

The Need Analysis of *Pencak silat* Speed Kick Instrument Based Technology

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Abstract—*Pencak silat* is a sport that requires a fast movement, so as to measure the speed of the attack requires technology-based instruments are valid and reliable, but if the practitioner requires it to support his training program. Thus, this study aims to analyze the needs of the coach on the instrument *Pencak silat* kick speed and availability of technology-based instruments. The object of this study were 11 informants consisting of 10 coaches and 1 head of laboratory tests measuring sport Faculty of Sport Science, Yogyakarta State University. The method used is qualitative analyzes information from multiple sources. The collection of data obtained through interviews and documentation of the coaches and the head of the laboratory. The data analysis is conducted qualitatively by gathering information and then reducing it to obtain the conclusion of the coach needs related instruments *Pencak silat* kick velocity measurement-based technology. The results of this study indicate that the need for instruments for the coach to measure the speed of technological based *Pencak silat* kick valid and reliable as well as the head of the laboratory also explain the lack of instruments for measuring the speed of *Pencak silat* kicks. Based on these results it can be concluded that the coach needs a kick velocity measurement instrument-based technology *Pencak silat*. The results of this study indicate that the need for instruments for the coach to measure the speed of technological based *Pencak silat* kick valid and reliable as well as the head of the laboratory also explain the lack of instruments for measuring the speed of *Pencak silat* kicks. Based on these results it can be concluded that the coach needs a kick velocity measurement instrument technology-based *Pencak silat*. The results of this study indicate that the need for instruments for the coach to measure the speed of technological based *Pencak silat* kick valid and reliable as well as the head of the laboratory also explain the lack of instruments for measuring the speed of *Pencak silat* kicks. Based on these results it can be concluded that the coach needs a kick velocity measurement instrument technology-based *Pencak silat*.

Keywords—*instruments, speed, kick, Pencak silat, technology.*

I. INTRODUCTION

Sport is a physical and psychological activity that can improve or maintain the quality of a person's health or should we say, physical and spiritual health. A popular sport became one of the goals for someone to do sports such as; football, basketball, badminton, gymnastics, etc., but with the times is not only a popular sport that is followed by many people, but the traditional sports did not lose competitiveness as a sport that attracts many. It is that exercise can be used as an educator, or having fun recreation, rehabilitation or repair the state of the body, and as an achievement in participating in various championships. In addition to popular sports, The original traditional sports culture of Indonesia namely *Pencak silat* can also attract the attention of many people as a means

to exercise. In accordance with the existence of *Pencak silat* is the original martial culture of the Malay (Indonesia) inherited from ancestors to be preserved, developed, and nurtured by the people of Indonesia and other countries [1]. Seeing the development of *Pencak silat* at this time, the indicator is the number of events or championships held on the level of the City / County until the Asian level championship.

Pencak silat itself is derived from the arts, which means a movement of attack and defence in the form of dance, rhythmic shown publicly with the rules of courtesy that has been determined, while *silat* which means that the core of the arts, a science that is used in a fight or defend themselves with death - desperately that are not performed in general [2]. Along with the progress of time in the end of *Pencak silat* can be displayed in public with rule which has been set by the Indonesian *Pencak silat* Association (IPSI). In the past *Pencak silat* aims for survival against wild animals, but this time one of the objectives of *Pencak silat* is to defend or maintain themselves as well as a venue for sporting achievement contested [3].

Pencak silat has some of the techniques used in game one kick. As for the kind of - kind of kick that is; front kick, rear sickle, and "T". Kick technique is often used when playing, because kicking has a value greater than the blow. In reaching an achievement of athletes or students should be trained and evaluated, so that it can be seen in the ability to attack and defend himself from his opponent. In order for the kick cannot be captured by the opponent, the kick must be done quickly. Based on this, we need an instrument or a measuring tool for measuring the speed of the kick.

The instrument is a mechanism to measure a phenomenon, which is used to make decisions, to collect and record information, and know the data from the end of treatment [4]. In another study explained that the instrument is a tool for fulfilling academic requirements, it can be used as a tool to measure an object measuring or collecting data about a variable [5]. Assessment instruments is important in the sport because as the tools used to collect information about the capabilities, interests and motivation of students or athletes to be measured.

In a literature explains that the principle of a measurement there are two important things that the validity and reliability [6]. Reliability refers to the consistency, accuracy, reliability, or reproducibility of the test results, then the validity refers to the meaning of the usefulness of the test results to be interpreted. Measuring instrument valid and reliable provide accuracy results measured against targets acquisition [7]. The measurement of the phenomenon is needed in many areas,

including in the field of sports. Making the instrument begins by stating the specific purpose instrument that determines the purpose of the instrument and shows the content area to be assessed [8]. Based on the nature of that instrument is manual has a degree of validity and reliability are low because of an error when using these instruments is greater than the instrument that is technology. This is because the human ability is not the same with technology.

Technology comes from the Greek, *techne* which means the skill and *Logia* which means knowledge, so the technology which literally means Technologic significant expertise in developing a science, and technology refers to an object or an object that is used for convenience to human activities, such as machinery, utensils, or other hardware [18]. Martono describes the technology can also defined as the knowledge of how to make something (know-how of making things) or how to do something (know-how of doing things), in the sense of man's ability to do something with a high value, good value benefits or resale value [19].

In another sense, the technology can include; understanding the system, organization, and also techniques. However, along with the development and progress of time, technological sense can be defined a concept relating to the type of usage and knowledge of tools, expertise, and how he can make an impact on the human ability to control and change something in the vicinity. It should be remembered that the use of technology should be considered, technology selection should be based on the effectiveness of the technology itself, ie selecting the technology to minimize the negative impact.

Based on the importance of a valid and reliable instrument in sport (*Pencak silat*), therefore the necessary preliminary studies to obtain the information needs of trainers which will be the foundation for the development of the instrument. Thus encouraged researchers wanted to know more about measurements and availability of instruments for measuring the speed of *Pencak silat* kick

The rest of this paper is organized as follow: Section II describes proposed research method. Section III presents the obtained results and following by discussion. Finally, Section IV concludes this work.

II. RESEARCH METHOD

The method used in this study is a qualitative type of research is based on data that is expressed in words, opinions, descriptions, and others not at numbers [9]. Analysis of the kick velocity measurement conditions *Pencak silat* performed in detail and depth to some information, therefore the design of the study is a case study. The case study is a type of research that understanding approach to the case conducted an intensive, in-depth, detailed, and comprehensive [10]. A case study approach essentially focused on the case, and this case can be obtained from the emerging issues, a unique case, a special context, cultural, natural, holistic, and other phenomena.

Informants were selected as many as 11 the criteria as *Pencak silat* coaches in the area outside Yogyakarta and Yogyakarta Special Region championship in St. Louis OPEN 2018 by 10 votes and 1 head coach Test Measurement Laboratory Faculty of Sport Science, Yogyakarta State University. As for where the study was conducted in

Yogyakarta in April 2018. Site selection is done with the consideration that the Yogyakarta in practice always active and some events are often won and became the overall champion either national or international level, in addition to Yogyakarta often hold good championship level City / County as well as national level.

Data collection techniques in this study using interview techniques and documentation. This interview was conducted against the informant in order to know and look for more detailed information about the evaluation and measurement of the speed of *Pencak silat* kick, and availability of the instrument. In an interview researchers can conduct a face-to-face and requires only general questions unstructured and open-ended it is done to get information, opinions, and views of informants [15]. While the documentation is done to understand the evidence concerning the implementation of the measurement conditions and the availability of speed measuring instruments *Pencak silat* kicks. The data were analysed qualitatively with the gathering of data related instruments *Pencak silat* kick velocity,

III. RESEARCH AND DISCUSSION

The results of the study will be discussed in this section on the implementation of the measurement and evaluation of *Pencak silat* kick speed and availability of *Pencak silat* kick velocity instruments. Here are the results obtained from the interview coach and part laboratory measurement tests Faculty of Sport Science, Yogyakarta State University.

A. Coach

Based on interviews with coaches obtained some information that is:

- The entire coach selected as informants in this study had experience as a coach and has licensed both the local level national coach both held in Yogyakarta or outside. Aside from the coaches at least the athletes he coached to victory in every championship, and thus between the license and the results can be a capital in the training of athletes
- Implementation instrument speed kick *Pencak silat* do better when there is no competition or approaching the competition, meaning that measurement to determine the level of speed kick the athlete is still done by the coach without looking at the schedule the championship and at the end of the exercise program, the implementation of the measurement can also be performed when the current talent scouting or selection recruitment of athletes ,
- Most trainers explain that rarely or never measured regularly speed kick *Pencak silat*, because there is no more appropriate instrument.
- Measurement speed *Pencak silat* kick was played directly by counting the number of kicks for 10 seconds and picking up the most. This is often done by the coach in order to determine the success of the exercise program that has been given to the athlete.
- The trainer explains the importance of an instrument or tool *Pencak silat* kick velocity measurement in order to serve as guidelines for coaches to determine the success of a training program has been prepared. From

this description it is clear that the coach wants to get or have the instrument.

- Coaches are in dire need of instruments to measure the speed of their kick-based martial art technology.
- The coach explained although there are already instruments (manual) but there is no instrument that is technology which is more valid and reliable to determine the speed of the *Pencak silat* kicks.

Of the ten coaches who have asked for information shows that all the coach needs the instruments that are technology, with planning using the Arduino UNO microcontroller minimum system which will be assisted by other components.

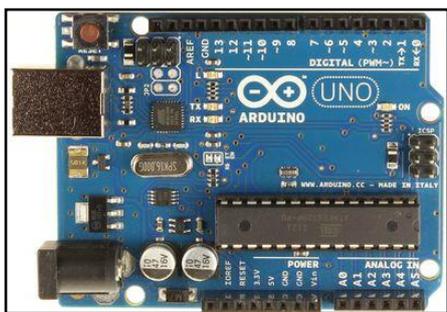


Fig. 1. Arduino UNO

Arduino UNO Figure 1 is a microcontroller board based on the ATmega328. Arduino UNO has 14 pin digital input / output (6 of them can be used as an output PWM), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. Arduino UNO load all that is needed to support the microcontroller, and easy connect to a computer or laptop with a USB cable, Planning is needed for the needs of the coaches, in addition to the Arduino UNO, laptop / computer are Push Button which later as a footstool and as a detector Condenser Mic voice that will be placed at the target [20].



Fig. 2. Condenser mic



Fig. 3. Push Button

Condenser Mic in Figure 2 is a device that is connected to the system to detect sound vibrations of *Pencak silat* athletes kick, while Push Button Figure 3. The tool lying on the floor which makes the running time or start when kakai released.

LCD is required when the coach asked for a time of display, but if not the result of a direct kick velocity stored in a computer or laptop. Based on a needs analysis of *Pencak silat* coaches following Table I. The results of interviews of 10 coaches.

TABLE I. RESULTS INTERVIEW COACH NEEDS

Names Initials	Area	Needs	
		Yes	No
ACS	Yogyakarta	√	
AY	Sleman	√	
AR	Banjarmasin	√	
S	Indramayu	√	
WDY	Sukoharjo	√	
HDR	Bantul	√	
PRB	Yogyakarta	√	
YLT	Bantul	√	
BBG	Yogyakarta	√	
ATN	Sleman	√	

Based on Table I above that all the coaches who were interviewed in *Pencak silat* championship 2018 UMP OPEN states with the development of technology-based instruments *Pencak silat* is very good, so the coaches are also very supportive and there are coaches who want to have a *Pencak silat* based instruments such technologies if there. So, overall the *Pencak silat* coach needs instruments based technology. It is much needed because during the kick velocity instrument *Pencak silat* can be said minimal, especially technology-based instruments therefore hope the coach will be the instrument that is more valid.

B. Head of Laboratory

Interviews were conducted on laboratory sections, especially in the sports measurement test laboratory Faculty of Sport Science, Yogyakarta State University, this is done to obtain information and to confirm the truth proclaimed the *Pencak silat* coaches. Results obtained information interview there are some measurement instruments of all instruments of speed but the speed has been no instrument to measure the speed of the *Pencak silat* in particular kick in either manual or based technology. Talking about the actual instrument is the same, still however every sport has a specification of movement and not so common, and so in every sport must have a measuring tool or instrument appropriate in order to obtain valid data.

The head of the laboratory of the Faculty of Sport Science, Yogyakarta State University also explains although there is the instrument does not necessarily have a good validity and reliability, because each instrument has disadvantages of each, especially if the instrument is still manual will result in a larger data errors. In addition, the laboratory is also clear that the importance of such an instrument in the measurement, so that the laboratory support their development planning instruments *Pencak silat* kick velocity with different models of digital or technology will be great.

Based on the results of interviews that have been made against the coach and the head of the laboratory can be concluded that the laboratories of the Faculty of Sport Sciences do not yet have a measuring tool or instrument to determine the results of the speed capabilities kicks sport *Pencak silat*, and yet have an instrument that is more valid and reliable, so that the coach was evaluate athletes with what their equipment. The head of the laboratory also gave an explanation that suggested to do the development in order to

create new knowledge in the field of technology and will be able to assist the trainers in the process of evaluation and measurement.

C. Description availability *Pencak silat* kick velocity instrument

In preparing the athletes ability then a coach should be able to meet an athlete needs such an instrument as a tool for evaluating the exercise results of athletes after a given program in a given time. Components of the physical conditions in the sport of *Pencak silat* is needed for the implementation of motion-kick technique performed must be quick and sudden [16]. Therefore we need an instrument for measuring the speed of the kick, it is clear that the coach cannot escape from the measuring instrument. Based on these Firdaos, in line with the opinion stating that the instrument gives a very important role in determining the quality of a measurement [12].

Information from several experts above that at the time of exercise for athletes rarely known ability, so that the coach cannot know who created the exercise program is appropriate or not by the needs of the athletes. No wonder if the appearance is not the maximum field athletes often we see an athlete is never a shot during a match, it happened because of the ability to do a kick is not owned. An instrument is said to be good if valid and reliable. This statement is in accordance with some studies explain that the main indicator of the quality of the measuring instrument is the validity, reliability [13], [14]. Validity refers to the extent to which an instrument can measure exactly what we want to measure. Reliability or reliability relating to the accuracy of the measurement procedure.

Each measurement coaches want a tool that is not difficult to use and the results of the tests can be trusted accurately. At the interview, the coach is confused, as long as it does not have a more accurate measuring tool or right. By using a measuring accuracy tool the results obtained also in accordance with their talent capabilities. Results of searches related to the availability of *Pencak silat* kick velocity instrument laboratory measurement tests obtained information that during the exercise has not been undertaken the development of special instruments *Pencak silat* kick velocity, so that laboratories do not yet have the instruments. Of the few references found are *Pencak silat* kick velocity instrument but the instrument is still manual, with implementation during the ten (10) seconds how many times the athlete can perform a kick with three attempts and captured the best time, then converted the kick velocity norm tables.

Based on the results of interviews obtained by researchers, that there is a gap between the needs of practitioners or trainers with the availability of existing measurement instruments. It can be concluded the coach does not have an instrument that is more objective, valid, and reliable. Apart from that the coach also needs a tool or instrument in the training process in order to know the results of his training. A description of some coaches remind us the importance of the development of *Pencak silat* kick velocity instrument to facilitate trainers to measure or evaluate the exercise program and can determine it goes so that athletes who trained entitled to the maximum speed.

IV. CONCLUSION

Based on interviews and analysis obtained can be concluded that there is an instrument for measuring the speed of *Pencak silat* kick to manual errors of assessment and without any guidelines that more valid and reliable. The coach felt that it was an important instrument in *Pencak silat* kick velocity measurements in order to measure the success of an exercise program, so the coaches really need the availability of *Pencak silat* kick velocity instrument based technology. Furthermore, the conclusions obtained from the head of the laboratory tests measuring sport Faculty of Sport Science, Yogyakarta State University fact that the unavailability of an instrument for measuring the speed of a special kick *Pencak silat*.

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