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Technical Skills Assessment Analysis: Gyaku-Zuki Shots in Karate

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Abstract: *The assessment of sport-specific technical skills is very important and studies on assessment frameworks in sports science are still limited. The Gyaku-zuki is one of the most frequently performed effective punches in Karate, and a set of assessments of its technical skills currently does not exist. Therefore, the establishment of a scoring framework is necessary to provide a standard for measuring athletes' technical skills. This study aims to develop a framework for assessing Gyaku-zuki technique skills that have a high level of validity. This development research was carried out by carrying out three stages of implementation; analysis of existing journals and documents to determine Gyaku-zuki's technical skills assessment, expert judges' assessment of the development of Gyaku-zuki's technical skills assessment using the Delphi method, and analysis of the results of expert judges' assessment by applying Aiken's V to test content validity. This study involved nine expert judges from both academics and practitioners and data analysis showed the relevance of this technical skills assessment material had a coefficient of V 0.96; the systematics of the material relevance assessment procedure has a coefficient value of V 0.93; Gyaku-zuki target direction has a coefficient value of V 0.93; the Gyaku-zuki test score has a coefficient value of V 0.81; distance has a coefficient value of V 0.89; clarity of implementation has a coefficient value of V 0.89. The study concluded that the construction of the Gyaku-zuki technical skill assessment has high content validity with a value of V > 0.8, so that the established framework can be used as a reference in conducting the Gyaku-zuki technical skills assessment.*
Keywords: *Karate, gyaku-zuki, assessment framework, sport science.*

INTRODUCTION

Karate is a Japanese martial art developed on the island of Okinawa and is currently considered a global sport (Clark, 2022; Gonzalez de la Fuente, 2021). In addition, karate is in great demand and is dominated by children and adolescents (Chaabene et al., 2015; Koropanovski et al., 2011; Srianto & Siswantoyo, 2022), and is currently one of the most popular sports since it was competed in at the Tokyo Olympics. 2020 (Rodrigues et al., 2022; Widyastuti & Dimyati, 2019; Zadarko et al., 2019). Peters (2020) explains that karate consists of kata matches and kumite matches; kata consists of a series of movements or moves while kumite consists of fighting. Kata and kumite matches are carried out using dynamic, precise, and well-coordinated techniques, so that a karate athlete is required to have good performance, which is determined by several factors including technique, tactics, and motor skills (Przybylski et al., 2021; Styriak et al., 2020).

Some literature states that the success rate of athletes in kumite matches is higher when athletes use punching techniques rather than kicking techniques (Fendrian & Nurzaman, 2016; Marandi et al., 2010; Zebua & Siahaan, n.d.). Gyaku-zuki is a technique commonly taught in Karate. Gyaku-zuki's punches are mid-range punches and are delivered in short time. This can be interpreted as a reverse punching technique that is often used in kumite tournaments (Ionete et al., 2011; Venkatraman & Nasiriavanaki, 2019). A backwards shot is described with the position of the left foot in front, then the blow is done with the right hand. Vice versa, the position of the right foot is in front, then the stroke is done with the left hand. The Gyaku-zuki punch is an effective punch to use in kumite tournaments because of its speed it may hit the stomach, neck and head. The initial stance of the Gyaku-zuki punch includes the chudan-no-kamae stance. This is a posture that targets the opponent that allows for attack, defense, and a flexible response to the opponent's movement (Shin et al., 2021), followed by a series of movements performed simultaneously including lowering the body's center of mass by extending the dachi and pushing the arms forward by aim at the opponent. Gyaku-zuki is a punch that is performed with a series of body movements rotating the hips and shoulders simultaneously (Venkatraman et al., 2019).

In determining the skill of the Gyaku-zuki technique, a Gyaku-zuki technique skill test is required. This skill test is an important aspect in coaching science which aims to measure the level of success and correctness of a technique (Iermakov et al., 2016). Based on the literature review, there is no test instrument for assessing the skill of the

Gyaku-zuki technique. The study is limited to tests to measure the speed of the Gyaku-zuki technique, analysis of Gyaku-zuki movements, the impact of morphology and motor skills while doing Gyaku-zuki (Doder et al., 2023; Hofmann et al. , 2008; Kadir & Haryanto, 2021), where the test is feasible to use if the Gyaku-zuki player already has punching technique skills. Therefore, it is important to study the preparation of the Gyaku-zuki technique skill test instrument as a first step in assessing the Gyaku-zuki technique. The test instrument was determined and validated by expert judges in carrying out the Gyaku-zuki procedure described by Doder et al. (2023).

METHODS

Research

This research is a development research using quantitative and qualitative analysis approaches to get a high value of validity. The implementation consists of three stages. The first stage is by analyzing existing journals and documents to determine the Gyaku-zuki technique skill test, the second stage is expert jury assessment for the Gyaku-zuki technique skill test which was developed using the Delphi method using a questionnaire (Saud, 2019). The third stage is by analyzing the results of expert judges' assessments by applying Aiken's V to test content validity.

Participants

This study involved nine expert jury participants, including five expert judges from the academic field who work as lecturers with doctoral and master of sports degrees. The four expert judges come from practitioners who have been working as karate trainers for more than ten years and hold a master of sports degree.

Data Analysis

Collecting data using a Likert scale questionnaire with four answer choices, namely: a score of four strongly agree, a score of three agrees, a score of two disagrees, and a score of one strongly disagrees (Awang et al., 2016; Croasmun & Ostrom, 2011). Then, qualitative data in the form of expert judgment suggestions are summarized and realized. Quantitative data were processed using the V-Aiken formulation to test the content validity of the Gyaku-zuki technique skill test. The range of V-Aiken values is zero to one, if the V value <0.6 is considered in the low category, if the V value is 0.6 – 0.8 it is considered in the medium category, if the V value > 0.8 is considered in the high category (Arthur et al. al., 2019). Table 1 shows the V-Aiken formula (Nengsih & Mawardi, 2021) which was implemented in this study.

Table 1. *V-Aiken Formula*

$V =$	$\frac{\sum s}{n(c-1)}$
$s =$	$r - lo$

V: the Aiken scale to find the value for
S: the reduction result of the validator value with the lowest value
N: the number of validators
C: the highest validity value
Lo: the lowest validity value

RESULTS

Based on document analysis, it can be defined that the Gyaku-zuki technique is a punch in karate that is often used in karate tournaments, or it is also known as a backward punch technique when the left foot is in front and the left foot is in front. The punch is done using the right hand, or vice versa. While the Gyaku-zuki technique skill test is a test to assess the quality of Gyaku-zuki's strokes based on instruments that have been constructed and occupied with high validity. Based on the analysis and advice of the expert judges, the Gyaku-zuki technical skill construction was formed. The execution of the Gyaku-zuki procedure adopted from previous studies is described as shown in Figure 1 (Doder et al., 2023).

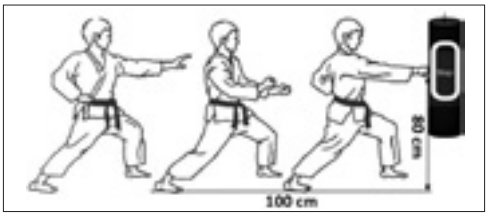


Figure 1. *Execution Procedure of the Gyaku-zuki (Doder et al., 2023)*

Tools

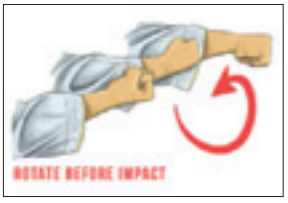
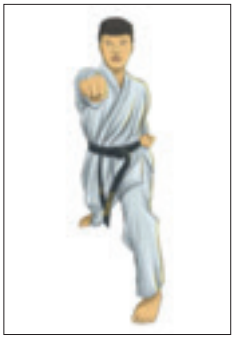
1. Target as a hitting target
2. Whistle as a starting sign of the test
3. Stationery to record test results

Procedure of Test

1. The test can be used for right-handed and left-handed Gyaku-zuki.
2. The target position is in front of the tester.
3. The Gyaku-zuki punch is done 3 times in 1 test.
4. The tester performs the chudan-no-kamae standing position.
6. Target punch can be adjusted (stomach, neck, or head direction)
7. The test is carried out after the tester blows the whistle.
8. The test is carried out 2 times, the best value is taken.

Table 2. *Indicators of Right-Handed Gyaku-zuki Technique Skill Test*

No	Steps	Test Indicators
1	Initial Stance  Figure Initial Attitudes 1 and 2	1. Eyes-view facing forward 2. Upright body position
	 Figure Initial movement attitude 3	3. Chudan-no-kamae position (one hand is in front, and one hand protects the body area).
	 Figure Initial movement attitude 4	4. Zenkutsu dachi, a half stance foot position (to produce a strong push, so the stance should not be low) (Khorasani et al., 2020).

No	Steps	Test Indicators
2	Implementation  Implementation Figure 1	1. Lowering the body mass center by extending the stance towards the target, the feet position is not in one straight line for maximum balance.
	 Implementation Figure 2	2. Rotating the hip and shoulder simultaneously.
	 Implementation Figure 3	3. Performing a straight forward punch while rotating the wrist (hand gripping position)
	 Implementation Figure 4	4. The position of the feet and hands are in opposite, the left foot is in the front and the punch is performed by using the right hand

No	Steps	Test Indicators
3	Continued Movements  Continuation Pictures of Movements 1 and 2	1. Pulling the body back to the original position 2. Pulling punches towards the hips
	 Continuation Pictures of Movement 3 and 4	3. Chudan-no-kamae standing with half stance of zenkutsu dachi. 4. Maintain the body upright and the eyes-view toward the target.

Assessment of the Gyaku-zuki technique

1. Score 4 if 4 of assessment indicators are correct
2. Score 3 if 3 of assessment indicators are correct
3. Score 2 if 2 of assessment indicators are correct
4. Score 1 if 1 of the assessment indicators is correct

Table 3. *Table of Assessment*

No	Steps	Score
1	Initial Stance	
2	Implementation	
3	Continued Movements	
Total Score		

Table 4. *Score Category*

Score	Category
≥ 3.1	High
2.1-3	Average
≤ 2	Low

Remarks: Score = Total Score / 3

The highest score of the Gyaku-zuki technique skill test is four and the lowest score is one. The score ≥ 3.1 is categorized as high, score 2.1-3 is categorized as average, and score ≤ 2 is categorized as low.

Table 5. *Result of Content Validation Test by V-Aiken Formula*

Point	Score																	∑s	n(c-1)	V
	Expert									S										
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9			
1	3	4	4	4	4	4	4	4	4	2	3	3	3	3	3	3	3	3	26	27	0,96
2	4	4	3	4	4	4	4	4	3	3	3	2	3	3	3	3	3	2	25	27	0,93
3	4	4	4	4	3	4	3	4	4	3	3	3	3	2	3	2	3	3	25	27	0,93
4	4	3	3	3	3	4	3	4	4	3	2	2	2	2	3	2	3	3	22	27	0,81
5	3	3	3	4	4	4	4	4	4	2	2	2	3	3	3	3	3	3	24	27	0,89
6	3	4	3	4	4	4	4	4	3	2	3	2	3	3	3	3	3	2	24	27	0,89
	21	22	20	23	22	24	22	24	22												

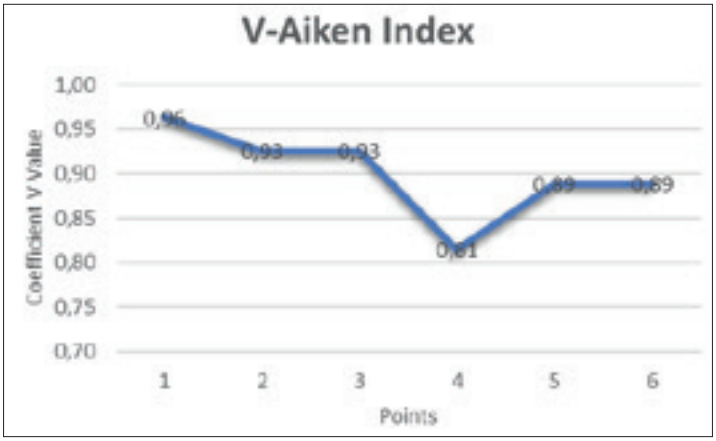


Figure 2. *V-Aiken Index*

The results of the analysis show that the value of the point one coefficient is V = 0.96 which is included in the high category; the value of the two-point coefficient V = 0.93 is included in the high category; the three-point coefficient value V = 0.93 is included in the high category; the fourth coefficient value V = 0.81 is included in the high category; the value of the five point coefficient V = 0.89 is included in the high category; the six point coefficient value is V = 0.89 included in the high category.

DISCUSSION

One of the characteristics of the progress of sports is the utilization of the sport science approach in its implementation which aims to foster athletes who excel physically, technically, tactically and psychologically. Sports science has directions for predicting, comparing results from tests, monitoring training results, making decisions, and setting goals (Zadorozhna et al., 2020). Technique is part of the athlete's psychomotor quality so that the accuracy and precision of the technique is considered a very important factor. This is because the correct technique will affect the performance of athletes. In order to train and develop the Gyaku-zuki technique, a coach must understand the process of moving stages to produce effective punches (Labintsev et al., 2021). One indicator to determine a person's technical quality ability is to carry out an assessment test, then analyze it to formulate improvements holistically (Pinto et al., 2022). The Gyaku-zuki skill test instrument is important to develop because the Gyaku-zuki punch is an effective punch used in karate tournaments (Ionete et al., 2011; Venkatraman et al., 2019). Recently, a test instrument for assessing the skill of the Gyaku-zuki technique did not exist. Therefore, this study aims to establish a construction test of the skill of the occupied Gyaku-zuki technique with a high level of validity.

The results of qualitative data and improvements from the expert jury in the development of the construction of the Gyaku-zuki technique skill test are described as follows: 1) the test is designed simply and easily with one direction of the target in front of the examiner, 2) the target can be the stomach, neck or head target, 3) the number of punch is 3 times according to the average attack in kumite. The results of the data analysis show that the first point regarding the relevance of the technical skills test material for Gyaku-zuki has a coefficient value of V 0.96; the second point is about the relevance of the systematic engineering skills test material for Gyaku-zuki has a coefficient value of V 0.93; the third point about the direction of the target of the Gyaku-zuki technique has a coefficient value of V 0.93; the fourth point about the number of repetitions of the Gyaku-zuki technique skills test has a coefficient value of V 0.81; the fifth point about the distance of the Gyaku-zuki technique skill test has a coefficient value of V 0.89; the sixth point about the clarity of the implementation of the Gyaku-zuki technique skills test has a coefficient value of V 0.89. This study concludes that a set of assessment test frameworks demonstrates a high level of validity.

CONCLUSIONS

Based on the discussion and results of data analysis, the study concluded that the construction of the Gyaku-zuki technique skills test items had high content validity with a value of V > 0.8. Therefore, a set of assessment test frameworks can be used to conduct tests of Gyaku-zuki technique skills.

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