

## The Development of Speed Punch Reaction (SPR) as a Tool for Reaction Speed of Karate Punch Training

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### Abstract

Developing reaction speed of punch training tool design for Karate which serves to improve the reaction speed of karate athletes' punch, so the training program will be more efficient in terms of time and power. The type of this study is R and D (Research and Development) research method. The study was conducted in two places, namely: Pusat dan Latihan Olahraga Pelajar (PPLOP) Jawa Tengah and Universitas Negeri Semarang 2017, for the testing of the tool, it was used by 16 athletes consisting of 8 junior karate athletes and 8 senior karate athletes. The final result of the reaction speed of punch training tool on Karate "Speed Punch Reaction" that the tool can be used by junior or senior athletes to practice the reaction speed of punch. The tool validation results from karate expert scoring rubric and equipment expert got score 94 (exact) while the effectiveness of speed punch reaction model was obtained from karate expert evaluation on small and large scale of testing by 2 experiments and 16 athletes stated that Speed Punch Reaction tool is effective to be used to train the reaction speed of punch.

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## INTRODUCTION

Utilization of appropriate technology is very helpful in improving sports achievements in the world, especially in Indonesia. In Law Number 03 in the Year of 2005 about National Sports System Article 74 Section 2 states that the Government, regional government, and/or the community can establish research and development institute of science and technology of sports which is useful to promote the founding and development of national sports.

There are so many factors affect the outcome of athletes' training, one of them is the creativity of a coach in creating and developing tools for training. Tool is an important media in training. The success of athlete coaching can be measured from the availability of sports equipments (Rachman I, 2017). Adequate sports equipment will reflect the quality of the coaching, so the coaching goal will be achieved well. Conversely, inadequate tools will have an impact on the low quality of coaching, so it can not produce the highest achievement. The lack of sports equipment has an impact on the training activities that are ineffective, inefficient, and exhausting. Nowadays the development of Karate in Indonesia is quite rapid, but the development is less followed by the optimal utilization of science and technology (IPTEK) in sports, especially in using training tools, especially for punch reaction training. In general, most of coaches still use a target which is made of foam to train punch reaction on their athletes which is used by being manually held and replacing the target of the punch. In this method one of the obstacles is that it takes a lot of energy in training the reaction speed of the punch so the speed of the target is longer and to move to another place is also decrease. It causes the result of the reaction speed of punch training is less of maximum (Jujur Gunawan Manullang, 2014). The coaches need to think about designing a tool that can be used to overcome these obstacles. This tool is expected to be utilized to facilitate and to make athletes easier in training, especially in the reaction speed of punch training.

Speed Punch Reaction (SPR) is a name for the design of the tools that the researchers propose to make the practice of punch reaction speed efficient. Speed Punch Reaction (SPR) is a simple tool that basically has a function to signal to athletes where the place/target must be hit in the form of a human body. The signal is a light from an LCD lamp which is given a touch sensor which if the lamp is touched or gets hit will die automatically and change another LCD lamp that lives on a different target. There are 4 sensors installed on this device. This was also conveyed by Wulandari Ika Puspita (2009) that the AT 89S8252 microcontroller can be applied to measuring the speed of human response by installing 4 switches. Another advantage of this toolkit is practical because it can be shifted or moved.

Based on the problems and conditions that exist in all colleges and karate clubs in Semarang (Bustami Syam, 2007), because of the absence of training tools, the problems that arised were as follows: (1) Achievement of novice athletes did not increase rapidly, especially in the ability in mastering the speed punch reaction training; (2) Colleges and karate clubs still use standard equipments, so there is no guatantee for the factor training time efficiency (Bompa, Tudor O. 2006).

While the advantages if the design of Speed Punch Reaction (SPR) is being researched and developed are as follows: (1) There will be a rapid improvement of novice athletes' achievement, especially in terms of mastery of the speed punch reaction subject. (2) The speed punch reaction training's time will be more effective. Technically, there will be an improvement in punch accuracy and movement automation; (3) Take part to assist FORKI Central Java Province, especially in terms of teaching and coaching achievements of Karate athletes in Central Java; (4) Making Speed Punch Reaction (SPR) is very simple and does not require high cost, practical (can be shifted and carried) and can be used two or more in a Dojo.

## METHODS

This research is a development research that aims to produce a product of speed punch reaction tool that is used as a training tool for karate athletes in improving the reaction speed of punch both *gsaku tsuki* and *kizami tsuki* (Ariandi Witara, 2008). The materials which were used in making speed punch reaction are fiber glas, aluminum, iron pipe, LED lamp, censor, Connector cable, LCD, Transistor, Capacitor, Transformer. The steps of development research are based on Research and Development (R & D) method. The procedures which are used are potential and problem, data collection, product design, design validation, design revisions, product testing, product revisions, and testing usage (Sugiyono, 2015). The testing design was carried out in 2 stages, those were a small group testing that conducted in PPLOP karate of Central Java. Research subjects that involved in the study were athletes karate as many as 16 athletes (junior and senior), karate trainers as many as 3 (three) people, experts/specialist of karate as much as 2 (two) people, experts/specialist equipment as much as 2 (two) people. The datum which were used in this research were qualitative data and quantitative data. The instruments which were used in developing product were interview, observation, documentation, and assessment rubrics. This research used qualitative approach and model development method. The validity of the data needs to be done by the researcher so the data that has been obtained can be justified its validity, some ways that can be done to know the validity of the research data are as follows: (1) Persistence of observation, (2) Triangulation, (3) Peers examination, and (4) Checking members through discussion (M.Nazir.2014.71)

## RESULTS AND DISCUSSION

### Product Description of Speed Punch Reaction (SPR) Tool

Specifications of product development of speed punch reaction (SPR) tool can be seen in the table below: (Table 1)

Product of development model of Speed Punch Reaction (SPR) tool has 3 (three) main parts, among others are: (Figure 1)

1. Part 1 (one) is the engine part or it can also be called the brain of Speed Punch Reaction, which consists of a combination of transistors, capacitors, LCD cable connector and iron plate with a thickness of 1 mm and has a diameter of 20 cm (Woolard Barry, 2006).
2. Part 2 (two) is the middle or the body of the Speed Punch Reaction, It is a combination of plywood board, acrylic, LED and touch censor that being connected by connector cable which will transfer the data to the Speed Punch Reaction machine (Malvino & Paul Albert., 2003)
3. Part 3 (three) is the bottom or foot of Speed Punch Reaction (SPR), in the shape of triangular which was made of iron plate with a thickness of 2 mm and a straight iron pipe 60 cm. In the middle of Speed Punch Reaction's foot was given a hole to up-down the iron pipe so that the height of the tool can be customized by people who use it. There is a jack, so it will be easy in raising and lowering the tool. At the center of the SPR was given paralon pipe with a size of 30 cm.

**Table 1.** Speed Punch Reaction (SPR)

No.	Development product
1	The product was made of various components those were aluminum, acrylic, connector cable, censor, transistor, capacitor, led, & transformer.
2	Can be moved here and there & can be moved up and down.
3	Using electronic technology
4	Local materials
5	Created manually
6	Minimum height 130 cm, maximum 180 cm
7	Using 4 lamps
8	Empowering the community
9	Local materials
10	For the maintenance should not be inundated, and burned.
11	Memiliki deskripsi tentang manual penggunaan produk (buku manual). Have a description of the product usage manual (manual book).
12	The price is affordable: Rp. 3.500.000



**Figure 1.** Part of Speed Punch Reaction Tool

### Validation Results of Speed Punch Reaction's Experts

To validate the product which has been produced, the researcher involved two karate experts from karate coaches, those were Mr. Febryan Gede Saputra, S.H (INKAI), and Mrs. Dyah Puspitasari (BKC), and 1 expert karate namely Mr. Anggoro Kriswanto S.Pd (INKAI), and an expert/specialist of electronics namely Mr. Ari Wibowo ST, MS (Wahid Abdul, 2007).

The result of filling the evaluation sheet or questionnaire by each Karate expert and expert/specialist of Karate equipment obtained score above 94 which entered in "good/proper" rating category.

### Test Results of the Speed punch Reaction's (SPR) Effectiveness

The results which were obtained by researcher in large-scale test and small-scale test were as follows:

1. A total of 8 junior athletes stated

Products can be used for training for junior athletes, The product is safe to use by junior athletes, The product is comfortable to use by junior athletes, and the Product already has the appropriate size.

The results obtained by researchers in large-scale test and small-scale test are as follows:

2. A total of 8 senior athletes stated

The product can be used for senior athletes' training, the product is safe to be used by the senior athletes, the product is comfortable to

be used by senior athletes, the product already has the appropriate size, the product can be used to improve reaction speed of punch skill of karate.

After the testing was complete, the karate experts also conducted assessments to the athletes. Here is an athletes rating table.

This research is a development research of Speed Punch Reaction tool which is a development research from batak pro lite dar quotronic tool.

**Table 2.** Results Assessment of SPR Tool by The Karate Experts on a Small Scale Test

No.	Name	Testing		
		Low	Medium	High
1	Detrin	30	35	27
2	Alfito	30	35	21
3	Galih Rizki	30	35	25
4	A. Wisnu	30	35	23
5	Wahyu M	30	35	34
6	Malik Rizki	30	35	28

Information:

Low = 2 seconds  
 Medium = 1.5 seconds  
 High = 1 second

**Table 3.** Experimental Results of SPR Tool testing by Karate Experts on Large Scale Test

No.	Name	Testing		
		Low	Medium	High
1	Detrin Sabda	30	40	33
2	Alfito D	30	37	24
3	Galih	30	38	25
4	A. wisnu	30	35	25
5	Wahyu M	30	42	34
6	Malik Rizki	30	35	28
7	Farizal	30	37	23
8	Ageng S	30	36	25
9	Erik Naseh	30	39	24
10	Dodik M.C	30	36	27
11	Achten N	30	39	29
12	Tefans P	30	35	22
13	Ryan S	30	37	26
14	Titis S	30	36	32
15	Pandu P	30	40	37
16	Anggoro K	30	41	34

Information:

Low = 2 seconds  
 Medium = 1.5 seconds  
 High = 1 second

### Speed Punch Reaction (SPR) Tool for Junior and Senior Karate Athletes

Data analysis and data interpretation were obtained through the activities undertaken by researchers by analyzing carefully all of the data that has been collected, namely the results of interview, observation, and documentation (Hidayat Rohman, 2016). Based on the data

analysis of the research results, it was obtained data of Speed Punch Reaction tool can be used for both junior and senior male karate athletes' training. In summary, the interview results data can be classified as follows:

1. In question number 1, in a small-scale test, 6 athletes stated that the Speed Punch Reaction development tool can be used as a training tool for karate athletes.
2. In question number 1, in a large-scale test, as many as 20 athletes stated that the Speed Punch Reaction development tool can be used for
3. In question number 1, as much as 2 supporter karate experts and in the third question, 3 trainers stated that the Speed Punch Reaction development tool can be used as a training tool for karate athletes.
4. In question number 2, 3, and 4, in a small-scale test, 6 athletes stated that the Speed Punch Reaction development tool has been safe, comfortable and standardized.
5. In question number 2, 3 and 4, in a large-scale test, as many as 20 senior athletes stated that the Speed Punch Reaction development tool has been safe, comfortable and standardized.
6. In question number 2, 3 and 4, as many as 2 supporter karate experts and as many as 3 trainers stated that the Speed Punch Reaction development tool has been safe, comfortable and standard.

#### **Speed Punch Reaction (SPR) Tool is Effective to Improve the Reaction Speed of Punch for Junior and Senior Karate Athletes**

Data analysis and data interpretation were obtained through the activities undertaken by researchers by analyzing carefully all of the data that has been collected, namely the results of interview, observation, and documentation. Based on the data analysis of the research results, it was obtained data of Speed Punch Reaction tool can be used for both junior and senior male karate athletes' training. In summary, the interview results data can be classified as follows:

1. In question number 5, in a small-scale test, a total of 6 karate athletes stated that the Speed Punch Reaction development tool can be used

as a means to improve the reaction speech of punch for karate athletes.

2. In question number 5 in a large-scale test, as many as 8 junior athletes and 8 senior athletes stated that the Speed Punch Reaction development tool can be used as a means to improve the reaction speech of punch for karate athletes.
3. In question number 5, as much as 2 supporter karate experts and, as many as 3 trainers stated that the Speed Punch Reaction development tool can be used as a means to improve the reaction speech of punch for karate athletes.

#### **CONCLUSION**

Based on the results of research on the Speed Punch Reaction (SPR) product development, it can be concluded as follows: (1). The model product of "Speed Punch Reaction (SPR)" tool can be used as a training tool for the reaction speed of punches for junior and senior karate athletes. (2) The model product of "Speed Punch Reaction (SPR)" tool is effective to be used to improve the reaction speed of punch for junior and senior karate athletes.

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