



Development of a Digital Standing Samsak as a Tool for Testing Kicking Ability in Jambi City Pencak Silat Athletes

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Abstract

Currently, almost all training activities in the pencak silat sport use various technologies that are currently trending. However, there are several manual tools that are still used in practicing pencak silat techniques, namely punching pads which are used to practice various kicks and punches so that they become strong and fast. This punching pad is usually also used as a tool to test kicking and punching abilities. The problem that often occurs is that the accuracy of timing when kicking becomes out of sync, one of which is still using a stopwatch which often results in human error, this is of course very detrimental to athletes who don't know how far their abilities in kicking have progressed. This research aims to develop a manual standing samsak tool made into a digital standing samsak that can be used to test kicking ability. The method in this research is to use the ADDIE development method. From the results of this research, it was found that this development product was worthy of being a tool for conducting pencak silat kick tests with a score obtained through two stages of validation by media experts and material experts and trials, namely, 86% of the score from media experts, 95.38% from material experts and 83.71% of the value from field trials, with this, the average value obtained from the three stages above is 88.36%. Thus it can be said that the product "Development of Standing Samsak Digital" is categorized as eligible with the criteria "GOOD"



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INTRODUCTION

The development of Science and Technology is currently increasing rapidly, making it easier for humans to carry out various activities that can speed up having sophisticated technology that we can encounter in our daily lives (Wiryaningrum et al, 2022), we can find these tools both at home, in factories, at the office, in hospitals, at schools and even many sophisticated technological equipment already exist in the sports sector.

In the past, before the advent of Science and Technology, everyone did everything manually, which took a long time and required a lot of extra energy (Khotimah et al, 2023). With this long time to produce something it becomes less productive. Likewise, in the field of sports, we cannot discuss athletes' achievements if the training system currently provided is still manual and does not utilize science and technology in various sporting activities. For example, currently there are lots of tools that are based on science and technology that we come across to train muscle strength, usually we find a lot of these sophisticated tools at gym clubs, we want to train muscles using a barbell of how many kilos, we just have to use it. Everything becomes efficient in practicing. We no longer have to think that if we want to train muscle strength, we no longer need to make a barbell from cast cement and put it in a bucket which then puts iron into the cement castings so that we can train muscle strength but we don't know how many kilos of cement castings we are lifting.

There are many technologically advanced tools that can be used when training and competing (Setyawan, 2017). Currently, all sporting activities use technology-based tools which can make it easier for coaches to provide training programs so that they can improve athlete performance both in training and competing. Through appropriate technology, it is hoped that the quality of athletes, both physically and technically, can improve so that they will achieve maximum performance and not just work, both in terms of time and energy (Aughey, 2011). With advances in Science and Technology, humans can streamline their time and energy in various types of work (Kong et al, 2019). Many tools have been created that, with the presence of this sophisticated technology, can be seen transparently during the match. The level of cheating during assessment in matches is increasingly less likely to occur. With the presence of this sophisticated technology, it has a positive influence on people's daily lives, especially in the field of sports.

Pencak Silat is a martial art that pays attention to mental and spiritual aspects (Setiawan & Mulyana, 2023). Pencak Silat is a form of culture for Indonesian people to defend themselves (Mardotillah & Zein, 2017). In Southeast Asian countries, Pencak Silat is known as Silat.

Pencak means basic self-defense movements (Fridianty, 2023). Meanwhile, silat means perfect self-defense movements that originate from sacred spirituality for personal safety from the community (Usra, 2018).

Pencak silat or known as silat is a traditional Indonesian martial art that pays attention to the beauty of movement in every move. Each region in Indonesia has its own unique style of pencak silat. Now Pencak Silat has become a sport that has many fans in various countries (Ramadhan, 2021). Understanding Pencak Silat can be knowledge about typical Indonesian sports.

Usually, the first basic technique in pencak silat sports is the stance technique (Suwiwa et al, 2017). This technique functions to maintain body balance for attack and defense. The second technique is the punch technique in silat. The silat punch technique is an attempt to attack the opponent using the hands (Pelawi, 2022). After the punch, enter the kick technique. The kick technique is a technique used to attack the opponent using the feet (Dailami & Jatmiko, 2019). However, it is not uncommon for kicks to be used to defend against enemy attacks. The parrying technique is a form of defensive technique in pencak silat (Dirhamsyah, 2020).

Pencak silat has many moves. Some of them are, Kuntao Style, Pulo Kali Style, Brajamusti Style, Pamur Silat Style, Fifth Style (Fitri et al, 2023).

In pencak silat, no matter how great your attacking ability is, it will be useless if you don't have good defensive skills (Wardoyo & Fitranto, 2021). Both must be balanced.

Currently, almost all training activities in the pencak silat sport use various technologies that are currently trending. This makes training much easier and supports athlete performance.

However, there are still several manual tools that are still used in practicing pencak silat techniques, namely punching pads which are usually used to practice various kicks and punches so that they become strong and fast. Punching pads have many forms, including standing punching pads, punching boxes which are held by one person and another person kicks or punches (Liu Q et al, 2014). There are also samsaks that are used to practice punches and kicks, usually these samsaks are hanging and some are standing. Abroad, many digital punching pad machines have been created (Dunn E et al, 2019). This punching pad is intended for the sports of boxing and muaythai (Fareza, 2024). With a digital punching pad, this machine is used for training which can be guided by a personal trainer via a computer, so training can be done at home without having a personal trainer come to the house. Box-shaped punching pads and hanging bags are also usually used not only for practice, but manual punching pad boxes and hanging bags are usually used to test various kicking abilities (Adamec J et al, 2021). The problem that often occurs is that the timing accuracy when kicking becomes out of sync. Sometimes the problem that often occurs is that when athletes are preparing to do a kick test, the stopwatch held by the coach often misses the time when counting the number of kicks, this is usually because human error often occurs, this is of course very detrimental to the athletes, the athletes don't know how far progress in his ability to kick.

Standing samsak and digital do not yet exist in the sport of pencak silat.

How beneficial it would be for the sport of pencak if the manual standing samsak tool could be combined with a digital system so that when testing kicking ability no more human error occurs and the accuracy of the assessment becomes accurate and valid so that coaches can know how far an athlete has progressed in training and able to achieve the desired achievements.

METHODS

The development method used in this research is the ADDIE (Analysis, Design, Development, Implementation and Evaluations) development method (Aldoobie, 2015). This model consists of five steps, namely: (1) analysis; (2) design; (3) development; (4) implementation; (5) evaluation. The ADDIE model can be used for various forms of product development. The advantages of the ADDIE model are its general nature and complete and detailed steps (Azzam, 2022).

Product Validity Data Analysis

Analysis of the validation results carried out by the validator is determined from the average percentage of validity scores using the following formula.

Practicality Data Analysis

Analysis of the practical results carried out by the validator is determined from the average percentage of the athlete and coach perception assessment questionnaire scores using the following formula.

$$\text{Percentage} = \frac{\text{Part}}{\text{Whole}} \times 100\%$$

- a. The digital standing bag tool is said to be valid if according to experts this tool meets the criteria of being very valid or quite valid.
- b. The digital standing bag tool is said to be practical if athletes and coaches state that the tool can be applied in the ability test process, and the level of practicality of the device meets good criteria.

Participants

Because the development of the digital standing samsak was created to measure kicking ability tests which are currently still intended for the martial arts branch, therefore the participants in this research will be Jambi City pencak silat athletes.

Data Collection Techniques and Instruments

In this research, the data collection method used was a non-test method using a questionnaire/questionnaire instrument. In this development research, researchers used several instruments in the context of product validity and practicality, namely:
1) Validity assessment instrument

The instruments used to assess product validity are the validation sheet for the digital standing samsak tool, the aspects assessed (in the form of scores), conclusions, suggestions for improvement, and the value scale that meets the valid or invalid criteria and the validation sheet for the respondent perception questionnaire (athletes and coaches).

- 2) Practicality assessment instrument

The instrument used to assess the practicality of the product is a

questionnaire, a questionnaire regarding respondents' perceptions (athletes and coaches) regarding the use of digital standing samsak tools.

RESULT

Set Of Tools

Series of Tools A series of tools is placed behind the kick target. This circuit consists of various components, namely Arduino as a microcontroller which works as a reader of sensor input and processes it, a Touch sensor (TTP223) as a reader for the number of kicks, a power bank as a voltage source, a 220k resistor as a resistance for adjusting the LED voltage, a push button as a button for resetting the readings. tool, LCD 16.

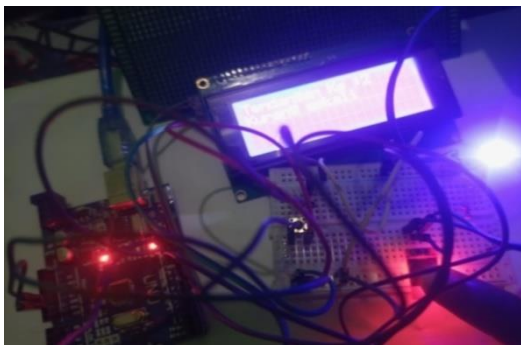


Fig 1. Appearance of the tool when assembled as a prototype

In the prototype tool there is 1 pc of project board, 1 pc of 220k resistor for the LED, 13 pcs of jumper cables and 1 Arduino microcontroller. From this picture you can see the various components connected to the ESP32. Each component is connected to an Arduino pin. There is 1 pc of touch sensor, a touch reader, a 16 x 2 LCD which is used as a medium for

displaying sensor reading information with a display of the number of kicks and criteria. 2 pcs of push buttons as tool program reset buttons.

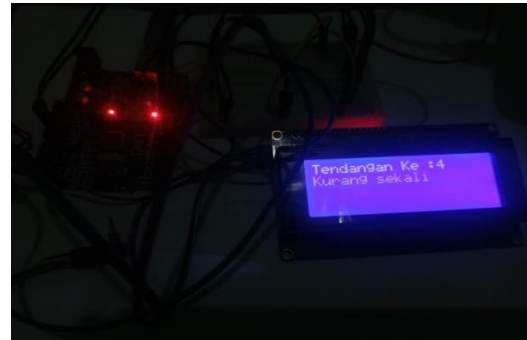


Fig 2. The display produced is LCD

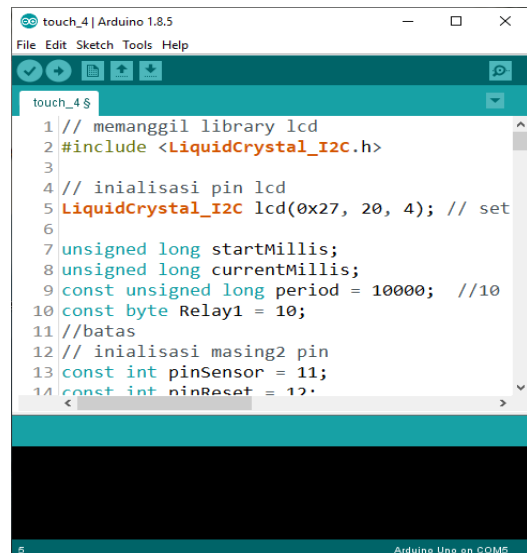


Fig 3. Tool algorithm coding process



Fig 4. Validated tool

After the tool creation is complete, the validation stage will then be carried out by two validators. In the product validation process, the material and media will be validated. The results of the validation that has been carried out are as follows:

1. Media Validator

First assessment results

NO	Rated aspect	Score Obtained	Maximum Score	Percent	Criteria
1	Appearance	22	30	73,3 %	Good
2	Safety	21	25	76 %	Good
3	Design Feasibility	37	45	77,7 %	Good
Total Score		80	100	76 %	Good

There are several notes that need to be considered for improvement, namely replacing the Touch sensor device (TTP223), which is very slow in responding to the number of kicks. In the first stage of the validation process, this tool obtained a percentage of 80%. According to media experts, in the first stage of the validation process, this tool can be declared to have "Good" criteria.

Second Assessment Results

NO	Rated aspect	Score Obtained	Maximum Score	Percent	Criteria
1	Appearance	24	30	80%	Good
2	Safety	21	25	76%	Good
3	Design Feasibility	41	45	82,2%	Good
Total Score		86	100	80%	Good

In the second stage of validation, the percentage obtained experienced an increase from initially getting a percentage of 80% in the first validation, increasing to 86% of the maximum score. It can be said that

according to media experts, "Standing digital samsak which was developed from the design, appearance and security feasibility aspects received the "WORTHY" category with "GOOD" criteria.

2. Material Validator

First assessment results

NO	Rated aspect	Score Obtained	Maximum Score	Percent	Criteria
1	Appearance	31	35	88,57 %	Good
2	Safety	28	30	93,3%	Good
Total Score		59	65	90,76 %	Good

In the first stage of validation, the product received a percentage of 90.76% and could be categorized as feasible and received the "Very Good" criteria with several notes that must be considered, namely tidying up the cable installation so as not to disturb the user when carrying out the kick ability test and replacing the LCD frame which originally used acrylic material. which is easy to remove with an iron frame so it doesn't come off easily.

Second Assessment Results

NO	Rated aspect	Score Obtained	Maximum Score	Percent	Criteria
1	Appearance	33	35	94,28 %	Good
2	Safety	29	30	96,67 %	Good
Total Score		62	65	95,38 %	Good

In the second stage of validation, the product received an increase in the score percentage, which previously obtained a percentage of 90.76% in the first stage of material expert validation. experienced an increase in the percentage score to 95.38%. with the criteria "Very Good" and worthy of being tested on users.

DISCUSSION

This development research resulted in a digital Standing Samsak product and has been tested in both small group trials and large group trials. The results of the large group trial were that the product got a percentage value, the product got a percentage value of 85.33% from the comfort aspect, 81.14% from the performance aspect, and 84.67% from the appearance aspect. Meanwhile, for the average accumulated value of the three aspects above, the product received an average value of 83.71% and can be categorized as "Decent" with the criteria "Good".

CONCLUSION

From the results of the research "Development of a digital standing samsak" it can be concluded that this development product is worthy of being a tool for carrying out pencak silat kick tests with a score obtained through two stages of validation from media experts and material experts and trials, namely, 86% of the score from media experts, 95.38% from material experts and 83.71% of the value from field trials, with this, the average value obtained from the three stages above is 88.36%. Thus, it can be said that the product "Development of Digital Samsak Standing" received a Decent rating with the criteria "GOOD". The suggestions for this research are as follows:

1. The more tools or products that support test capabilities in pencak

silat, the greater the accuracy in carrying out the test itself. And with this test tool, it will be able to save time in carrying out tests and minimize human error when carrying out tests.

2. For researchers who are interested in the same problem, they should be able to follow up further on the results of this research so that they can obtain the treasures of sports science and coaching science as well as learning science.

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