



DEVELOPMENT OF WEB-BASED PENCAK SILAT DOUBLE CATEGORY TRAINING MEDIA

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Abstract:

Pencak silat rules have changed in terms of the competition system and in terms of scoring. The artistic category in pencak silat consists of single category, double category, team category and solo creative category, each of which has its own characteristics. 49 people participated in filling out the questionnaire from the preliminary research which was divided from 19 coaches and 30 artistic category athletes from the Special Region of Yogyakarta and Central Java province. 83.7% of respondents agreed that the doubles category is the most difficult move to learn. As many as 87.8% of respondents have never encountered digital-based double-category training media. This research aims to produce a training media in the form of a web-based to facilitate the double-category training process that is valid, feasible, and effective to be used by coaches and athletes. This study uses the research and development method with the ADDIE model. Product quality results are tested from 3 aspects: validity, feasibility, and effectiveness. The web product developed is considered valid as it has an average score of 90.8% from material

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experts and 95% from media expert. The media developed are also considered feasible, with what was obtained in this research being web media with an average score percentage of 89% from the athletes and an average score of 92% from the coaches. The media developed is declared effective using the paired sample t-test and both media obtain the results that show sig, (2-tailed) of $0.000 < 0.05$. So that the development of this training media can be used to practice easily by arts category pencak silat athletes. The hope is that the development of digital-based media can continue to be developed and studied repeatedly academically.

Keywords: pencak silat, media development training, artistic category

1. Introduction

Pencak silat was registered as an intangible cultural heritage at the 14th UNESCO session in Bogota, Colombia with the title of the discussion "Decision of the Intergovernmental Committee: 14.COM 10.B.15" (Sampurna, et al., 2021). In the aspect of sports achievement, pencak silat rules have changed in terms of the competition system and in terms of scoring (Sudirman, et al., 2022). Pencak silat currently competes in 5 match numbers, namely the fighting category, artistic tunggal (single), artistic ganda (double), artistic regu (team), and artistic solo creative (PERSILAT, 2021). The artistic category assessment focuses on logical technical movements, steadiness, and stamina when demonstrating a series of moves (Mardius, et al., 2023; Almas et al., 2023). The most noticeable change in the competition system is in the artistic category (single, double, team, and solo creative).

Previous research on the artistic category of pencak silat has mostly discussed the single category and the team category. The artistic single and team categories are moves whose technical movements are standardized and amount to 100 moves arranged in order and are not allowed to be changed (PERSILAT, 2021). The use of training media in the artistic single category discusses the learning of the single category by using a standardized moves video (Lubis, et al., 2022). The artistic team category also uses an Android smartphone application to display learning videos of standardized team technique movements (Rifky Syarif Hidayat & Siswantoyo, 2019). Different from the single and team arts, the doubles and creative solo categories do not have standardized movements. So, the movements that are demonstrated depend on the creativity of each athlete and coach (PERSILAT, 2021; Setiawan et al., 2023). The artistic doubles category is considered to have a high level of difficulty and a high risk of injury. This is because the attacking and defensive movements demonstrated by two athletes are done directly with fast and powerful reaction movements against each other and even with the use of weapons (Liu, 2023). To add insight, there is a need for learning media that discusses in detail the dual art category. learning media is needed to help athletes understand the important points that exist in the dual art category so that athletes can reach the best peak of achievement (Susanto, et al., 2023). With the achievement of athletes who indirectly

make efforts to preserve cultural heritage and will be useful for strengthening the sense of love for the nation (Sutoyo, 2023).

Learning media serves as a tool that acts as an intermediary between the conveyer of information and the recipient of information including sport education (Baytiyeh, 2021). The development of web media requires a deep understanding of physical activity as a means to improve skills as the basis of the exercise process (Currie, et al., 2020). In addition, physical exercise at the right dose can improve human well-being (Kinoshita, et al., 2022; Prabowo et al., 2022; Aziz et al., 2023; Hardinata et al., 2023). Training with proper media can improve physical skills and maintain psychological stability (González-Hernández, et al., 2022; Adi Prabowo et al., 2022). In education or training, media is utilized to facilitate interaction between the source of information, the trainer, the medium, and the athlete, both directly and indirectly (Iyer, et al., 2022). Media acts as an intermediary responsible for conveying information between the source of information and the recipient during the teaching process in an educational environment (Lischer, et al., 2022). The validation of media is necessary to ensure that the media used in the learning process is reliable and valid according to experts in the field. Learning resources are required to be further tested and validated through surveys to gather feedback from the education sector and experts' opinions (Verboord, 2022). The principles considered in multimedia development include design, user control and feedback instructions, athlete activities, and video elements (Hoard, 2019). A web system aims to process information and present media in a way that is easily understood by everyone (Khder, 2021). In the field of sports, websites can be seen as a positive resource for coaches to obtain sports-related information (Farhat, et al., 2022). Looking at existing research, learning media for pencak silat sports that discuss in detail about the artistic double category is difficult to find.

In the artistic doubles training process, there are additional challenges due to the absence of standardized techniques so learning media is needed as a benchmark based on the needs required. To overcome this, a web-based learning media was developed as a tool in the artistic double-category learning process. Media developed in the form of a web must be tested for validity, practicality, and effectiveness so that it can achieve the main goal of competitive sports, namely the peak of athlete achievement (Ohlendorf, et al., 2021). This development research is needed so that the process of understanding material about pencak silat artistic double category can be done in more detail.

2. Material and Methods

This study adopts a research and development (R&D) approach. The research model is based on the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) framework developed by Dick and Carey in 1996. Each of the meanings of the word ADDIE is a process of stages or steps in the ADDIE model development research (Yeh & Tseng, 2019). A complete explanation of the steps of the ADDIE development model is as follows:

- 1) Analysis is the stage that defines what athletes and coaches will learn. Finding and determining needs, identifying existing problems, and conducting task analysis are part of this stage;
- 2) The design phase is concerned with making a prototype that involves designing the development of training media for the doubles category, including competition rules, scoring processes, and appropriate training guides based on existing problems. This design process aims to create an initial prototype of the doubles category web;
- 3) Development of materials and content in the initial prototype that is further realized and refined to meet the needs of the field. This phase transforms the prototype into a fully functional web ready for implementation;
- 4) Implementation is the application process of the developed media. Media in the form of the web can be used to assist training in the doubles category. Testing is carried out directly with athletes and coaches;
- 5) The evaluation phase aimed to assess whether the developed product was deemed suitable for use or if further improvements were necessary. The goal was to enhance the product for more effective and precise utilization.

The test subjects in this research were coaches in Special Region of Yogyakarta and college student pencak silat athletes in the Special Region of Yogyakarta. The total number of estimated test subjects suitable for the research was not known with certainty so the researcher applied an incidental sampling technique (Sugiyono, 2015). Incidental sampling is one of the sampling techniques chosen by chance with the conditions that meet to be used as a research subject (Mateos, et al., 2020). The initial research used a survey technique of 49 respondents consisting of 30 artistic category athletes and 19 coaches. At the field trial stage, 17 coaches and 28 martial arts athletes were the research subjects. Then at the effectiveness test stage, 10 pairs of double artistic athletes in the participating categories were selected to see the level of media effectiveness.

2.1 Media Learning Test Procedure

Product testing is carried out with the aim of achieving valid, feasible, and effective criteria for training media products. Validation is a necessary factor for the usefulness of a study (Surucu, & Maslakci, 2020). Field trials were conducted in two stages, namely the initial trial and the main trial to see the feasibility of the product. The initial trial involved evaluating the media developed by content experts, media experts, and several trainers with the required competencies. The main trial involved coaches in the Special Region of Yogyakarta and athletes from the Yogyakarta State University Pencak Silat Student Activity Unit. Descriptive data analysis is employed to analyze the results of observations and document research, particularly in the preliminary study stage. This calculation is used on the results of the assessment of the data that has been obtained when distributing the questionnaire. The effectiveness test uses a paired sample t-test to test the effectiveness of the product developed in this study. The level of effectiveness of a learning media determines the impact of using the media during the learning process

(Paramitha, et al., 2022). Learning media has a positive impact when the media develops when the subject's results have improved.

2.2 Data Collection Technique

The data collection used in this study used methods based on test and non-test techniques (Winarti, et al., 2022). Data collection with test techniques using direct practical assessment. Then the non-test data collection technique uses interview and survey techniques with questionnaires. The data analysis technique used in this study consists of descriptive and quantitative data. Descriptive data analysis was used to analyze the results of observations and document studies, especially at the preliminary study stage. This calculation is used on the results of the assessment of the data that has been obtained when distributing questionnaires (Rifky Syarif Hidayat, 2018). The final assessment is in the form of a total number of results summed up from the respondent's assessment (value with 5 scales).

3. Results and Discussion

The initial research used a survey technique of 49 respondents consisting of 30 art category athletes and 19 coaches in the Special Region of Yogyakarta, West Java, Central Java, and East Java. The results of the initial research were 83.7% of respondents stated that of all the artistic categories in pencak silat, the doubles category had the highest level of difficulty. As many as 87.8% of respondents also had difficulty in finding digital media as a source of knowledge from the artistic category, especially the doubles category. The difficulties in the doubles category according to respondents are as follows:

- 1) There is no standardized sequence of technical movements so there is no definite guidance;
- 2) Lack of sources to learn the doubles category;
- 3) The risk of injury in the doubles category is very high;
- 4) Lack of athletes who want to participate in the doubles category;
- 5) Difficulty in making logical and rational attack and defense movements;
- 6) A high level of creativity is needed in determining the technical movements to be used in the doubles category.

Initial observation is needed to the phenomenon which in this case is an existing match event that is around (Duda, et al., 2020). The observation was conducted during the 58th Anniversary Sports Festival of Universitas Negeri Jakarta, held from June 1 to 4, 2022. In this event, the doubles category had the fewest participants, totaling 7 contingents, consisting of 3 male pairs and 4 female pairs. Similarly, at the International Virtual Pencak Silat Championship organized by Universitas Sebelas Maret, the doubles category also had the fewest participants, totaling 11 contingents, comprising 5 male pairs and 6 female pairs. Furthermore, at the national invitation championship hosted by Universitas Negeri Yogyakarta from June 28 to July 1, 2022, the doubles category had only 7 contingents, including 3 male pairs and 4 female pairs.

The results of observational data on the artistic category in pencak silat have different characteristics. In the single artistic category is shown by 1 athlete by demonstrating empty hand moves, machetes, and sticks with a sequence of 100 movements of predetermined techniques (standard). The Double artistic category is shown by 2 athletes who perform attack and defense moves with bare hands, mandatory weapons, and archipelago weapons directly (non-standard moves). In the team artistic category demonstrated by 3 athletes by demonstrating empty-handed moves with a sequence of 100 movements of predetermined techniques (standard) simultaneously. The solo creative category is shown by 1 athlete by demonstrating empty hand moves and weapons as required by the selection and sequence of technical movements that are freed or not determined (not standard).

The sequence of movements of the double category technique is not standardized, so a good example model is needed that can be used as a benchmark. The highest pencak silat championship held is the 19th Pencak Silat World Championship held in Melaka-Malaysia in 2022. The results of the observation showed that in the men's doubles category was won by the Malaysian team which had 8 moves (empty hands, dual parang, sticks, and lading), 146 total attack and defense moves, 24 interval moves, and demonstration time of 3 minutes 1 second. The women's doubles category was won by the Thailand team with 6 moves (empty hands, parang, stick, and celurit), 108 attack and defense moves, 19 interval moves, and a demonstration time of 3 minutes and 1 second. The media web is crafted, beginning with initial observations and focusing on field requirements, deficiencies, and improvements from previous research. An initial concept or draft of the double forms material is organized in the form of a web platform. The results of the initial design were validated by 3 material experts and a media expert (refer to Table 1).

Table 1: Assessment Results from Material Experts and Media Expert

Expert	Percentage	Category
Material expert 1	90%	Very good
Material expert 2	92.5%	Very good
Material expert 3	90%	Very good
Media expert	95%	Very good

Valuable comments and feedback were collected to refine the developed media (refer to the web design in Figures 1, 2, 3, and 4). In the initial test, drawing from a select group of 12 martial artists and 4 coaches based in Sleman district and the UNY Pencak Silat Student Activity Unit (UKM Pencak Silat UNY). The athlete's assessment of the web media demonstrated a total score of 643, corresponding to an 89% rating. Coaches' evaluation of the web media total score of 362, equating of a 91% rating. The main field test engaged martial artists and athletes from DIY and certain areas of Central Java, encompassing 17 coaches and 28 athletes. In terms of athlete's assessments, the web-based media garnered a total score of 1,496, equivalent to an 89% rating. Coaches'

evaluations of the web-based media resulted in a total score of 1,558, achieving of 92% rating.

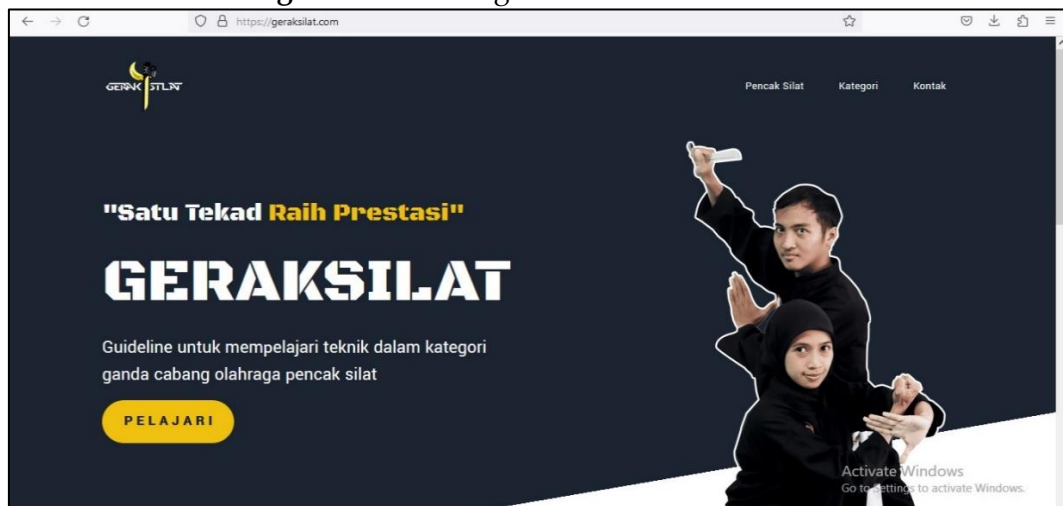
In this study, both a pre-test and a post-test are conducted, with the post-test taking place within a 3-week span after the pre-test (refer to the pre-test and post-test results in Table 2). The trial subjects consist of 10 pairs of martial artists with a foundation in artistic forms from DIY and the UNY Pencak Silat Student Activity Unit (UKM Pencak Silat UNY).

Table 2: Results of the Number of Motion as an Effectiveness Test

	Number of Double Category Pairs									
	1	2	3	4	5	6	7	8	9	10
Pretest	26	16	8	21	20	14	31	28	34	22
Posttest	85	77	57	87	78	69	95	83	89	78

Description: The number obtained is the total number of technical movements and interval movements

Figure 1: Home Page of "Geraksilat" Website



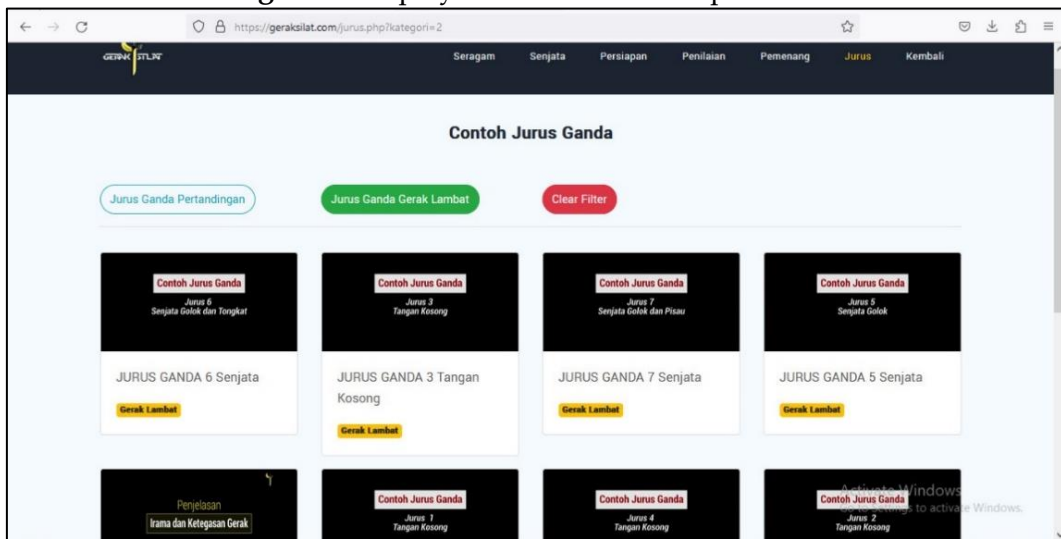
Source: <https://geraksilat.com/>

Figure 2: Menu of "Geraksilat" Website



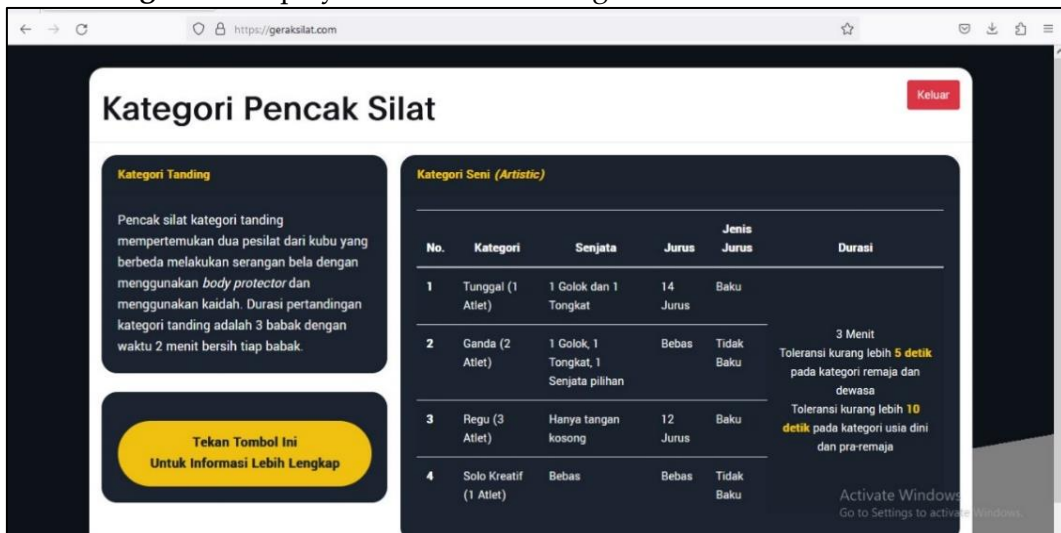
Source: <https://geraksilat.com/#pelajari>

Figure 3: Display of the "Video example" Menu



Source: <https://geraksilat.com/jurus.php?kategori=>

Figure 4: Display on the "Match Categories in Pencak Silat" Menu



Source: <https://geraksilat.com/> then select 'kategori' in the top right center

Before the data above is processed using paired sample t-test analysis, the data above needs to be tested for normality as a condition for paired sample t-test testing (refer to Table 3).

Table 3: Normality Test Results

Test of Normality	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	.106	10	.200*	.987	10	.991
Posttest	.198	10	.200*	.945	10	.610

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Based on the table above, the normality test for pretest and posttest results is normally distributed because the sig. value is more than 0.05. So, it can be said to be normally distributed. After that, the paired sample t-test was conducted.

Table 4: The Result of Paired Sample T-test

	Paired Differences	t	df	Sig. (2-tailed)					
					Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference	
								Lower	Upper
Pair 1	Pretest posttest	57.900	4.999	1.581	61.476	54.324	36.627	9	.000

The results of the paired sample t-test showed that sig. (2-tailed) of 0.000 < 0.05, so it can be concluded that there is a significant difference between the pre-test and post-test values of the effectiveness test data (refer to Table 4). In other words, the fighter's practical ability increased after using the media during the training process.

4. Discussion

Initial research found that of all the art categories in pencak silat, the doubles category is the category with the highest level of difficulty. This is related to the characteristics of each art category. The doubles category has fast and dynamic movements and does not have a standardized sequence. When viewed from the diversity of movement techniques in, good stamina is needed by athletes double category because the technical movements are carried out at high speed (Subekti, et al., 2020; Narita Devi et al., 2022; Trisnar Adi Prabowo et al., 2023). Need to know that when the motion technique has a motion that changes direction it requires special attention to avoid injuries that occur (Alanen, et al., 2023; Kurak & Büyükçelebi, 2021).

Looking at the results of observations at major martial arts championships events like the 58th Anniversary Sports Festival of Jakarta State University, International Virtual Pencak Silat Championship organized by Universitas Sebelas Maret, and at the national invitation championship hosted by Yogyakarta State University. The doubles category consistently had the lowest number of participants in these Pencak Silat championships. This relates to the results of the initial research survey which described difficulties in multiple categories. The lack of athlete participation in the doubles category is due to the high level of difficulty and high risk of injury because the movements presented occur in body contact with bare hands and weapons which are said to be dangerous. The movements presented in the artistic category must be powerful, fast, and look logical (Haqiyah, et al., 2017; Hikmah et al., 2023; Wangi et al., 2023). So many athletes feel reluctant to participate in the doubles category.

It is necessary to design media that helps coaches and athletes in the doubles category training process. Media made based on the needs of the results of the initial analysis of the research conducted. The media that is practical and often used is web

media. The application of training media is an effective strategy in studying artistic categories in pencak silat (Lubis, et al., 2022). The need to access resources provided through the internet platform is very important for activities in daily life so that getting to know the web is necessary (Ismail & Kuppusamy, 2022). Web services are software components based on web frameworks and object-oriented standards and technologies for web usage that electronically connect different user applications and different platforms. The main objective of the developed web media can help athletes and coaches overcome problems that are perceived as pressure to achieve success (Hill, et al., 2018).

Athlete preparation must start early with talent identification in childhood, especially for the achievement-oriented training process geared towards high performance (Syaifulloh & Doewes, 2020). The training process needs to be considered by the coach, because basically the athlete's opportunity to develop abilities in terms of technique and life is needed (Cronin, et al., 2023). The training process also requires maintaining the athlete's physical and psychological condition so that it remains good so that it can release its potential. Because when the body is not okay or has an injury, then one's body will experience problems when doing technical motion training (Toner et al., 2023). Apart from focusing on athletes, it is also important to look at the physical and mental readiness of the coach. Because coaches with professional status have high demands and expectations so that the physical and mental health of the coach also needs to be considered (Kenttä, et al., 2020; Majewska et al., 2021).

The latest technology has various forms, one of which is in the form of a web which is said to help the training process because of the ease of use of the device to access sports information (Mascret, et al., 2022). The transfer of double category score calculation has differences from manual calculation to digital calculation so that media is needed as a source that discusses in more detail (Anifah, 2023). Determining the materials that will be included in the web media needs to be compiled and reviewed by material and media experts. Things that need to be considered in the doubles category are match rules, uniforms during demonstrations, weapons used during demonstrations, scoring systems, techniques for determining winners, various kinds of slow-motion example videos, motion rhythm explanation videos, and doubles category match videos (PERSILAT, 2021).

The assessment from the material expert received an average score of 90.83% and the media expert's assessment received a score of 95% so that it was in the very good category. The comments and suggestions from material experts and media experts such as the selection of background colors that are changed to be clearer, writing that must be standardized, the layout of images on the web is more clarified, clearer images, the addition of double category material, refining the images of weapons used, adding match rules specifically on the scoring system, and illustrations of double martial arts arenas that are clearer and more detailed.

The trial stage was carried out after making revisions from experts. At the initial trial stage, the results of the assessment from the coach with a total score of 89% and the athlete with a score of 91% so that it falls into the category of very good a with some additional suggestions for use. Furthermore, after making improvements obtained from

the initial trial, the main trial was carried out on a larger scale. The results obtained from the assessment of the coach with a total score of 89% and athletes with a score of 92% so that it falls into the category of very good.

After the initial and main trial stages are completed, a test is needed to test the effectiveness of the developed web media. The effectiveness trial is conducted to assess the extent to which the developed media product has achieved its objectives or if further improvements are needed. The effectiveness test was carried out on web media using 10 pairs of double-stance athletes with a period of 3 weeks. The results of the data obtained show an increase in athlete competence in that time. The paired sample t-test results show sig. (2-tailed) of $0.000 < 0.05$, So it can be concluded that there is a significant difference between the pre-test and post-test values of the effectiveness test data, which means that the media is proven effective to help improve the abilities of coaches and athletes.

This research has several limitations, ranging from the subject, the environment to the situation that existed at the time of the research. Limitations of theoretical studies regarding multiple categories, research conducted during the transition period of changes in pencak silat regulations from the old version to the new version and still possible changes, and the speed of access from the web depends on the level of internet connection speed of the user and researchers cannot regulate the level of internet speed of each device.

5. Conclusion

The development of the web-based media aims to facilitate coaches and martial artists specializing in ganda techniques in thoroughly understanding the essential aspects of this form. The media also serves as a platform for disseminating the latest rules of pencak silat, particularly the updated version. Media produced are included in the very good category on the interpretation scale. In other words, from the aspect of validation assessment, the media products developed are said to be valid. The web products produced were tested as guidelines in the training process then the results obtained from the media developed are included in the very good category and can be said to be feasible and practical. The effectiveness test was carried out on web media with the paired sample t-test results show that there is a significant difference between the pre-test and post-test values of the effectiveness test data. So that the development of this training media can be used to practice easily by arts category pencak silat athletes. The hope is that the development of digital-based media can continue to be developed and studied repeatedly academically.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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