was normally distributed or not. This test was needed before carrying out other tests by assuming that the residual values followed a normal distribution so that the statistical test was said to be valid. However, if it was not valid then this parametric statistic cannot be used. This is reinforced by the statement that a normality test was needed to obtain information whether the requirements of a representative sample have been fulfilled or not (Sukestiyarno & Agoestanto, 2017). The decision-making criterion in this normality test is that H_0 is rejected if the significance value is $\text{Asymp. Sig (2-tailed)} < 0.05$ which means the data is not normally distributed and H_0 is accepted if the significance value is $\text{Asymp. Sig (2-tailed)} > 0.05$ which means the data is normally distributed (Marfu'ah, Rudibyani, & Sofya, 2015).

The condition for a data to be said to be normally distributed is a Sig value > 0.05 . Because the sig value obtained is > 0.05 , it can be concluded that the data obtained is normally distributed, so this parametric statistic can be used. After carrying out the normality test, the next step is to carry out the Linearity test. This linearity test aims to obtain information whether the data has a linear relationship or not. The linearity test was carried out to find out whether the linear properties that existed between the two variables that were being identified were theoretically compatible or not with the research results obtained. After that, a regression test was carried out to find out the results of the effect of using smash tools on junior high school students.

The results of the development of this tool for training smashes include: (1) This tool functions as a tool for training smashes in volleyball. (2) This tool can be used in settings such as schools and colleges. (3) The material of this tool uses iron and sponge so that when used for training it is not easily damaged. (4) The use of a jump height setting is used for the comfort of the tool when used. (5) The design of the tool formed is adjusted to the function and comfort of the tool. (6) The use of basic colors to make the tool look more attractive. (7) The use of materials adapted to safety and comfort to protect players from injury.

This research is in line with research conducted by [Pratama et al. \(2022\)](#) which discusses educational technology in PJOK subject matter. However, previous studies have not implemented technology in several schools that have different accreditations ([Santoso, 2019](#)). Therefore, this study discusses the effect of learning using technology by teachers on students at various levels of school to find out the results of the learning carried out. So that it can be seen to what extent learning aids are needed in the learning process to support a good result.

Technology on student learning outcomes in this study is in line with research conducted by [Santoso \(2019\)](#) which discusses student learning outcomes by using technology during learning to be able to create a conducive student learning atmosphere and provide a good attitude during learning. However, this study still did not get maximum results in the learning process due to the lack of facilities and infrastructure used, so other facilities and infrastructure were needed to support the learning process to be more interesting and improve students' abilities in PJOK learning.

The update of this study discusses the influence of the response of smash aids in learning in junior high schools, where in previous studies students still did not have good enough learning outcomes in learning sports, especially in volleyball. Based on this, the researcher carried out an innovation that was able to increase students' ability to understand learning volleyball smash shots through tools that were made as attractive as possible. The limitations of this study are the facilities and infrastructure in several schools that have accreditation below A.

Conclusion

The study concluded that the existing technological developments such as innovative smash learning aids in volleyball games are urgently needed to improve learning outcomes, especially in PJOK subjects. Based on the results of descriptive statistical tests, good results were obtained in schools that were accredited (e.g., School A) but the schools that were not accredited needed infrastructure and other facilities. The response of teachers and students to smash aids in volleyball games is quite good. This can be seen from the results of interviews conducted so that with these tools they are able to improve the ability to play volleyball for students, especially in smash shots. From the results of the regression hypothesis test, an influence is seen from students' responses to the smash tool in PJOK learning volleyball subjects. It is recommended that a high school learning aid kit in volleyball should be made available so that it can train students to have more good potential in sports, especially volleyball. For further research, the researcher recommends conducting research using even more variables and at different levels and using alternatives or other aids in the PJOK learning process.

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