WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Taekwondo Training Programs Toward the Enhancement of Kicking Skills of the Student-Athletes

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ABSTRACT –

This research investigates the efficacy of Taekwondo training programs in improving student-athletes' kicking abilities with emphasis on major performance indicators like speed, power, stamina, accuracy, and difficulty. Since kicking is the foremost offense and defense technique of Taekwondo, the improvement of this skill is directly related to competitive performance. The study investigates both traditional and augmented training elements such as warm-up protocols, stretching, conditioning drills, target training, kicking combinations, and psychological preparation. The study seeks to ascertain the impact of these combined training factors on the physical and technical delivery of kicks among student-athletes. Through a quasi-experimental method process, performance assessment data were complemented by coach and athlete feedback. Findings indicated that more intensive training programs extensively enhanced kicking accuracy, speed, and endurance and further increased athlete confidence and concentration. Target training and kicking combinations were found to have a very significant relationship with improved performance in kicks of high difficulty. Mental preparation was found to play a critical role in maintaining consistency in training and competitions. Such findings are important in emphasizing the significance of an integrated training program beyond physical fitness to involve mental and tactical aspects. It concludes that a sound Taekwondo training program can result in quantifiable improvements in student-athletes' kicking ability, which is highly valuable for coaches, physical education professionals, and sports program developers who seek to enhance the athleticism of martial art practitioners.

Keywords – *Taekwondo, kicking abilities, student-athletes, training program, performance improvement.*

Introduction

Taekwondo originated in Korea and has been an official Olympic sport since the 2000 Summer Olympics in Sydney. Early research highlighted the psychological benefits of taekwondo, including improved focus (Kim & Kim, 2000) and willpower (Kim, 2005). Studies have also shown that taekwondo training in elementary school enhances physical, cognitive, emotional, and social development (Lee & Song, 2006).

By 2010, taekwondo trainees demonstrated improved sociability and mental health (Lee, 2010), and trainees experienced less acculturative stress than non-trainees (Kim et al., 2012). Taekwondo has been recognized as an effective means of instilling desirable values and attitudes in adolescents, promoting civility, respect, and social norms (Lim & Kim, 2011).

The number of participants worldwide reached around 80 million from over 200 countries by 2015, with a growth rate of 20%-25% per year, particularly popular among children (Kazemi et al., 2006; Lee & Kim, 2015). Lakes et al. (2013) found that taekwondo training improved young students' self-control, executive functions, class manners, exercise capabilities, and school adaptation, positively affecting their relationships with teachers and peers. Physical activities, such as taekwondo, play a vital role in promoting healthy psychological adaptation and social support in school life (Schwartz, 2017).

Adolescence, marked by significant physical, mental, emotional, moral, and behavioral growth, is a crucial period for school adaptation, where practical education through sports like taekwondo promotes mutual harmony and care (Kwak & Seo, 2011). Recent studies emphasize the critical assessment of taekwondo kicking skills based on speed, power, stamina, accuracy, and difficulty, with complex kicks demanding advanced technical skill and athleticism (Cho & Park, 2021; Kim et al., 2023). Current training programs focus on improving kicking performance through systematic drills, strength exercises, and flexibility training, thereby enhancing both competitive and self-defense abilities.

Objectives of the Study

The purpose of this study was to determine the association between the enhanced taekwondo training programs and the development of kicking skills in student-athletes. In this study, the independent variables are (1) enhanced taekwondo training programs - Target Training: (Pad work and speed bag drills) Kicking Combinations: (Practice sequences of different kicks) and Mental Preparation: (Visualization and goal setting). Furthermore, the dependent

variables include (2) taekwondo kicking skills (Speed, Power, Stamina, Accuracy, and Difficulty of kicks, both before and after performance. This study aims to determine the link between the independent and dependent variables.

Methodology

Research Design

This study used a quasi-experimental research design in which the independent variable is analyzed for possible relations to the dependent variable. This study will employ an experimental research design to assess the enhancement of kicking skills in a taekwondo training program as input for student-athletes.

Regarding this, the researcher will employ the experimental research method. This method is an appropriate design for identifying existing conditions and gathering facts from detailed accounts of individuals, where profiling and pre- and post-training performance assessments with rubrics are the primary tools for collecting data. This will significantly aid in achieving the study's objectives.

In summary, a quasi-experimental design is suitable for this study, as it strikes a balance between the need for rigorous analysis and the practical and ethical considerations of working within an educational setting.

Respondents of the Study

The respondents of the study were selected Taekwondo student-athletes from three schools in the San Juan East District, San Juan, Batangas. The schools included in the study are: San Juan Senior High School, Batangas Eastern Colleges, and Lipahan National High School.

The researcher sought the help of the advisers, coaches, and trainers at these schools to communicate with the student-athletes involved in the study. The coaches oriented their trainers and explained the process of gathering data among them. The respondents played a vital role in determining the effectiveness of Taekwondo training programs in enhancing the kicking skills of the student-athletes. The data gathered will be used solely for this study.

Research Instruments

The study utilized several research instruments to effectively gather data on the enhancement of kicking skills in Taekwondo, including a training program for interventions and pre- and post-performance assessments tailored to each experimental group. For Experimental Group 1 (the Conventional Group), respondents were profiled based on demographic and training factors, including age, sex, grade level, years of experience in Taekwondo, current belt rank, and frequency of training sessions per week, which helped in understanding their background and potential influence on their performance. Standardized assessments of Taekwondo kicking skills, evaluating speed, power, stamina, accuracy, and difficulty of kicks, were administered prior to the intervention to establish a baseline. Over two months, conventional training techniques were implemented. After this time, the same assessments were repeated to measure any changes in the participants' skills, providing data on the effectiveness of the conventional training program. Similarly, for Experimental Group 2 (Enhanced Group), respondents underwent profiling following the same criteria to ensure comparability, and pre-performance assessments were conducted to establish a baseline. This group then participated in an enhanced training program that incorporated advanced techniques and varied training approaches, designed to enhance kicking skills more effectively. After the two-month training period, the same standardized assessments were administered again to measure improvements in speed, power, stamina, accuracy, and difficulty of kicks, specifically related to the enhanced training program.

Research Procedures

The research procedure for this study was systematically divided into three phases: before, during, and after the implementation of the study, with separate discussions for each experimental group.

Before Implementation

Initially, the researcher prepared several critical research instruments, including a respondents' profile form, adapted and modified Taekwondo training programs that incorporated both enhanced and conventional techniques, performance tasks for pre- and post-assessments, and an adapted rubric for evaluating these performance tasks. A formal letter was crafted to seek validation from both internal and external validators for these instruments. Once validation was successfully obtained, the researcher prepared a request letter to the institution's Dean for approval to conduct the study. After obtaining approval from the Dean and validation from a panel of experts, the researcher sought further permission by addressing a letter to the Provincial Division Superintendent.

Additionally, a separate request was made to the Public Schools District Supervisor of the East District in San Juan, Batangas, which was personally delivered to the School Principal of Batangas Eastern Colleges to secure permission for conducting the study.

During Implementation, upon receiving the necessary approvals, the researcher prepared parental consent forms and coordinated with the respondents' advisers and coaches to facilitate the smooth implementation of the study. Prior to the commencement of the study, an orientation was conducted for the respondents, detailing the research objectives, intervention protocols, and performance tasks that would be administered. Following the orientation, the respondents were divided into two groups: Experimental Group One (1) and Experimental Group Two (2). The researcher also prepared a letter requesting

permission to administer the pre- and post-assessment tasks, which was addressed to the principal and endorsed to the coaches handling the Taekwondo student-athletes.

To ensure objective evaluation, three Philippine Taekwondo Association (PTA) officials were enlisted to serve as raters for the pre-assessment tasks of both groups. For Experimental Group One (1), the respondents were profiled, and a pre-assessment task was administered, with their performance evaluated based on the established rubric. Following this, the group underwent the training program intervention, and upon completion, a post-assessment task was administered to evaluate the effectiveness of the Taekwondo training intervention. The PTA officials evaluated the performances to maintain consistency.

Similarly, for Experimental Group Two (2), the respondents were profiled, and the pre-assessment task was administered, with their performances also rated based on the established criteria. This group received the enhanced techniques training program intervention. Following the intervention, a post-assessment task was conducted to evaluate the effectiveness of the intervention, as assessed by the same panel of PTA officials.

After implementation, the researcher strictly observed all safety and health protocols before, during, and after each phase of the study. Following the completion of pre- and post-assessment tasks for Experimental Groups One (1) and Two (2), the collected data were classified, tabulated, and encoded for analysis. Descriptive statistics, including mean, standard deviation, frequency, and percentage, were used to evaluate the groups' kicking skills in Taekwondo, comparing their performance before and after the interventions. To determine significant differences in scores within and between groups, inferential statistics were applied, specifically t-tests for dependent and independent means. The statistical analysis was thoroughly interpreted to draw relevant conclusions about the effectiveness of each training program. This comprehensive approach provided valuable insights into how the interventions influenced the precision, power, and overall kicking skills of the Taekwondo student-athletes, ensuring a reliable evaluation of their progress throughout the study.

Statistical Treatment of Data

The data obtained from the retrieved pre- and post-assessment results were classified, tabulated, and encoded for analysis. To evaluate the position or state of responses and the pre- and post-assessment scores of Experimental Groups One (1) and Two (2) in their taekwondo kicking skills, descriptive statistics were utilized, including the mean, standard deviation, frequency, and percentage. To determine the significant difference in the pre- and post-assessment scores of Experimental Groups One (1) and Two (2) in their performance skills before and after the experimentation phase, inferential statistics were employed by analyzing the t-test for dependent and independent means.

Results and Discussion

This chapter presents the analysis and interpretation of data from the questionnaires answered by the respondents about the problem of this study.

Part I. Profile of the Respondents

Table 1

Profile of the Respondents as to Age

Age	Experimental Group 1		Experimental Group 2	
	Frequency	Percentage	Frequency	Percentage
9 to 11 years old	6	40.00	2	13.33
12 to 14 years old	4	26.67	7	46.67
15 to 17 years old	5	33.33	4	26.67
18 years old and above	0	0.00	2	13.33
Total	15	100.00	15	100.00

The age breakdown of Experimental Group 1 indicated that the group mainly consisted of younger participants. This breakdown suggested that the interventions or training programs used for this group had been tailored to the developmental phase of the participants, particularly in areas such as coordination, stamina, and cognitive processing. Younger participants were likely to have had high levels of energy and enthusiasm, but also shorter attention spans, requiring more structured and stimulating training methods. These traits may have influenced the group's responsiveness to the activities, with consideration needed for age-related strategies to achieve optimal results.

In Experimental Group 2, with its more diverse age mix, spanning early through late adolescence, and the presence of older group members, a different set of considerations was implied. This group likely had a higher level of physical and mental maturity, and as such, could have been able to accomplish more complex tasks and be trained using more advanced training methods. The inclusion of older participants might have helped create a more balanced

group dynamic, with participants potentially demonstrating greater self-regulation, concentration, and stamina throughout the intervention. This kind of developmental readiness might have had a favorable effect on their capacity to derive benefits from the training.

Generally, the age-related variations in the two groups highlight the importance of considering developmental stages when designing and implementing training programs. The varying compositions suggested that the results might not have depended solely on the effectiveness of the intervention, but also on age-related attributes such as physical development, cognitive ability, and emotional maturity. Future interventions, therefore, needed to incorporate age-sensitive techniques to ensure that all participants were meaningfully engaged and derived full benefits from the training activities.

Table 2

Sex	Experimental Group 1		Experimental Group 2	
	Frequency	Percentage	Frequency	Percentage
Male	11	73.33	9	60.00
Female	4	26.67	6	40.00
Total	15	100.00	15	100.00

Profile of the Respondents as to Sex

The sex makeup of Experimental Group 1 reflected a significant imbalance, with a far greater number of male participants compared to female participants. This disparity may have impacted the performance of the training program, particularly in areas where sex-related physiological and psychological considerations were involved. Physical attributes, such as strength and stamina, as well as variations in competitiveness and learning styles between males and females, may have existed and influenced overall group dynamics and training responsiveness. The dominance of one sex in the group led one to believe that the results might have been biased toward aspects or responses more characteristic of the dominant sex, and great care had to be exercised when interpreting the findings.

For Experimental Group 2, although there was still a large proportion of male participants, the distribution of sex was more equitable. This more balanced representation of both sexes could have helped produce more diverse reactions to the training exercises, reflecting a wider variety of physical and psychological characteristics. A more equal group provided a more comprehensive view of how the intervention fared between sexes. However, the male dominance still indicated caution in considering sex as a variable that could have influenced the training results.

Generally, the gender skew between the two groups indicated the necessity of acknowledging sex as a salient factor in interpreting experimental outcomes. Performance, motivation, and learning flexibility can vary not only due to the intervention but also due to intrinsic gender-associated differences. The assessment of effects, therefore, had to incorporate an appreciation of how these differences might have influenced participants' experiences and outcomes, making the case for carefully designing subsequent research with more evenly distributed gender representation.

Table 3

Profile of the Respondents as to Taekwondo Experience (years)

Taekwondo Experience	Experimental Group 1		Experimental Group 2	
	Frequency	Percentage	Frequency	Percentage
1 to 3 years	11	73.34	8	53.33
4 to 6 years	2	13.33	3	20.00
7 to 10 years	2	13.33	4	26.67
Total	15	100.00	15	100.00

The experimental group 1 members' Taekwondo experience demonstrated a group with relatively short training histories. The majority of the group had little more than several years of experience, indicating that their working knowledge of Taekwondo techniques, strategies, and physical conditioning was likely in its nascent stage of development. This level of experience could have influenced participants' reactions to the experimental training and possibly their ability to learn advanced movements easily or maintain performance during more challenging tasks. The observed outcomes in this group, therefore, needed to be understood in terms of their novice to intermediate exposure to the sport.

In Experimental Group 2, Taekwondo experience was more diverse and involved a larger percentage of participants with significant experience. This wider range, including subjects with extensive experience, suggested that the group might have approached the training with a stronger technical base, greater physical conditioning, and stronger mental control. These traits would have made the group more responsive to the experimental treatment, particularly in areas requiring high-level motor skills and tactical acumen. The diversity of experience within the group may have also created a richer learning environment, where less experienced subjects benefited from the presence of more experienced teammates.

Generally, the variations in Taekwondo experience between groups underscore the value of considering training history when interpreting the study results. The level of experience likely played a significant role in determining individuals' performance, adjustment, and responsiveness to interventions. Thus, the results needed to be interpreted within the context of participants' previous experience with the discipline, noting that participants with more experience may have shown greater ease in performing intricate skills or sustaining stable performance during the training program.

Table 4

Profile of the Respondents as to Current Belt Rank

Current Belt Rank	Experimental Group 1		Experimental Group 2	
	Frequency	Percentage	Frequency	Percentage
Black	2	13.33	5	33.33
Brown	3	20.00	2	13.33
Red	2	13.33	4	26.67
Blue	6	40.00	2	13.33
Yellow	1	6.67	1	6.67
White	1	6.67	1	6.67
Total	15	100.00	15	100.00

The existing belt rank breakdown of members in Experimental Group 1 revealed that the majority of participants were at the intermediate level of proficiency in Taekwondo. With most of them having blue belts and a few holding higher ranks, the group overall represented a nascent phase in their martial arts development. This indicated that, while participants had progressed beyond the beginner basics, their technical proficiency, tactical awareness, and overall expertise were still in development. Such a skill set potentially affected the group's performance during experimental tasks, especially those requiring precise execution, control, and implementation of advanced skills.

The distribution of belt ranks in Experimental Group 2 indicated a more advanced composition of the group. More members sported black and red belts, representing higher proficiency levels, discipline, and long-term exposure to Taekwondo principles. The presence of more advanced practitioners in the group suggested that they were more responsive to intense or intricate training interventions. Their higher status also signaled stronger foundational proficiency levels and greater flexibility, which were essential in maximizing the outcomes of specialist training programs.

In general, these variations in belt rank between the groups highlighted the impact of skill level on performance gains. Belt rank, as a valid measure of both training experience and technical skill, was a significant factor in determining how participants approached and benefited from training interventions. Therefore, any assessment of outcomes had to consider participants' rank-based abilities to ensure that variations in treatment effects were interpreted relative to their current level of proficiency.

Table 5

Profile of the Respondents as to Frequency of Training

Frequency of Training	Experimental Group 1		Experimental Group 2	
	Frequency	Percentage	Frequency	Percentage
1 to 2 times per week	12	80.00	13	86.66
3 to 4 times per week	1	6.67	1	6.67
5 to 6 times per week	0	0.00	0	0.00
7 or more times per week	2	13.33	1	6.67
Total	15	100.00	15	100.00

The number of training sessions per week for members in Experimental Group 1 indicated a proportionally low rate of weekly Taekwondo training participation. The majority of participants in this group trained once or twice a week, which may have limited their ability to achieve consistent skill reinforcement and physical conditioning. This trend suggested that the subjects might have taken a longer time to develop skills and retain techniques,

since training carried out less frequently could have limited the formation of muscle memory and performance readiness. The low frequency of sessions likely impacted the group's ability to tap into the full potential of the traditional training regimen.

In Experimental Group 2, although most participants also trained one to two times per week, the fact that some attended more frequent sessions showed that there had been a greater commitment and training intensity among certain members. This difference might have existed because the improved training program had attracted or inspired participants with higher commitment levels to acquire and refine their skills. The possibility of more frequent practice could have allowed for quicker development in technical performance, physical fitness, and mental understanding of Taekwondo. Frequent training sessions facilitated the development of improved motor patterns and increased consistency, both of which were key determinants of skill improvement.

Generally, training frequency was a key criterion in determining the success of any intervention. It had a direct influence on the extent to which participants learned techniques, responded to physical demands, and sustained gains in performance. The findings related to differences in training frequency across groups underscored the importance of considering individual training habits when concluding the study outcomes. The consistency of practice and its intensity had to be considered key factors in appreciating variability in results and the overall efficacy of training interventions.

PART II. Pre-assessment scores of respondents in their Taekwondo kicking skills in experimental groups 1 and 2 in terms of: speed, power, stamina, accuracy, and difficulty of kicks.

Table 6

Pre-assessment Scores

Variables	Experimental Group 1		Verbal Interpretation	Experimental Group 2		Verbal Interpretation
	Mean	SD		Mean	SD	
Speed	2.18	0.31	*Fair*	2.49	0.40	*Fair*
Power	2.22	0.45	*Fair*	2.73	0.31	*Good*
Stamina	2.07	0.31	*Fair*	2.47	0.35	*Fair*
Accuracy	2.04	0.40	*Fair*	2.33	0.44	*Fair*
Difficulty of Kicks	2.13	0.37	*Fair*	2.49	0.52	*Fair*

Legend: Mean (average score) Standard Deviation (S.D.)

1.00 - 1.49 Needs Improvement; 1.50-2.49 Fair; 2.50-3.49 Good; 3.50-4.49 Very Good; 4.50-5.0 Excellent

Experimental Group 1, trained using traditional methods, generally demonstrated "Fair" performance across all assessed dimensions—speed, power, stamina, accuracy, and kick difficulty. This level indicated the presence of basic skills, but inconsistent execution. The group's low power and endurance scores suggested inadequate development of anaerobic strength and muscular stamina, essential components in Taekwondo. Additionally, reduced accuracy and difficulty ratings indicated limited neuromuscular coordination and cognitive responsiveness, which traditional training often failed to address. These findings align with past research that emphasizes the limitations of rote-based training in developing high-level athleticism. Overall, the group showed functional competence but risked stagnation without more dynamic and targeted training interventions.

In contrast, Experimental Group 2, which followed an enhanced training program, demonstrated stronger pre-assessment performance, with several scores approaching or exceeding the "Good" level, particularly in power and kick difficulty. This improvement implied that the upgraded training likely included resistance work, variable drills, and cognitive tasks, enhancing both physical and decision-making abilities. However, stamina and accuracy remained in the "Fair" range, highlighting the need for further focus on endurance and precision through advanced conditioning strategies.

In summary, while both groups began at a moderate performance level, the enhanced training group showed greater potential for improvement. The findings highlighted the effectiveness of incorporating scientifically supported, skill-specific training methods such as target training, kicking combinations, and mental preparation. These approaches led to noticeable gains in speed, power, stamina, accuracy, and execution of brutal kicks. The results support a shift toward structured, multidimensional training programs to promote continuous development. Overall, the study emphasizes that integrating physical and psychological components is essential in advancing athletic performance and achieving long-term success in Taekwondo training.

PART III. Post-assessment scores of respondents in their Taekwondo kicking skills in experimental groups 1 and 2 in terms of: speed, power, stamina, accuracy, and difficulty of kicks.

Table 7

Post-assessment Scores

Variables	Experimental Group 1		Verbal Interpretation	Experimental Group 2		Verbal Interpre Tation
	Mean	S.D.		Mean	S.D.	
Speed	3.07	0.36	Good	3.58	0.48	Very Good
Power	3.29	0.49	Good	3.60	0.47	Very Good
Stamina	3.13	0.55	Good	3.62	0.40	Very Good
Accuracy	3.02	0.50	Good	3.62	0.28	Very Good
Difficulty of Kicks	3.00	0.33	Good	3.51	0.21	Very Good

Legend: Mean (average score) Standard Deviation (S.D.)

1.00 - 1.49 Needs Improvement; 1.50-2.49 Fair; 2.50-3.49 Good; 3.50-4.49 Very Good; 4.50-5.0 Excellent

The post-assessment results for Experimental Group 1, which followed a traditional training regimen, showed improvement from "Fair" to "Good" across all skill areas—speed, power, stamina, accuracy, and kick difficulty. This indicated that the conventional method effectively developed foundational skills through repetition and structured practice. Gains in power and speed reflected improved motor coordination and strength, while better stamina scores demonstrated enhanced endurance. Accuracy and execution of moderately complex kicks also improved, suggesting that consistent basic drills-built control and reliability. However, performance still fell short of excellence, highlighting those traditional methods lacked the dynamic, high-intensity components needed for advanced neuromuscular and tactical development.

Experimental Group 2, trained under an enhanced program, achieved "Very Good" ratings in all dimensions. Their superior results reflected the effectiveness of resistance training, variable target work, and cognitive drills, all of which promoted explosive strength, endurance, and precision. High stamina scores suggested well-developed aerobic and anaerobic conditioning, while improved accuracy and the ability to handle difficulty indicated advanced neuromotor control and task adaptability. These outcomes aligned with motor learning theories and emphasized the value of progressive, feedback-rich environments.

Overall, both groups improved, but the augmented program proved more effective in developing higher-level performance. The results supported the integration of modern, scientifically grounded methods into martial arts training to promote comprehensive skill advancement across physical, technical, and cognitive domains.

PART IV. Test of difference in the pre-assessment performances of the respondents in their Taekwondo kicking skills in experimental groups 1 and 2 before the experimentation phase.

Table 8

Test of Difference in Pre-assessment Performances

Variable	Experimental Group 1		Experimental Group 2		T	df	Sig. (2-tailed)	Interpretation
	Mean	SD	Mean	SD				
Speed	2.18	0.31	2.49	0.40	-2.168	14	0.024	*Significant*
Power	2.22	0.45	2.73	0.31	-3.360	14	0.002	*Significant*
Stamina	2.07	0.31	2.47	0.35	-3.850	14	0.001	*Significant*
Accuracy	2.04	0.40	2.33	0.44	-1.818	14	0.045	Not Sig.
Difficulty of Kicks	2.13	0.37	2.49	0.52	-2.125	14	0.026	*Significant*

Legend: if the p-value < 0.05, then it is statistically significant.

If the p-value >0.05, then it is NOT statistically significant.

Experimental Group 1 consistently performed lower in speed, power, stamina, accuracy, and difficulty of kicks. This indicated that the training programs applied were not as successful in enhancing core Taekwondo competencies. These outcomes correlate with earlier studies that suggest conventional or less detailed training tends not to lead to significant physical and technical achievements (Franchini et al., 2011). Without specialized and progressive training, the athletes were unable to acquire the required neuromuscular adaptations and motor control for advanced kicks (Bridge et al., 2014). This emphasized the need for more specialized training methods to improve kicking performance.

Experimental Group 2 showed significant improvements in speed, power, endurance, and kicking difficulty, indicating that the training program enhanced their technical and physical capacities. This was in accordance with evidence showing that task-specific training, such as target practice and combinations of kicks, enhances neuromuscular efficiency, muscular power, and endurance (Faigenbaum & Myer, 2010). Preparation of the mind also enhanced better concentration and motor coordination, which supported more complex kicking techniques (McEwan et al., 2020). However, accuracy enhancements were not substantial, suggesting that precision required longer or more specific skill training, as supported in the literature, which emphasizes the importance of repetitive practice for establishing accuracy (Schmidt & Lee, 2011).

The general results indicated that intensive and augmented training programs significantly improved key physical attributes of Taekwondo kicking, including speed, power, stamina, and the execution of complex techniques. However, improvements in accuracy were less pronounced, suggesting that this skill may require more targeted drills or a longer training duration. This aligns with the principle of specificity, which states that sport-specific exercises yield the most effective performance gains (Behm & Sale, 1993).

Additionally, the results emphasized the importance of integrating physical conditioning with mental preparation to achieve holistic athlete development. Mental strategies, such as visualization and goal setting, have been shown to enhance focus, confidence, and execution under pressure, thereby reinforcing their value in martial arts training (Zemková, 2017). Therefore, for comprehensive advancement in Taekwondo, especially in mastering precision-based techniques, training programs should not only be physically intensive but also mentally structured and aligned with the specific demands of the sport.

PART V. Test of difference in the pre-assessment and post-assessment scores of the respondents in their Taekwondo kicking skills in experimental group 1 before and after using the conventional Taekwondo training program.

Table 9

Test of Difference in Pre-assessment and Post-assessment Scores of Experimental Group 1

variable	Pre-assessment		Post-assessment		T	df	Sig. (2-tailed)	Interpretation
	Mean	SD	Mean	SD				
Speed	2.18	0.31	3.07	0.36	-7.135	14	0.000	*Significant*
Power	2.22	0.45	3.29	0.49	-6.808	14	0.000	*Significant*
Stamina	2.07	0.31	3.13	0.55	-8.411	14	0.000	*Significant*
Accuracy	2.04	0.40	3.02	0.50	-7.192	14	0.000	*Significant*
Difficulty of Kicks	2.13	0.37	3.00	0.33	-6.703	14	0.000	*Significant*

Legend: if the p-value < 0.05, then it is statistically significant.

If the p-value >0.05, then it is NOT statistically significant.

The analysis of the pre-assessment and post-assessment scores for Experimental Group 1 reveals statistically significant improvements in all measured variables: speed, power, stamina, accuracy, and difficulty of kicks. These significant changes indicate that the training program effectively enhanced the participants' physical and technical abilities. The consistent pattern of improvement aligns with well-established principles in sports science, which emphasize that systematic and targeted training lead to measurable gains in athletic performance. Specifically, the enhancements in speed and power are supported by literature highlighting how progressive overload and specific drills improve muscle strength and neuromuscular efficiency (Kraemer & Ratamess, 2004). Additionally, the observed increase in stamina is consistent with findings that regular, sport-specific conditioning enhances cardiovascular endurance and fatigue resistance, which are crucial for maintaining high performance throughout bouts or competitions (McArdle, Katch, & Katch, 2010). Improvements in accuracy and the difficulty of kicks further support motor learning theories, which suggest that repetitive, focused practice fosters better skill acquisition and refinement, allowing athletes to execute complex movements with greater precision and control (Schmidt & Lee, 2011). Overall, these results affirm that the applied training regimen was effective in developing both the physical capacities and technical skills necessary for optimal performance in Taekwondo.

PART VI. Test of difference in the pre-assessment and post-assessment scores of the respondents in their Taekwondo kicking skills in experimental group 2 before and after using the enhanced Taekwondo training program.

Table 10

Test of Difference in Pre-assessment and Post-assessment Scores of Experimental Group 2

variable	Pre-Assessment		Post-assessment		T	df	Sig. (2-tailed)	Interpretation
	Mean	SD	Mean	SD				
Speed	2.49	0.40	3.58	0.48	-9.122	14	0.000	*Significant*
Power	2.73	0.31	3.60	0.47	-6.500	14	0.000	*Significant*
Stamina	2.47	0.35	3.62	0.40	-8.404	14	0.000	*Significant*
Accuracy	2.33	0.44	3.62	0.28	-9.648	14	0.000	*Significant*
Difficulty of Kicks	2.49	0.52	3.51	0.21	-9.713	14	0.000	*Significant*

Legend: if the p-value < 0.05, then it is statistically significant.

If the p-value >0.05, then it is NOT statistically significant.

The pre-assessment and post-assessment results of experimental group 2 clearly show significant improvements in all measured variables—speed, power, endurance, accuracy, and difficulty level of kicks. The significance implies that the intervention or training program followed had a meaningful and favorable effect on the participants' performance. The improvement is non-chance-based, as indicated by the highly significant p-values, suggesting that the observed differences are statistically significant. These results support previous literature that highlights the power of rigorous training programs in increasing athletic performance. For example, sport-specific conditioning research highlights how targeted training enhances neuromuscular coordination and physical qualities, such as speed and power, and directly translates into improved performance in complex movements (Bompa & Haff, 2009). In addition, studies on martial arts training have revealed that regular practice, emphasizing skill difficulty and psychological preparation, develops stamina and accuracy, essential elements in performing hard kicks (Bridge et al., 2012). The significant enhancement in kick difficulty mirrors not only physical fitness but also motor knowledge and skill acquisition as formulated in Schmidt and Lee's (2011) theory of motor control, which identifies how repetitive, single-minded practice achieves greater ability and malleability in the execution of skills. Thus, the findings highlight the need for a comprehensive training program that addresses both physical and technical aspects to achieve significant performance improvements among Taekwondo athletes.

PART VII. Test of difference in the post-assessment performance of the respondents in their Taekwondo kicking skills in experimental groups 1 and 2 after the experimentation phase.

Table 11

Test of Difference in Post-assessment Performances

variable	Experimental Group 1		Experimental Group 2		T	Df	Sig. (2-tailed)	Interpretation
	Mean	SD	Mean	SD				
Speed	3.07	0.36	3.58	0.48	-2.976	14	0.005	*Significant*
Power	3.29	0.49	3.60	0.47	-2.246	14	0.021	*Significant*
Stamina	3.13	0.55	3.62	0.40	-2.847	14	0.006	*Significant*
Accuracy	3.02	0.50	3.62	0.28	-4.731	14	0.000	*Significant*
Difficulty of Kicks	3.00	0.33	3.51	0.21	-5.277	14	0.000	*Significant*

Legend: if the p-value < 0.05, then it is statistically significant.

If the p-value >0.05, then it is NOT statistically significant.

The post-assessment results for Experimental Group 1 demonstrate significant improvements in all key performance indicators, including speed, power, stamina, accuracy, and difficulty of kicks. These significant outcomes suggest that the training regimen applied to this group effectively enhanced both the physical and technical capabilities of the participants. This aligns with research in sports science, which emphasizes that consistent, structured training

programs can improve neuromuscular coordination and muscular strength, directly influencing athletic performance parameters such as speed and power (Kraemer & Ratamess, 2004). Additionally, endurance improvements can be attributed to enhanced cardiovascular conditioning, which supports sustained performance and delays fatigue —a critical factor in combat sports (McArdle, Katch, & Katch, 2010). The refinement in accuracy and complexity of kicks reflects the benefits of motor learning principles, where repetitive skill practice leads to improved precision and control, which are crucial for mastering complex Taekwondo techniques (Schmidt & Lee, 2011). Thus, the results validate the effectiveness of the intervention in producing meaningful performance gains for this group.

For Experimental Group 2, the significant improvements observed across all performance variables similarly highlight the success of the training intervention in elevating physical fitness and technical skill. The significant changes underscore the effectiveness of the specific exercises and drills used, which likely targeted muscle power, speed, and cardiovascular endurance, foundational components of Taekwondo performance (Bompa & Haff, 2009). The marked improvement in the difficulty of kicks also indicates advanced motor skill acquisition, supported by theories of skill learning that emphasize the role of deliberate practice and mental focus in achieving higher levels of performance complexity (Ericsson, Krampe, & Tesch-Römer, 1993). This suggests that the program not only enhanced physiological capacities but also fostered better coordination and precision, essential for competitive success in martial arts. Therefore, these significant results confirm the efficacy of the tailored training methods for this group as well. The clear improvements in both groups demonstrate the importance of well-rounded, sport-specific training in developing all aspects of athletic performance. Combining physical conditioning with skill practice, as supported by research, helps Taekwondo athletes enhance their speed, power, stamina, and accuracy, preparing them confidently for more challenging competitions ahead.

Conclusion and Recommendation

Conclusions

The study's findings led to the following conclusions.

The analysis of the pre-assessment performance revealed a nuanced outcome regarding the null hypothesis that the two groups did not differ significantly. This hypothesis was partly rejected because Experimental Group 2 (Enhanced) demonstrated a notably higher baseline in speed, power, stamina, and difficulty of kick compared to Group 1 (Conventional), indicating an initial advantage in these physical domains.

However, the hypothesis was accepted for accuracy, as both groups showed no significant difference in kicking accuracy at the start, suggesting they began on equal footing in this particular skill.

Following the implementation of their respective training programs, the null hypotheses that pre-test and post-test scores would not differ significantly within each group were rejected. Both groups exhibited remarkable improvements across all five performance variables—speed, power, stamina, accuracy, and difficulty of kicks—highlighting the effectiveness of their training regimens in enhancing kicking ability.

Following the training period, it became evident that the Enhanced Training Group outperformed the Conventional Group in all aspects of kicking performance. This finding rejected the initial assumption that there would be no difference between the two groups. The success of the enhanced program underscores the significant impact of incorporating advanced training elements, including targeted drills, kicking combinations, and mental preparation techniques such as visualization and goal setting.

These components not only enhance physical skills such as speed, power, stamina, and accuracy but also develop mental focus and resilience, which are essential during competitions. While both training methods help athletes improve, the enhanced approach offers greater, well-rounded gains that boost overall kicking ability. This evidence strongly supports the adoption of a holistic, mindful training program in Taekwondo, benefiting athletes, coaches, and schools by elevating performance, reducing injury risks, and fostering long-term success both on and off the mat.

Recommendations

Based on the findings and conclusions, the following recommendations are formulated:

1. For Taekwondo Athletes: It was suggested that subsequent experimental research ensure equal baseline performance between groups by using random assignment and pre-screening. This helped remove initial bias and ensured an equitable comparison of training interventions. For competing athletes, coaches are recommended to emphasize progressive complexity in kick combinations and target specific situations to mimic actual combat conditions, thereby enhancing the technical challenge.

2. For Coaches and Trainers: Educational centers, trainers, and sport program developers were encouraged to continue applying systematic Taekwondo training programs, as both regular and upgraded approaches had proven successful in enhancing general kicking ability. Fundamental standard training still played an important role, particularly for novices. Instructors and Taekwondo program planners were encouraged to incorporate enhanced training elements, such as target practice, kick combinations, and mental preparation, into their training programs. These techniques have shown better results and were suggested for implementation to maximize athletic performance, particularly for student-athletes at the intermediate to advanced level.

3. For Schools and Institutions: Schools play a crucial role in supporting student-athletes and can significantly enhance their success by adopting the improved training methods outlined in the study. Providing access to practical training tools and programs focused on strengthening kicking skills

naturally boosts students' confidence and morale. This positive energy reflects well on the school's sports programs and reputation, fostering a culture of excellence and well-being. Schools are encouraged to invest in quality resources, facilities, and mental health support, creating an environment where student-athletes can thrive both physically and psychologically. By promoting these enhanced training methods, schools not only raise their competitive profile in Taekwondo events but also demonstrate a meaningful commitment to holistic athletic development. Taekwondo training programs were recommended to incorporate psychological skills training, such as visualization, focus drills, and mental rehearsal, to enhance athlete confidence, accuracy, and performance under pressure.

Together, these recommendations present a comprehensive and mindful approach to Taekwondo training that supports athletes, coaches, and schools alike. By emphasizing physical skill development, mental preparation, and nurturing environments, the entire Taekwondo community can grow healthier, more skilled, and more confident, fully prepared to succeed both on the mat and beyond. This balanced approach reflects the study's clear evidence that combining advanced physical drills with mental techniques leads to greater performance gains, injury prevention, and lasting athlete well-being.

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