



Implementation of Motion Analysis Applications in Watersports in the Lambung Mangkurat University Environment

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Abstract

This study was conducted to determine the ability in water sports. This research is intended to determine motion analysis with the implementation of using the konovea software application. The research is a survey research with descriptive data type. The population in this study were students at Lambung Mangkurat University. The data collection technique used purposive sampling, the sample obtained was 40 people where students who were taking lectures on water sports. Data obtained in the form of video and data analysis using kinovea software. The results showed that swimmers can perform improved movements with an average pass rate of 87% of the results of the evaluation of good and correct movement assessment after analyzing through the use of the application. Then based on the results of the questionnaire test the level of understanding of the sample as much as 97% has understood the use of the kinovea software application.

Keywords: Biomechanical Analysis, Swimming Skills, Kinovea Software

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Artikel Info:

Submitted: 03/11/2023

Revised: 04/11/2023

Accepted: 13/11/2023

Published: 17/11/2023

How to Cite: Anggara, N., Sarmidi., Pratiwi, E. (2023). Implementation of Motion Analysis Applications in Watersports in the Lambung Mangkurat University Environment. *Journal Coaching Education Sports*, 4(2), 323-330. <https://doi.org/10.31599/jces.v4i2.3173>

Author's Contribution: a – Study Design; b – Data Collection; c – Statistical Analysis; d – Manuscript Preparation; e – Funds Collection



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A. Introduction

The rapid development of technology in the current era of globalization has provided many benefits in progress in various social aspects (Kurniawan, 2017; Lestari, 2018). The use of technology by humans in helping to complete work is a necessity in life (Kurniawan, 2017). This must also be followed by the development of human resources (HR). Humans as technology users must be able to utilize existing technology, as well as further technological developments (Saleh & Widiyanto, 2019).

Human adaptation to new technologies that have developed must be done through education (Tozzo, 2018). This is done so that the next generation is not left behind in terms of new technology. Technology and education are able to develop together along with the new generation as the successor to the old generation (Sharon et al., 2022). According to the opinion (Han & Abdrahim, 2023) education is guidance that is carried out consciously by educators to students with the aim of forming the main personality, both physically and mentally. The development of digital technology, especially in the computer field, has encouraged the emergence of sophisticated software in terms of digital image processing.

The sophistication of the software continues to grow with the aim of providing data processing in the form of better images in accordance with its purpose (Muharni et al., 2021). Digital image processing is familiar in the

world of computers, especially those related to fields such as photography, film, medicine, satellite imaging, and others (Mithun, 2021). The world of education needs a way or method to help analyze the need for motion (mechanics) in water sports. The forms of water sports that are featured in the Physical Education Study Program are: diving, water polo, water sports, and rowing. The need for technological developments in the digital era to analyze motion in learning, especially in water sports in the Physical Education Study Program, Department of Sports and Health Education, Faculty of Teacher Training and Education ULM.

The Physical Education Study Program at Lambung Mangkurat University (ULM) faces several problems related to technological developments, especially in the analysis of water sports motion. Limited infrastructure and technology, lack of training for educators, gaps in student knowledge, lack of research and development, lack of curriculum integration, and financial challenges are some of the obstacles that need to be overcome. Measures such as infrastructure improvement, educator training, and increased integration of technology in the curriculum are needed. Collaboration with industry, related institutions, and efforts to increase engagement with external parties can be a solution to overcome these problems. In addition, the promotion of research and development in the field of water sports

technology can help the ULM Physical Education Study Program remain relevant and develop along with the times.

As an integral step to address the problems faced by the Physical Education Study Program at Lambung Mangkurat University (ULM), it is important to link improvement efforts with previous research findings. Previous research in the field of sport technology and physical education can provide a strong foundation for formulating improvement strategies.

Some previous studies may have highlighted the effectiveness of using technology in improving sports learning or analyzing movement. These results (Sunarno, 2017) may provide a basis for designing educator training programs or better integrating technology in the curriculum. In addition, previous research findings on collaboration between educational institutions and industry in the field of technology can also provide valuable insights.

The importance of research and development within the institution can also be linked to efforts to improve research in the Physical Education Study Program (Amran et al., 2021). Aligning research with industry needs and the latest technological developments can help ensure that the program remains relevant and produces graduates who are ready to face the demands of the world of work (Aprilyadi et al., 2021).

By linking improvement measures with previous research findings, the Physical Education Study Program at ULM can gain

deeper insights, maximize the potential of technology in water sports learning, and ensure that improvements made are based on best practices that have been tested through previous research.

This research aims to identify and address the challenges faced by the Physical Education Study Program at Lambung Mangkurat University in integrating technology, especially in water sports motion analysis. The focus of the research included identifying specific barriers, developing strategies for improving technology infrastructure, training educators, and integrating technology in the curriculum. Other objectives involve building collaborations with industry and related institutions, encouraging internal research and innovation, increasing student involvement in technology learning, and contributing research findings to the scientific literature. Thus, this study is expected to provide practical guidance and contributions to the scientific literature for continuous improvement in the face of technological change in the field of Physical Education.

B. Methods

The method used in this research is survey research with observation techniques based on literature. Recorded (visual) results with documentation using a camera. Documentation is carried out to record movements in the water carried out by students during learning which will then be analyzed through the "kinovea

software version 0.7.10" program. In the implementation of this research using two-dimensional cinematography analysis using kinovea software analysis system version 0.7.10. This research design uses an evaluative descriptive design. The reason for using the descriptive evaluative method is to deeply understand the motion analysis carried out by students so that at the time of the final exam students can really analyze the motion to be able to find out the shortcomings and improve it so that it is good and correct. The research method for making this biomechanical analysis application is done by analyzing the core problems, and then proceeding with making a design to solve the problem.

For the research time from June to December 2023, and the place of this research in Banjarbaru City in the Lambung Mangkurat University environment where there are water courses related to motion / mechanics, as well as the use of digital technology as the basis for application development.

The population in this study were students at the University of lambung mangkurat. The sample in this study were students in the Department of Education, Department of Natural

Sciences, to the Department of Engineering related to mechanics, digital technology as the basis for application development. and not far from the scope related to mechanics to water, for the number of samples is still unknown based on the criteria listed above.

The method used in this study is a survey research method with observational techniques. The technique of observation or observation in this case is taking videotape. The data was analyzed using the kinovea video analysis software system. Video recordings are entered on a laptop that has kinovea video analysis software installed. The dart trainer offers a complete range of video analysis equipment including simulcam and stromotion which makes the stages of movement while in the water either while floating or floating.

C. Result and Discussion

Result

In the research results and discussion, an overall overview of the kinovea software application analysis will be presented. Analysis of the kinovea software application that is running explains how the process of motion processes in swimming sport.



Figure 1. Drive Phase Mechanics



Figure 2. Pond Trajectory

The task during swimming lessons in this case is to pull and push downward and rest against the series of movements in freestyle swimming. This push, caused by the strong extension of the pelvic, knee and ankle joints,

causes the body to be projected forwards and upwards towards the next stroke. The position of the body's girdle is favored to allow for stability in the water and to reduce resistance in the water



Figure 3. Freestyle swimming mechanics

Objects experience angular motion when at the same time move through the same angle and in the same direction. In this case, swimmers are related to some of these functions that the results of swimming motion analysis using kinovea

software application-based instruments will be very helpful to be able to evaluate students, in order to achieve the best performance in taking aquatic sports courses. The following are the observation results

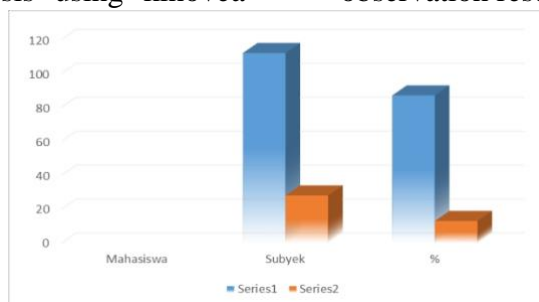


Figure 4. Grapich Observation Results

The results of students' understanding of the kinovea software application

Table 1. Learning Achievement Levels in water courses

Percentage of Learning Achievement Level		
Indicator	Object	Percentage %
Affective	students	65
Cognitive	students	68
Pyschomotor	students	87



Figure 5. Observation Result

The overall results of the learning achievement graph summary can be clearly seen acceleration, speed, and deceleration, so that it can be known up and down in freestyle swimming.

Based on Figure 3. above, it can be seen that swimming acceleration only occurs once at a distance of 0-50 meters, then swimmers tend to maintain their maximum speed until the finish. Analysis of swimming speed has not been able to maximize swimming acceleration properly, because normally swimming acceleration can only be done after the swimmer performs the start push stage. After reaching their maximum speed, swimmers cannot maintain or maintain speed, and tend to experience a significant decrease in speed. The data above can be conveyed that there are two factors that affect swimming speed patterns, namely: (1) The biomotor component of speed endurance is not good, so it is necessary to learn speed endurance, so that swimmers can maintain their maximum speed well and there are no two accelerations. (2) Swimming technique, the average swimmer swims with high speed, namely swimming on a straight track. The following is about the results of research on the speed of 50 m short distance swimming swimmers:



Figure 5: Research team and students

D. Acknowledgments

Thank you for the assistance provided by LPPM Lambung Mangkurat University. thanks to JPOK students who have helped.

E. Conflict of Interest

From a number of studies conducted, the following conclusions were drawn: Sport Education is present to conduct monitoring, evaluation, and control tests of achievement sports learning. Swimmers can perform acceleration (acceleration) at a distance of 0-50 meters with an average value of acceleration (acceleration) performed by swimmers, namely 1.23 m / s, and swimmers again accelerate at a distance of 80-90 meters with an average value of acceleration (acceleration) performed by swimmers, namely 1.23 m / s. improve movements that are still not good after seeing from the Kinovea application analysis.

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