

## Is There a Need Instrument Volleyball Underhand Service Using Artificial Intelligence?

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### Abstract

Analysing the need for the implementation of the development of the ball volleyball lower serve instrument is one of the right ways to design what instruments are in accordance with the wishes of students so that learning objectives can be achieved. The purpose of this study is to see whether there is a need for the development of an artificial intelligence technology ball volleyball lower serve instrument. This type of research is descriptive quantitative with survey as the method used. The test instrument used is a questionnaire distributed by google form. This research was conducted at SMA Negeri 1 Tanjung Batu with 194 respondents. The results of the study obtained students with a very needy category as many as 139 (71.65%), students with a needy category as many as 34 (17.53%) students, a moderate category of 7 (3.61%), a category of less need as many as 10 (5.15%) and a category of very little need as many as 4 (2.06%) students. very low 24%. The findings of this study are that in general students at SMA Negeri 1 Tanjung batu need the development of an instrument for serving under volleyball with Artificial Intelligence technology, with these findings, it is used as a basis for conducting further research to develop products in the form of a test instrument for serving under volleyball with Artificial Intelligence technology.

**Keywords:** Underhand Service; Instrument; Artificial Intelligence

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## INTRODUCTION

The progress of science today is very rapid along with the times. Various scientific disciplines have progressed according to the needs and demands of the times. Science will always change with the demands and progress of the times. Currently, we have entered the age of technology and the challenges of industry 4.0. Various sciences must quickly adapt to these demands, one of which is sports science. In the current sporting landscape, it is not uncommon for professional sport teams and organizations to employ multidisciplinary sport science support teams. In these teams and organizations, a “head of performance” may manage a number of sub-discipline specialists with the aim of enhancing athlete performance (Rothwell et al., 2020).

Various sports have used technological advances to support activities both in learning and during training. Developed countries today have made extensive use of technology to support the achievements of their athletes. Technology is evident in sport in a variety of contexts including from the playing, consuming and spectator experience. Due to the inherent need for technology in sport it is becoming more important to understand how to develop a comprehensive strategy regarding the management of innovation (Ratten, 2020). Examples of developed countries that are successful in sports by utilizing science and technology are the

United States, China, Japan, Germany and other countries. Sport contexts differ depending on the type and location of sport being played or consumed. For outside sports there will need to be specific conditions that are conducive to the playing of the sport. This can include certain weather conditions that can be predicated by sports technology devices (Nicolò et al., 2020). One of the sports that is currently progressing by utilizing technology is volleyball. Computer-based volleyball player analysis (Xiong, 2021) sensor-based lower passing test instrument (Indrakasih et al., 2022). Based on the results of these studies, it can be concluded that digital technology has developed to the volleyball game as a medium for training and also a volleyball skill instrument which is certainly better. Based on preliminary observations and observations in the field to find out the problems and what is needed by the subject in the field, currently the service skill measurement test tool used is still manual, so that when conducting tests the level of effectiveness and the resulting data is less objective, because the test results are calculated manually. The instrument has not utilized technology so that the retrieval process, data analysis process, and the resulting score information cannot be seen directly by the testi or tester. There are several previous studies that have developed manual instruments into several computer-based development results or other development results that utilize technology as a medium. Among them are the results of research with the results of research on digital-based volleyball lower serve skill test instruments (Muslimin et al., 2020). The development research utilizes digital technology in the form of a vibrating sensor to capture volleyball objects that hit the sensor which then sends score data on the computer screen.

The disadvantages of this instrument are the lack of sensitivity of the sensor so that there are often errors in the resulting score and requires 168 sensors that must be placed on plywood to bounce the volleyball. So that requires 84 pieces of plywood. The test equipment is difficult to move due to the large number of tools and the size of the test media. by practitioners to understand general technology practices and where to close the gap between what is available versus what is needed (Luczak et al., 2020). The development research that will be carried out is to create an Artificial Intelligence (AI) Camera-based volleyball service test instrument. Artificial Intelligence (AI) or artificial intelligence is a part of computer science that allows machines (computers) to function in the same way as humans. The results of research on the analysis of volleyball player movements based on Artificial Intelligence (AI) produce player errors more quickly analysed so that players can improve their skills based on the results of the analysis, especially the player's service movement (Dai & Li, 2021), further research on the development of volleyball instruments is to develop android-based passing instruments (Syari'ah, Destriana, 2023), (Destriana Destriana, Destriani Destriani, Ahmad Richard

Victorian, 2023), it has not been seen that previous researchers have used Artificial intelligence technology.

The development of this test instrument utilizes Artificial Intelligence (AI) camera technology of the Logitech Webcam HD C270 type and software programs, where the main components of this test instrument are Artificial Intelligence (AI) cameras of the Logitech Webcam HD C270 type and applications so that a sophisticated and valid volleyball service test instrument is produced. Artificial Intelligence Camera (AI) type Logitech Webcam HD C270 is a type of camera equipped with a very high resolution motion detection feature, making this camera one of the technological products that are widely used by the general public (Mien et al., 2022). The presence of artificial intelligence and some increasingly advanced and creative innovations will have a very significant impact on all aspects of human life, including social, business, economics, sports and health. Artificial Intelligence itself works by combining the existence of a number of data, repetitive processing, and intelligent algorithms. This allows the software to learn automatically from patterns or features in the data that exist in the data. Artificial Intelligence can also be said to be a very, very broad field of study. The scope of theories, methods, technologies, and sub-fields that exist in Artificial Intelligence are very include machine learning, neural networks, cognitive computing neural networks, cognitive computing, computer vision, and scientific language processing. scientific language processing

This Logitech Webcam HD C270 Artificial Intelligence (AI) camera technology will be combined with sports science in ball games. Where by using this type of Artificial Intelligence (AI) Camera Logitech Webcam HD C270 as a medium for capturing object movements in the form of a volleyball which is then made special software as a program to apply the capture of ball movements from the Artificial Intelligence (AI) Camera type Logitech Webcam HD C270 into numbers as scores, then the data will be displayed on the laptop or computer screen, This analysis was carried out only on the service because this development only developed the underhand serve instrument, so the analysis was only focused on the underhand serve, the purpose of this study is to see if development is needed about the Artificial Intelligence (AI) Camera-based volleyball service test instrument.

## **METHODS**

This type of research is descriptive quantitative. a type of research that aims to describe systematically, factually, and accurately about the facts and nature of certain populations, or try to describe the phenomenon in detail (Sugiyono, 2019). The method used in this research

is the survey method (Sugiyono, 2019) . In the study and direct observation of the symptoms of small and large populations with social phenomena in the field of education, describing the process of transformation of the components of scientific knowledge. This research was conducted to find out some things that happen in the field, in this case looking at using numerical computing tools. The subjects of this study were students of State Senior High School 1 Tanjung Batu. Data collection was carried out through distributing questionnaires via google form which was filled in via an online link with quantitative data type with an (Tangkudung, 2016) instrument in the form of a questionnaire.

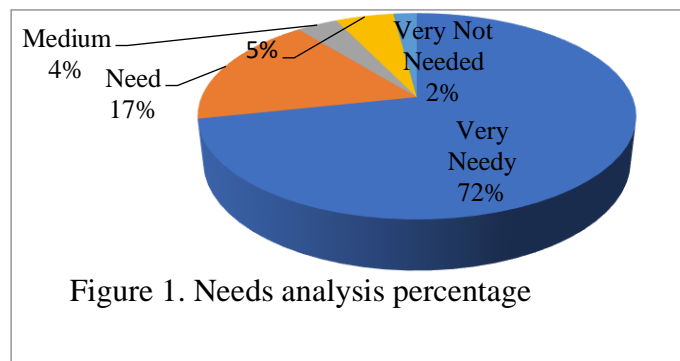
The questionnaire 4 indicators, namely: simplify and shorten time, information obtained is valid and reliable, facilitates assessment when performing service, the test becomes more innovative by following the current technological advances current technology. Decision making in this reliability test that is, if the value of  $r_{hitung} \geq r_{tabel}$  then the questionnaire items used are declared reliable or consistent. Reliable or consistent, otherwise if the value  $r_{hitung} \leq r_{tabel}$  then the questionnaire items used are not reliable or inconsistent used are not reliable or inconsistent. After obtaining the results as many as 22 valid statement items and 1 invalid statement item, next questionnaire reliability test was carried out. The questionnaire reliability test uses the Alpha formula with the help of SPSS 25 getting the results  $r_{hitung} \geq r_{tabel}$  is  $.958 \geq .349$ . Questionnaire is a data collection technique by asking questions to be answered by respondents (Prasetyo, 2014). Data collection techniques by distributing questions to respondents about the need for a volleyball bottom service instrument using Artificial Intelligence. The questionnaire was filled in to find the respondents' opinions regarding the need for the use of Artificial Intelligence in the volleyball underhand serve instrument. The research site is Senior High School No 1 Tanjung Batu, Kec. Tanjung Batu, Kab. Ogan Ilir, Prov. South Sumatra, the research time was held on July 20-28, 2023. With the number of respondents amounting to 194 students. Data collection in the field by sharing the Google form link which is distributed in the WhatsApp group of class X (ten), XI (eleven), and class XII (twelve).

## RESULTS AND DISCUSSION

The results of the analysis of the need for the use of AI in the underhand serve volleyball instrument at State Senior High School No1 Tanjung Batu in 2023/2024 can be seen based on the following table 1:

**Table 1.** Percentage Needs Analysis Volleyball Underhand serve instrument using AI

No.	Criteria	Frecuency	Percentage
1.	Very Needy	139	71,65
2.	Need	34	17,53
3.	Medium	7	3,61
4.	Not Needed	10	5,15
5	Very Not Needed	4	2,06
	Total	194	100



Based on table 1, the results obtained with a sample size of 194 students. In accordance with the criteria really need as many as 139 (71.65%) students, with a category needing as many as 34 (17.53%) students, a moderate category of 7 (3.61%), a category of less need as many as 10 (5.15%) and a category of very little need as many as 4 (2.06%) students.

Based on the results of the study, it was found that 71.65% of students of State Senior High School 1 Tanjung Batu 3 really need the development of a volleyball lower serve test instrument using artificial intelligence which is a form of innovation in the implementation of the volleyball lower serve test which was originally done manually. Based on the results of the study, it was found that 139 (71.65%) students in the category really needed, 34 (17.53%) students in the category needed, 7 (3.61%) students were in the moderate category, 10 (5.15%) students were in the category did not need and 4 (2.06%) students were in very little need.

The development of capability for innovation in specialists in physical education and sport involves enhancing their psychological qualities such as particular sensitivity to professional changes, readiness to take risks and be responsible for possible failures, independent judgment while taking professional decisions, focus on personal and professional self-development, willingness to search for new professional ideas (Palamarchuk et al., 2020). Physical Education teachers in applying AI, regarding practice implications, this study addresses the topic of AI innovations affecting all life domains, including PE; it highlights AI applications' relevance to PE technology, based on existing research (Lee & Lee, 2021), the other research AI can be useful in saving human lives by analysing the medical records of

patients and thus predicting the criticality in patients (Hamid et al., 2022) in research the literature that AI augments educational content, customizes it for any individual according to their needs, and raises the flag of caution for anticipated learning difficulties (Bhutoria, 2022).

Based on the results of the study, it is hoped that the development of underhand serve instrument using artificial intelligence technology is the initial basis for conducting further research, namely the product development stage, namely the underhand serve instrument using artificial intelligence, artificial intelligence, human work becomes easier (Prasetyo et al., 2023). With the Artificial Intelligence in the field of education to help the process of daily activities including teaching and learning (Luh Putu Ary Sri Tjahyanti & Dkk, 2022).

The factors in this needs analysis that influence the analysis of the need for the development of volleyball underhand serve instruments using artificial intelligence technology to achieve these development needs are seen from the students' views that students need this development in order to improve the quality and results of volleyball learning, especially volleyball service, stating that the ease of use perspective is the level to which a person believes that using a particular system can reduce the effort needed to do something, research by (Beal et al., 2019) assessing the work in these areas, we explore how AI is used to predict match outcomes and to help sports teams improve their strategic and tactical decision making and order to further the use of AI and ML in team sports.

The perspective of convenience is related to the successful use of the volleyball lower serve test instrument using artificial intelligence technology, the application of the lower serve instrument can be understood as the willingness and ability of students to participate and contribute to the development of science and technology, especially in the sport of volleyball. Another indicator of this needs analysis is to simplify and shorten the time for conducting the underhand serve test, the result is that students strongly agree if there is technology that can be used to shorten time.

Indicators of data obtained from the lower serve test using artificial intelligence technology are valid and reliability, the results obtained in general show that students want this because during the assessment process there are no errors and the data obtained can be immediately known by students. Indicators make it easy to calculate points if you take the lower serve test 5 times, the results obtained in general students strongly agree with making it easier to calculate points, because it does not have to involve many people and the score recording results appear after the lower serve is performed. Indicators of learning to be more innovative with current technological advances in general, students strongly agree with this innovation. Learning test instruments using artificial intelligence technology help in testing,

collecting data and analysing data, this is in line with the opinion of AI technology can help improve decision-making based on data, reduce human error, and increase efficiency (Spitzer, 2023), to determine learning styles, learning models have been suggested in literature, but there is no readily available software tool that provides the flexibility to select and implement the most suitable learning model, to fulfil this dire need, a framework of a tool is proposed here, which takes into consideration multiple learning models and artificial intelligence techniques for determining students' learning styles (Bajaj & Sharma, 2018).

Technology can be used as an effective and efficient instrument or tool in the teaching and learning process to achieve maximum learning outcomes (Monita, 2021), AI can be used to improve learning outcomes, presenting examples of how AI technology can help education systems use data to improve educational equity and quality in the developing world, improving student learning outcomes is influenced by teachers who are proficient in learning technology (Pedro et al., 2019). Learning technology is the theory and practice of designing, developing, using, managing, and evaluating learning processes and resources.

## **CONCLUSION**

The conclusion of this research is that there is a need for the development of volleyball lower service instruments using artificial intelligence technology, this is the basis that there is a need for further research to develop artificial intelligence technology lower service instruments. With the development of artificial intelligence technology lower serve instrument is expected to be a renewable innovation in learning physical education and sports, especially volleyball games.

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