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A Study on the Teaching Method of Judo Subjects as Practical Personality Self-Reflection and Martial Arts

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Abstract

Purpose: *The virtues acquired based on the experience of Judo subject as practical personality self-reflection and martial arts should be practiced in their lives by developing them as personality competence. In other words, the purpose of this study is to form personality values through Judo, such as detailed lecture teaching plan and learning education plan, on the personality view of Judo subject as practical personality self-reflection and martial arts.*

Method: *This study was to obtain the amount and quality of lectures and research in the field of education through the study of teaching method innovation of Judo subject as practical personality self-reflection and martial arts. In addition, a learning model for communicating with students was presented and a better teaching method was presented. Furthermore, it will proceed to improve the learner's ability such as critical thinking ability, communication ability, interactive communication, cooperation ability, and creativity of the study according to the teaching method innovation of Judo subject as practical personality self-reflection and martial arts.*

Results: *The advantage of action learning class was that it not only Judo participated in the class through the presentation of discussion and Judo practice but also improved the ability of the students to observe, discover and control their cognitive process from a higher level of perspective. In addition, it is a learning method that is essential for the fourth industrial era because it can improve the ability such as critical thinking ability, communication ability, cooperation ability, and creativity as practical personality education.*

Conclusion: *Personality Classroom As a natural self-reflection and martial arts, various topics such as methods and models for Judo class operation and teaching method innovation methodology, or media production were possible. In other words, there should be a teaching method and a learning model according to the amount and quality of lectures and research in the educational field through the teaching method research method. In addition, it is necessary to plan the class operation that can participate and worry on its own so that learners can motivate, and to have learning programs such as Judo's curriculum as a practical personality self-reflection and martial arts of the learning model, design of learner, learning development, utilization of learners, management of learners and evaluation of learners.*

[Keywords] ***Practical Personality, Judo, Teaching Method, Self-Reflection, Learning Education Program***

1. Introduction

The purpose of the teaching method applying the teaching method innovation of Judo subject as the practice personality self-reflection and martial arts is pursuing the formation of personality through the body pursued by humans. This means that the practical personality self-reflection should be aimed at acquiring the knowledge of personality virtue experientially through Judo training on personality virtue related to the qualities to be equipped as a human being, and developing the virtue acquired based on experience as personality competence to practice personality value in his life.

The expected effect of Judo learning as a practice personality self-reflection and martial arts is that the practice personality emphasizes experiencing various personality virtues while training Judo, that is, it is to experience the personality virtues through courtesy, patience, and confidence virtues, to feel the self with you through consideration, respect, and personality virtue experiences, and to experience leaders, cooperation, and service virtues. Furthermore, it is to establish a greater self-reflection virtue through experience of responsibility, trust, and justice virtue.

In addition, as a teaching and learning method that can interact with students to maximize learning in class by using information technology, the teaching goal should be set to try to interact with students and learn the deepening process.

Especially, Judo education in practical personality education has the basis of human completion. Self-reflection literally emphasizes the virtues of human beings and personality formation and presents practical philosophy through experiential education. Among them, through the process of Judo development and development, it is possible to understand the concept of courtesy, practice and courtesy through Judo training, and to reflect on the self of mindfulness by smoothing the center movement through the back and forth, the back and forth, the back and forth, the rear and forth, the rear and the right, and the bump.

In addition, it learns the movement by repeatedly training basic physical strength formation, rolling and basic fall method through basic physical strength training with understanding of patience concept. With understanding the concept of patience, the completion of the forward rotation method, and the basic physical strength are trained to protect the body. In other words, the concept of confidence is understood, and Judo's effort writing motion (push, pull, etc.) and effort writing motion are used to understand the movement of the opponent and to experience the concept of how to use the power of the opponent.

Confidence is to show confidence through patience, and to achieve confidence that Judo can overcome opponents by using concept experience and opponent's power on how to grasp opponent's movement through the effort writing movement (push and pull, etc.) and the force writing movement. This is to complete self-reflection through Judo's thought, curriculum and Judo's personality. Leadership is essential for this. Through understanding the concept of leadership and encouraging classes, leadership experience and hand-crafted learning are conducted. In other words, leadership is a leader with confidence through patience, that is, through the promotion class, it learns the movement by solidifying Judo's practice technique. In addition, it is necessary to learn the movement as a back technology along with understanding the concept of cooperation, and to experience cooperation by performing the action in accordance with the other party. In addition, it is necessary to learn the movement as a foot technique and to experience cooperation by performing the action in cooperation with the other party. In addition, the definition is experienced through the understanding of the definition concept and self-defense through the understanding of the definition concept and the legal definition concept, self-defense and the five-phase defense. In this case, Judo as a martial arts education of practical personality, KimJoong-hyoung(2019)[1], Analysis of the Actual Condition and Improvement in Martial Arts Challenge Classes in Elementary School, KimEui-Hwan(2004)[2], The Roles Of Yongmoo-Do Leading Martial Arts Education In 21st(C), LeeKang-woo, AhnYong-kil(2019)[3], A Research on the Application Direction for Martial Arts Training through the Character Education Policy Analysis, ParkDong-Chul(2002)[4], Somatics and physical training skill in martial arts, KimEui-Hwan(2005)[5], The Current Status and Future Directions of Martial-Arts Education in Yong-In University, KimJoo-Youn(2011)[6], The Existence Basis of Dongnae "Martial Arts School" and Martial Arts Education in Open Port Area, LeeKi-Yong, ChoYong-Tae(2016)[7], Neds Analysis for Personality Education Orientation of the Colege Students, YuSung-Seon(2018)[8], Study on the Method and Prospect of Personality Education in AI Era of the 4th Industrial Revolution,

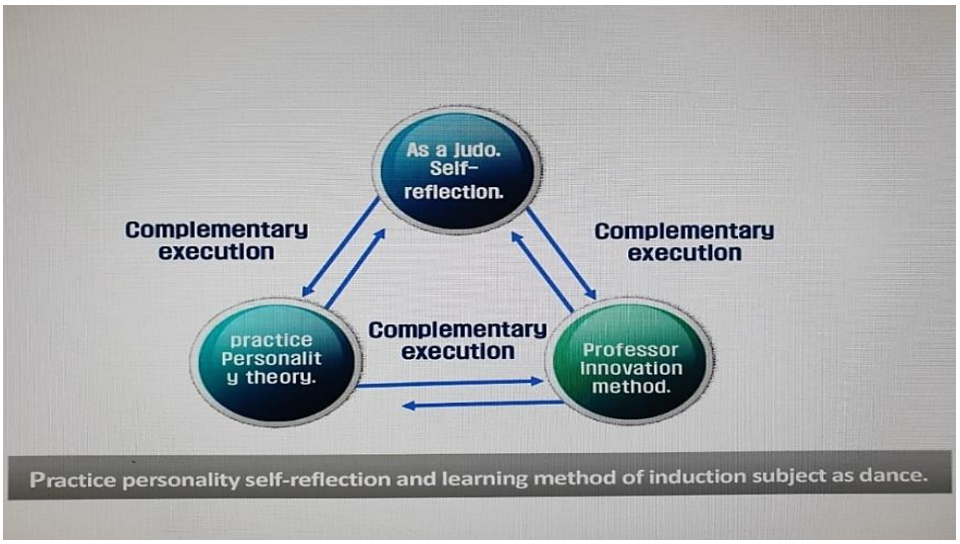
Namkung-Jeong(2018)[9], Effect of Group Art Program for the Personality Education of University Students etc.

The previous studies showed that the identity of the personality virtues related to the qualities to be equipped as students through personality education was insufficient. This suggests the necessity of acquiring the knowledge of humanity virtue experientially through Judo training as a martial arts.

Therefore, virtues acquired based on the experience of Judo subject as practical personality self-reflection and martial arts should be developed as personality competence and the value of personality should be practiced in their own life. In other words, the purpose of this study is to form personality values through Judo, such as detailed lecture teaching plan and learning education plan, on the personality view of Judo subject as practical personality self-reflection and martial arts.

This study was to obtain the amount and quality of lectures and research in the field of education through the study of teaching method innovation of Judo subject as practical personality self-reflection and martial arts. In addition, a learning model for communicating with students was presented and a better teaching method was presented.

Figure 1. Practice personality self-reflection and learning method of induction subject as dance.



In particular, as a teaching method innovation of Judo subject as a practical personality self-reflection and martial arts, I planned the class operation that can participate and worry for myself so that learners can give learning motivation, and I sought and developed a learning model. I tried to improve the quality of education through better research and class.

First, the study investigated and analyzed Judo's practical personality and self-reflection values; second, it investigated and analyzed Judo's whole human completion and practical discourse. Third, research and analysis were conducted to explore teaching method innovation and Judo teaching method management methodology.

Based on the concrete approach, it will be carried out to improve the learner's ability such as critical thinking ability, communication ability, interactive communication, cooperation ability, and creativity of the study according to the teaching method innovation of Judo subject as practical personality self-reflection and martial arts. However, it is revealed in advance that the in-depth interview was conducted by selecting seven university students because it was somewhat vast to interview 45 people online.

2. Judo's Practical Personality and Self-reflection

Judo Inseongkwan's self-reflection is a personality martial arts education that trains the body through attack and defense, especially in learning virtue by harmonizing the body and mind by cultivating the mind through training. Judo is an interpersonal game that competes through direct physical techniques while complying with all the rules, and strong will is formed with training the body through attack and defense[10].

Judo's process of winning can cultivate a true Yogi, which is a great help in forming social attitudes and habits. In other words, the fundamental purpose of Judo training is to use the power of mind and body most effectively. This training is to train and train the body and mind through the practice of attack and defense, and to acquire the essence of all physical techniques. In addition, it completes its own self in Judo's performance. He also tried to contribute to human society.

First, he trained his physical strength. Second, he learned how to beat his opponent in his original posture. Third, they learn to develop good personality and act right. As such, Judo In-Seong-kwan's goal is not just to win the game, but to be true. Judo is a one-on-one interpersonal fighter with his opponent, and it is natural to win rather than defeat.

First, it is the cultivation of virtue. In the seal, it is the courtesy of gratitude to the other person. And you should exchange skills with each other kindly and develop a mind that refrains from acting like suddenly drinking water because you are thirsty.

Second, it is the cultivation of intellectuals. The teaching from the teacher should be remembered correctly. Based on this, in order to improve the physical technique, he should mobilize his imagination and not stick to his own claim but be taught by the leader.

Third, the theory of the game should be applied to various aspects of life. When players come to the game, they need to look at the relationship of the players and to have a spirit of winning the players. In other words, in the game, the problem of winning and losing always sticks together, so you should not be proud of winning. And even if you lose the game, you do not act in a ruthless manner, but you always need an attitude to keep your best attitude.

Judo has three purposes: physical education, competition, and mental training. Only if these three are maintained in harmony can they reach the goal of ultimate human formation. This goal is to achieve its own realization and contribute to society as a social person. Also, if you are aiming only for practice and victory in the game, you should not forget that Judo is very important in the fact that it is physical fitness and mental training for your future. Judo training, which aims only at mental training, is also desirable to practice Judo's purpose of acquiring self-defense in physical strength and competition.

As such, Judo's fundamental purpose is to cultivate desirable human virtue through training of body and mind and to create true human formation at the same time. Judo's training, which competes with his own physical ability, can be said to be a performance of indomitable determination, courage, enterprisingness and independence along with his strong physical strength. This practice is a valuable virtue of self-completion that trains the body and mind.

Therefore, it should not be arrogant to win Judo's game like the philosophy of Toegye Lee Hwang. You should not be afraid of any dangerous place. You should not be relieved to be in a safe place. It is always to make oneself equal in Judo's training and to correct the body and mind.

3. The Completion of Humanity and Discourse of Practice in Judo Education

Judo's technique refers to the action of the principle of technology under the promise of catching and receiving each other by selecting the basic technology among the attack and defense technology of many Judo technologies. Through this practice, we can learn the principle of the use of power and the reality of technology such as tilting, writing, and hanging of various attacks and defenses. However, since it is promised by a certain order and method, it can not change freely like free practice, so it may be formal or less interesting in technical practice. However, if you acquire enough Judo's principles, right body writing, tilting, making, and hanging skills through this exercise, you can easily apply it to free practice and game skills.

Therefore, learning the basic example of Judo training is an important part in improving the perfection of Judo, and there should be a change of consciousness that both leaders and trainees deeply recognize the necessity of training and teaching in parallel with the practice of freedom.

Therefore, there is a very similar point in the nature of human completion in the performance of Judo education. To reinterpret Judo as “DouiSangMa Yogiwiin” as education, righteousness can not be human without practice. No matter how good the writing is, it is useless if it is not done, and if it is done without looking at it with the correct gaze as Judo education, the meaning is meaningless[11].

Therefore, if you do not carry out the reason of spiritual morality, you can not correct your mind, and if you do not realize the reason of correct enlightenment, you will not be able to righteously do others. This is the original spirit of Judo education, "The body thought that I saw as “DouiSangMa Yogiwiin”. If so, as Judo education, "If you want to complete the whole human being viewed as DouiSangMa Yogiwiin, you should first know the Judo process[12].

It means 'to repeat, learn and learn while appealing to the old'. Through such Judo performance, we can get “DouiSangMa Yogiwiin” as Judo education, which is a complete human completion. Because the whole human completion is a process of strong will and noble spirit of blood, sweat and tears. There should also be an endless class of effort for one's own controlled life. Only then can all the steps of complete human completion be done by itself, and it can be “DouiSangMa Yogiwiin” as a word to the point of the duty to care for and respect others by getting self-realization.

Therefore, the process of Judo's performance and the three processes of learning Buddhism are the continuous process of conscious efforts through the practice of mind and body in a common sense.

Judo suggests the importance of physical performance, which is the educational idea of “DouiSangMa Yogiwiin” which can be implied by “DouiSangMa Yogiwiin”. So what is the 'morality' seen in Judo?, This means that in order to understand how Judo forms good character, we must first look at how we can get 'morality'.

Especially, the whole human completion of Judo performance is a social characteristic, and since it is not directly related to the goal of 'technique' and fighting, its existence itself can be evaluated as a coincidence, not an inevitable. Therefore, the main part of Judo education should be considered for the performance of Judo training. Judo education is not compliant with norms or can not learn self through violent behavior of physical techniques. Judo leaders should present examples of behavior toward violent attitude.

Judo education should not be conducted out of courtesy first, and Judo education should suggest a way to effectively cope with and control the force rather than using force. In other words, true Judo education cultivates habits to overcome through their patience.

In addition, Judo practitioners must learn various physical techniques and learn their sentences by imitating and training the skills of Judo leaders or opponents. In other words, Judo

education must include educational aspects of physical techniques according to the movement and principle of 'technique' by Judo leader. In other words, it certainly helps to cultivate moral and intellectual virtue. Especially, Judo's various competitions have factors that naturally reduce the strong spirit and anxiety of the trainees, so Judo education is inevitable.

Especially, Judo's performance process is a work of the body that makes it familiar in responding to the structure prepared in advance in violent and dangerous situations. In short, you learn control through your own moderation, and you realize that you do not have to face physical strength as you improve your confidence and your own control. In other words, the habit formed by Judo education is the overall meaning of human life, that is, it makes it possible to act calmly without being embarrassed by maintaining human reason. This is to make the body consciousness of the courtesy calm those who perform Judo and to complete the act so that they can act mildly and self-controlly. This physical activity not only cultivates morality but also becomes the driving force to form a whole human completion. Through Judo learning, it is to improve personality and morality by cultivating ethical thinking and morality that cares for oneself and others.

In this regard, Judo education as “DouiSangMa Yogiwiin" in Judo education, virtue and personality must be controlled by oneself. This is not the completion of human virtue and character overnight; it is the completion of whole human being as virtue and character of moderation through numerous Judo educational practices. Therefore, it is to be a whole human completion that makes human virtue and personality through the restrained education of Judo performance and moderates.

Especially, the endless efforts in Judo education should be made to complete the right whole human being, which means that the meaning of “DouiSangMa Yogiwiin” as Judo education should be re-examined in the contents of the nuclear power plant.

4. Judo Class Management and Teaching Method Innovation Methodology as Practical Personality Self-reflection and Martial Arts

Understanding the concept of courtesy is practice and courtesy through Judo training. Preparation and basic movements, basic posture and right dress, and courtesy practice and manners as a mind-set smooth the center movement through backward and forward, backward and forward, backward and forward, and bumping. Understanding the concept of patience is a basic physical strength formation through basic physical strength training, and it learns the movement by repeatedly training rolling and basic fall method. Basic physical strength through basic physical strength training is the forward rotation and reception completion, and basic physical strength is trained to protect the body.

In addition, understanding the concept of confidence is to understand the movement of the opponent through Judo's effort writing motion (push and pull) and to experience the concept of how to reverse the power of the opponent. Confidence is a self-confidence through patience, and Judo's effort-writing movement (push, pull, etc.) is used to understand the movement of the opponent through the effort-writing movement and to experience the concept of how to use the power of the opponent in reverse. It achieves the confidence that it can overpower and do the opponent by using the power of the opponent. Understanding the concept of leadership is to complete cooperative learning to be caught by hand skills, which is to say, leadership is to be a leader with confidence through patience[13].

Therefore, cooperative learning through the leadership experience through the promotion class is a cooperative learning through the hardening movement, and understanding the concept

of cooperation is to learn the back-skill movement. In addition, you can experience cooperation by performing the action in accordance with the other person.

This cooperation is a medium that can be led by each other and can do it by themselves, so that they can learn the foot skill movement. Understanding the concept of justice is a concept of justice through self-defense as a group composition, and it is required to mention self-defense and five-phase defense in detail as a legal definition explanation, The definition of the blast furnace is to experience the concept of justice through courtesy, patience, confidence, leader, and cooperation through self-defense through situational drama[14].

As Judo education of practical personality, the class of action learning was designed and practiced by the instructor and students to participate and worry on their own in order to obtain the quality of education. Before the class operation, the researcher tried to understand the concept through the video or materials prepared by the instructor. In other words, during the class operation time, they wanted to gain thought by discussing and presenting the deepening process of practical personality education and learning it as their own. The active participation of students should be made while conducting the action learning class for the first time[15].

Especially, it was found that the students not only participated in the class through the presentation of discussion and Judo practice but also improved their ability such as mental action such as observation, discovery and control from a higher level of perspective on their cognitive process. In addition, it is a learning method that is essential for the fourth industrial era because it can improve the ability such as critical thinking ability, communication ability, cooperation ability, and creativity as practical personality education.

Figure 2. Research professor judo throwing video data.

Figure 3. Research professor judo hardening video data.

Then, I presented opinions on students and learning in personality and leadership. The practical movement was composed of throwing technique and hardening technique, and the name was composed of English capital notation.

Table 1. Achievement of students' goals on practice personality and leadership.

Self-reflection and Leadership of Nature and Achievement of Students' Goals	
<Judo Metching Technology Practical Personality through Struggling Technology>	
KJW	Leadership has learned that it has the ability, qualities, and leadership as a leader through the announcement of leading oneself.
SKS	Through the process of leading the team to achieve or achieve the goals set by the team, they respect themselves and others and learn their roles as leaders. This was able to acquire knowledge as a leader of Judo's martial arts value in terms of practical personality.
PEO	In the social climate where individualism and selfishness are becoming widespread, it was possible to acquire one of the important virtues to learn and learn from experiencing 'role map' through discussions with professors and presentations with students.
HOJ	The role of leader was not to be learned by books sitting on chairs, but to learn by building up leadership and mutual trust through interaction with people around them through experiential knowledge.
SHJ	I was able to learn through discussions with professors and presentations with students that I can naturally develop leadership in various efforts and experiences in order to communicate with them and confidence that I can teach someone.
KMCH	Ruther should take the lead as a responsible person and initiative more than others and act as an example of others. Through this, it was possible to acquire the ability to maximize the qualities and

	abilities as a leader and to achieve the leadership through discussions with professors and presentations with students.
KCHR	Leaders recognized that it is more important to have an attitude of taking the initiative than to teach well, and they showed a demonstration rather than just teaching it by words, and then they learned that they would Judo so that team members could follow through discussions with professors and presentations with students.
synthesis	Therefore, in order to effectively teach learning through Judo class operation, the plan was established, and basically, the practical skills were effectively progressed and the leadership goals were organized. The study conducted all the goals according to the fundamental purpose of Judo, and presented and discussed with the students about the teaching of the beating through Judo's guidance.

As such, it is true that there were many difficulties in the achievement drawings due to the current Corona 19 as a result of the practical class of the handy-to-hand online class, but it was obtained through the in-depth qualitative interview of the students that the participation of the students was good due to the progress of the new teaching method.

I'll put the above together and list it. As a practical personality self-reflection and martial arts, various topics such as methods and models for Judo class operation and teaching method innovation methodology, or media production were possible[16].

In the field of education through the teaching method research method, there should be a teaching method and a learning model according to the amount and quality of lectures and research. In order to motivate learners to learn, the study plan and develop a learning model that can participate and worry on their own[17].

As a martial arts of practical personality, it is necessary to maximize the learning effect through learning images and learning materials related to Judo class, as well as the expected effect, as well as the learning process in the aspect of program and educational engineering to improve the learner's ability, design of learner, learning development, utilization of learner, management of learner and evaluation of learner[18].

Also, there should be effective progress of the plan of learning guidance through Judo class operation and teaching method research as the practice personality self-reflection and martial arts, and in the actual practice of education goal and Judo education, there should be a composition of educational goals such as step-by-step introduction, development, and finishing. This is the four subcategories of development area, which are print technology, audiovisual technology, computer technology, and integrated technology. In the use of education media, it was possible to implement teaching method innovation and dissemination, learning execution and institutionalization of learning[19][20][21][22].

First, the method of teaching and learning contents were developed to maximize the learning effect through learning images and learning materials related to Judo class operation as practical personality self-reflection and martial arts[23][24].

Second, the study tried to obtain the quantity and quality of lectures and research in the field of education through Judo teaching method research as practical personality self-reflection and martial arts. In other words, the study planned the class operation that can participate and worry on their own so that learners can motivate learning and developed a learning model. This model was presented to maximize the learning effect through learning images and learning materials related to Judo class as a practical personality self-reflection and martial arts, which suggested various mediators and efficient teaching methods to form learner's motivation[25][26][27][28].

Third, as a practical personality self-reflection and martial arts, the study program such as the learning process of Judo subject, the design of the learner, the development of learning, the utilization of learners, the management of learners and the evaluation of learners was sought., In other words, the study tried to obtain the amount and quality of lectures and research in the field of education through Judo class and teaching method research as practical personality self-reflection and martial arts. Moreover, learner is the learning motivation. In other words, the study planned the operation of the class that can participate and worry on its own, and developed a learning model. In particular, it maximized the learning effect through learning images and learning materials related to Judo class as practical personality self-reflection and martial arts[29][30][31]. In addition, the study conducted a study on the learning process of the program and educational engineering aspects to improve the ability of the learner, the design of the learner, the development of learning, the utilization of the learner, the theory of learner management and the evaluation of the learner, This study suggests the goal of acquiring and utilizing practical knowledge through the expected effect of learners[32][33].

Therefore, it is necessary to utilize it in the field through knowledge, understanding and interpretation that can understand and apply the theories and practices necessary for Judo class and teaching method as practical personality self-reflection and martial arts.

5. Conclusion

This study aims to obtain the amount and quality of lectures and research in the educational field through the study of teaching method innovation of Judo subject as practical personality self-reflection and martial arts, and suggests a better teaching method by presenting a learning model that can communicate with students. Especially, as a teaching method innovation of Judo subject as a practical personality self-reflection and martial arts, I planned the class operation that can participate and worry for the learner so that they can give learning motivation, and I searched for and developed a learning model.

First, Judo's fundamental purpose is to cultivate desirable human virtue and to create true human formation through training of body and mind. Judo's training, which competes with his own physical ability, can be said to be a performance of indomitable determination, courage, enterprisingness and independence along with his strong physical strength. This practice is a valuable virtue of self-completion that trains the body and mind.

Second, in Judo education, which is viewed as “DouiSangMa Yogiwiin” as Judo education, virtue and character must be controlled by oneself. This is not the completion of human virtue and character overnight; it is the completion of whole human being as virtue and character of moderation through numerous Judo educational practices. Therefore, it is to be a whole human completion that makes human virtue and personality through the restrained education of Judo performance and moderates.

Third, various themes such as methods and models for Judo class operation and teaching method innovation methodology, or media production as practical personality self-reflection and martial arts were possible. In other words, there should be a teaching method and a learning model according to the amount and quality of lectures and research in the educational field through the teaching method, and a teaching program should be planned to participate and worry for the learner to motivate himself to learn, and as a practical personality self-reflection and martial arts of the learning model, there should be a learning process of Judo subject, design of learner, learning development, utilization of learner, management of learner and evaluation of learner.

Therefore, the next teaching method will be carried out to improve the learner's ability such as critical thinking ability, communication ability, interactive communication, cooperation ability, and creativity of the study according to the teaching method innovation of Judo subject as practical personality self-reflection and martial arts.

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7. Appendix

7.1. Authors contribution

	Initial name	Contribution
Author	IS	-Set of concepts ☑ -Design ☑ -Getting results ☑ -Analysis ☑ -Make a significant contribution to collection ☑ -Final approval of the paper ☑ -Corresponding ☑ -Play a decisive role in modification ☑ -Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑ -Participants in Drafting and Revising Papers ☑ -Someone who can explain all aspects of the paper ☑

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Effects of Taekwondo Breaking Player's Self-Management on Stress and Performance

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Abstract

Purpose: *This study is meaningful in analyzing in detail how the self-management of demonstration members of college Taekwondo demonstration events affects their stress and performance. In addition, this is to provide basic data for follow-up studies that help improve performance and prescribe for exercise stress based on thorough self-management of Taekwondo demonstration team members.*

Method: *For this study, a survey was conducted on college Taekwondo demonstration members for about 4 months. The purpose and intent of the study were fully explained to the coaches of each team, and consent was sought. This researcher and research assistant visited the training site of Taekwondo demonstration teams and conducted a survey. A survey was conducted after explaining the preparation method, purpose, and intent of the study to the participants who voluntarily participated in this study.*

Results*: As a result of a regression analysis on the effect of self-management of college Taekwondo demonstration members on performance, it was found that body management, interpersonal management, training management, and mental management, which are sub-Factor s of self-management, were not statistically significant. In addition, the regression model shows a value of F from p<.001 to .325 and R^2=.012 for the regression equation, showing 1.2% explanatory power of the total variance.*

Conclusion: *As a result of examining the relationship between exercise stress and self-management of members of the college Taekwondo demonstration team, it was found that mental management had an effect on unfair behavior among sub-Factor s of exercise stress. For time constraints, physical and mental management had an effect. It was found that mental management had an effect on functional discontent and career concern. Second, it was found that all Factor s did not affect the effect of self-management of college Taekwondo demonstration members on performance. Third, it was found that all Factor s did not affect the effect of the exercise stress of college Taekwondo demonstration members on their performance.*

[Keywords] ***Taekwondo, Breaking, Self-Management, Stress, Performance***

1. Introduction

Self-management can be seen as the most basic Factor that determines success and failure. This is defined as the ability to manage and coordinate with one's own efforts[1]. The self-management of athletes is a cognitive behavioral strategy as a means of showing the best performance and improving the best athletic performance[2].

Heo Jeong-hoon established interpersonal management, training management, body management, and mental management as the main concepts in the process of developing a tool to measure the degree of self-management. Interpersonal management refers to human relations such as friends, seniors, juniors, leaders, and parents. Training management refers to strategies

for maintaining and developing skills and physical development through regular training and personal training. body management refers to physical self-management strategies including weight control, food control, injury prevention, and sleep control. Mental management refers to a cognitive self-management strategy that overcomes and controls negative emotions for successful performance and promotes positive thinking[3]. Kim Byung-joon, Orlick, and Partington reported that self-management is emerging as a major strategy for individual goals for athletes and that there is a thorough difference in self-management between excellent and poor players[4][5]. In other words, self-management can be seen as a basic Factor that determines success and failure. Exercise stress is a psychological phenomenon that easily occurs in an environment that is a sports situation. This occurs when fear of failure, skepticism about one's competence, restrictions on time and place, economic burdens, the importance of win or loss, demand from one's surroundings, and imbalance with one's ability are emphasized[6][7]. Players' loss of motivation, loss of interest, imbalance in sleep and eating habits, and obsession with winning or losing appear as stress Factors. These Factors also lead to injuries, leading to unfortunate consequences of giving up one's career. This situation is common in Taekwondo demonstration events where highly difficult moves are performed in the air. Unlike Poomsae and sparring, the Taekwondo breaking event has not been adopted as an official Taekwondo event, and the Presidential Flags competitions are being held at each college as a demonstration event. However, there are no clear scoring regulations and low social interest, so Taekwondo breaking players have a narrow range of career choices. This reality can act as a growing stress Factor for Taekwondo demonstration athletes. Efficient management is important for Taekwondo demonstration athletes because everyone experiences exercise stress during their career, and self-management is highlighted as an influencing Factor .

For successful players around the world, self-management is an important Factor in determining the outcome of competitions. Yoo Jin and Jang Deok-seon conducted a study on the importance of psychological and technical Factor s for Korean national team athletes[8]. According to this study, it was found that self-management along with the attention and confidence of players and coaches was considered important, which was directly related to their performance.

It was said that performance means comprehensive ability, including skills exerted by individual players or teams. The best performance is created by the interaction of physical, psychological, and physiological Factor s. In the case of players with similar skills and physical strength, psychological Factor s have been reported to determine the outcome of the competition. According to a study that investigated the relationship between self-management and performance in elite athletes , the better the self-management ability, the better the performance. It was also found that high exercise stress affects performance[9][10][11][12].

Athletes' stress occurs when the environmental characteristics of training, competition, and daily life do not match the athlete's ability[13]. In the case of Taekwondo exhibition events, victory or defeat is determined with a single try, so one must play with tactics and perfect skills depending on the situation of the competition. Stress appears due to the burden of performing techniques and psychological pressure caused by anxiety, decreased confidence, tension, and decreased motivation. Stress appears to be due to various negative effects such as quitting, injury, loss of interest, loss of will, and lack of confidence[14][15][16][17][18]. This affects performance, leading to a decline in performance.

Many studies have been conducted on the self-management of demonstration team members in Taekwondo demonstration events [19][20][21][22]. However, studies on the relationship between self-management on exercise stress and performance are insufficient.

Therefore, this study is meaningful in analyzing in detail how the self-management of demonstration members of college Taekwondo demonstration events affects their stress and

performance. In addition, this is to provide basic data for follow-up studies that help improve performance and prescribe for exercise stress based on thorough self-management of Taekwondo demonstration team members.

2. Research Method

2.1. Research subjects

This study selected members of the national college Taekwondo demonstration team, and 223 copies of the questionnaire were collected using the convenience sample extraction method. When looking at the characteristics of the study subjects, the gender ratio was 81.6% for men and 18.4% for women. The research subjects were Taekwondo demonstration team members nationwide: 39.0% in first-year, 25.1% in second-year, 25.6% in third-year, and 10.3% in fourth-year. The training period was 29.6% for 1 to 2 years, 36.8% for 3 - 4 years, 17.9% for 5 - 6 years, 6.7% for 7 - 8 years, and 9.0% for 9 years or longer. The characteristics of the study subjects are shown in <Table 1>.

Table 1. Characteristics of study participants.

Description		Numbers	Percentage (%)
Gender	Male	182	81.6
	Female	41	18.4
School year	1	87	39.0
	2	56	25.1
	3	57	25.6
	4	23	10.3
Experience	1 – 2 years	66	29.6
	3 – 4 years	82	36.8
	5 – 6 years	40	17.9
	7 – 8 years	15	6.7
	9 years or longer	20	9.0

2.2. Survey tools

2.2.1. Self-management questionnaire

In this study, Heo Jung-hoon's questionnaire was revised and supplemented to consist of a total of 17 questions[3]. It consists of a Likert 5-point scale that gives 1 point for 'Strongly disagree' and 5 points for 'Strongly agree.' It consisted of four Factor s: mental management, interpersonal management, training management, and physical management. As shown in Table 2, the reliability coefficient (Cronbach' α) of each sub-Factor was found to be training management .875, interpersonal management .913, mental management .807, and physical management .704.

Table 2. Validity and reliability analysis of self-management.

Factor	Question	Factor 1	Factor 2	Factor 3	Factor 4	Cronbach' α
	Training management 4	.845	.279	.161	.093	.875
	Training management 2	.826	.259	.128	.161	
	Training management 3	.808	.241	.269	.136	
	Training management 1	.715	.250	.281	.181	
Interpersonal management	Interpersonal management 4	.246	.838	.167	.034	.913
	Interpersonal management 1	.272	.810	-.065	.128	
	Interpersonal management 2	.231	.750	.138	.056	
	Interpersonal management 3	.034	.668	.482	-.061	
	Interpersonal management 5	.283	.612	.437	.051	
Mental management	Mental management 2	.119	.411	.684	.038	.807
	Mental management 1	.430	.078	.673	.096	
	Mental management 3	.466	.047	.644	.206	
	Mental management 4	.209	.233	.626	.290	
Body management	Body management 2	.183	.032	.001	.811	.704
	Body management 1	.029	-.006	.253	.699	
	Body management 4	.367	.140	-.024	.647	
	Body management 3	-.040	.026	.487	.586	
Eigen		3.459	3.259	2.698	2.160	
Dispersion		20.348	19.171	15.869	12.706	
Cumulative		20.348	39.519	55.388	68.094	

2.2.2. Exercise stress questionnaire

In this study, Oh Yoon-kyung and Lee Kang-heon's questionnaire was revised and supplemented to consist of a total of 22 questions[7]. It consists of a Likert 5-point scale that gives 1 point for 'Strongly disagree' and 5 points for 'Strongly agree.' It consisted of four Factor s: unfair behavior, functional discontent, time constraints, and career concern. As shown in Table 3, the reliability coefficient (Cronbach' α) of each sub-Factor was found to be unfair behavior .913, functional discontent .886, time constraints .948, and career concern .896.

Table 3. Validity and reliability analysis of exercise stress.

Factor	Question	Factor 1	Factor 2	Factor 3	Factor 4	Cronbach' α
	Unfair behavior 5	.777	.052	.299	.174	.913
	Unfair behavior 7	.766	.096	.242	.204	
	Unfair behavior 6	.753	.174	.191	.095	
	Unfair behavior 3	.751	.152	.280	.205	

	Unfair behavior 2	.746	.083	.299	-.009	
	Unfair behavior 4	.705	.217	.219	.188	
	Unfair behavior 1	.672	.222	.333	.108	
Functional discontent	Functional discontent 4	.153	.879	-.015	.156	0.886
	Functional discontent 3	.106	.864	.162	.188	
	Functional discontent 5	-.009	.798	.120	.098	
	Functional discontent 2	.297	.747	.123	.082	
	Functional discontent 6	.264	.630	.233	.231	
	Functional discontent 1	.090	.606	.113	.231	
Time constraints	Time constraints 4	.311	.198	.852	.184	.948
	Time constraints 5	.377	.141	.827	.195	
	Time constraints 2	.399	.121	.777	.218	
	Time constraints 1	.378	.141	.763	.194	
	Time constraints 3	.413	.181	.751	.084	
Career concern	Career concern 3	.158	.268	.124	.849	.896
	Career concern 4	.150	.258	.102	.835	
	Career concern 2	.139	.271	.277	.802	
	Career concern 1	.183	.086	.151	.759	
Eigen		4.839	3.992	3.918	3.154	
Dispersion		21.997	18.144	17.811	14.337	
Cumulative		21.997	40.141	57.952	72.289	

2.2.3. Perceived performance questionnaire

In this study, Mamassis and Doganis's questionnaire was revised and supplemented to consist of a total of 8 questions[23]. It consists of a Likert 5-point scale that gives 1 point for 'Strongly disagree' and 5 points for 'Strongly agree.' As shown in <Table 3>, the reliability coefficient (Cronbach' α) of each sub-Factor was found to be .918.

Table 4. Validity and reliability analysis of perceived performance

Factor	Question	Factor 1	Cronbach' α
Perceived performance	Perceived performance 3	.877	.918
	Perceived performance 2	.872	
	Perceived performance 1	.824	
	Perceived performance 6	.818	
	Perceived performance 8	.809	
	Perceived performance 7	.762	
	Perceived performance 5	.730	
	Perceived performance 4	.688	

Eigen	5.117	
Dispersion	63.957	
Cumulative	63.957	

2.3. Collecting data

For this study, a survey was conducted on college Taekwondo demonstration members for about 4 months. The purpose and intent of the study were fully explained to the coaches of each team, and consent was sought. This researcher and research assistant visited the training site of Taekwondo demonstration teams and conducted a survey. A survey was conducted after explaining the preparation method, purpose, and intent of the study to the participants who voluntarily participated in this study.

2.4. Data processing

The questionnaire data collected in this study were subjected to frequency analysis using SPSS 26.0 to investigate the general characteristics of the study participants. In addition, the validity and reliability of the measurement tools were verified using the Cronbach' α coefficient, an exploratory Factor analysis and internal consistency verification.

Multiple regression analysis and correlation analysis were conducted as a method to investigate the relationship between variables of self-management, exercise stress, and performance.

3. Results

3.1. Correlation analysis

<Table 5> shows the verification results through Pearson's correlation coefficient for each Factor of self-management, exercise stress, and performance. Body management, a sub-Factor of self-management, showed significant correlation with interpersonal management, mental management, and training management, and insignificant correlation with unfair behavior, time constraints, functional discontent, career concern, and performance. Interpersonal management showed significant correlation with mental management and training management, and there was no significant correlation with unfair behavior, time constraints, functional discontent, career concern, and performance. Mental management showed a significant correlation with training management, and there was no significant correlation with unfair behavior, time constraints, functional discontent, career concerns, and performance. Training management showed insignificant correlations with unfair behavior, time constraints, functional discontent, career concerns, and performance. Unfair behavior showed significant correlation with time constraints, functional discontent, and career concerns, and insignificant correlation with performance. Time constraints showed a significant correlation with functional discontent and career concerns, and showed a significant correlation with performance. Functional discontent showed a significant correlation with career concerns, and there was a significant correlation with performance. Career concerns showed an insignificant correlation with performance.

Table 5. Results of correlation analysis between variables.

Description	Body management	Interpersonal management	Mental management	Training management	Unfair behavior	Time constraints	Functional discontent	Career concern	Performance
Body management	1								

Interpersonal management	.233**	1							
Mental management	.460**	.545**	1						
Training management	.395**	.575**	.609**	1					
Unfair behavior	-.145*	-.291**	-.294**	-.444**	1				
Time constraints	-.274**	-.254**	-.306**	-.463**	.722**	1			
Functional discontent	-0.061	-0.01	-0.041	-.157*	.423**	.415**	1		
Career concern	-0.128	-0.129	-.231**	-.391**	.429**	.459**	.490**	1	
Performance	0.002	0.001	0.038	-0.03	0.073	0.015	-0.059	-0.064	1

Note: ** p<.01.

3.2. Effects of self-management of Taekwondo demonstrators on exercise stress

<Table 6> shows the results of multiple session analysis on the effect of self-management of college Taekwondo demonstration members on exercise stress.

First, as a result of multiple regression analysis on the effect of self-management of college Taekwondo demonstration members on unfair behavior, it was found that mental management had a significant effect on academic adaptation at a statistically significant level. In addition, in the regression model, the F value shows a value of p<.001 to 13.717 and R^2=186 for the regression equation, showing an explanatory power of 18.6% of the total variance. However, among the sub-Factor s of self-management, body management, interpersonal management, and training management were not statistically significant.

Second, as a result of conducting a regression analysis on the effect of self-management of college Taekwondo demonstration members on time constraints, it was found that mental management had a significant effect on academic adaptation under a statistically significant level. In the regression model, the F value shows a value of p<.001 to 15.804, and the explanatory power of 21.1% of the total variance is R^2=.211 for the regression equation. However, among the sub-Factor s of self-management, body management, interpersonal management, and training management were not statistically significant.

Third, as a result of conducting a regression analysis on the effect of self-management of college Taekwondo demonstration members on functional discontent, it was found that mental management had a significant effect on academic adaptation under a statistically significant level. In addition, the regression model shows that the F value shows a value of p<.001 to 2.055 and R^2=019 for the regression equation, showing 1.9% explanatory power of the total variance. However, among the sub-Factor s of self-management, body management, interpersonal management, and training management were not statistically significant

Fourth, as a result of regression analysis on the effect of self-management of college Taekwondo demonstration members on career concerns, interpersonal management and mental management had a significant effect on academic adaptation at a statistically significant level. In addition, the regression model shows that the F value is 11.099 at p<.001, and R^2=154 for the regression equation, showing the explanatory power of 15.3% of the total variance. However, among the sub-Factor s of self-management, body management and training management were not statistically significant.

Table 6. Effects of self management on exercise stress.

	Unfair behavior			Time constraints			Functional discontent			Career concern		
	B	Beta	t	B	Beta	t	B	Beta	t	B	Beta	t
(Constant)	.468		10.396***	.521		10.143***	.512		7.075***	.521		7.913***
Body management	.085	.046	.669	.094	-.105	-1.541	.093	-.015	-.198	.094	.044	.627
Interpersonal management	.127	-.042	-.540	.142	.022	.291	.139	.103	1.203	.142	.159	2.005*
Training management	.120	-.041	-.487	.133	-.008	-.101	.131	.060	.653	.133	-.053	-.615
Mental management	.095	-.413	-4.953***	.106	-.430	-5.227***	.104	-.247	-2.700**	.106	-.468	-5.503***
	R^2=.186, F=13.717***			R^2=.211, F=15.804***			R^2=.019, F=2.055			R^2=.154, F=11.099***		

Note: *p<.05, **p<.01, ***p<.001.

3.3. Effects of self management of college Taekwondo demonstration team on performance

<Table 7> shows the results of multiple regression analysis on the effect of Taekwondo demonstration team members' self-management on their performance.

As a result of a regression analysis on the effect of self-management of college Taekwondo demonstration members on performance, it was found that body management, interpersonal management, training management, and mental management, which are sub-Factor s of self-management, were not statistically significant. In addition, the regression model shows a value of F from p<.001 to .325 and R^2=.012 for the regression equation, showing 1.2% explanatory power of the total variance.

Table 7. Effects of self-management on performance.

	Performance		
	B	*Beta*	*t*
(Constant)	.411		8.742***
Body management	.074	-.008	-.102
Interpersonal management	.112	.001	.006
Training management	.105	.092	.975
Mental management	.083	-.083	-.889
	R^2=.012, F=.325		

Note: *p<.05, **p<.01, ***p<.001.

3.4. Effects of exercise stress on performance of college Taekwondo demonstration team members

<Table 8> shows the results of multiple regression analysis on the effect of exercise stress on performance of demonstration team members.

As a result of a regression analysis on the effect of exercise stress on performance of college Taekwondo demonstrators, unfair behavior, time constraints, functional discontent, and career concerns, which are sub-Factor s of exercise stress, were not statistically significant. In addition, in the regression model, the F value shows a value of p<.001 to 1.165, and for the regression equation, R^2=.003 shows 0.3% explanatory power of the total variance.

Table 8. Effects of exercise stress on performance.

	Performance		
	B	*Beta*	*t*
(Constant)	.209		18.130***
Unfair behavior	.078	.164	1.654
Time constraints	.070	-.035	-.347
Functional discontent	.063	-.074	-.916
Career concern	.059	-.082	-1.006
	R^2=.003, F=1.165		

Note: *p<.05, **p<.01, ***p<.001.

4. Discussion

This study is meaningful in analyzing and investigating in detail the effects of self-management of college Taekwondo demonstration team members on exercise stress and performance. For the purpose of the study, a survey was conducted on 253 student athletes of the national college Taekwondo demonstration teams, and the discussion of the research results was as follows.

First, as a result of examining the relationship between exercise stress and self-management of members of the college Taekwondo demonstration team, it was found that mental management had an effect on unfair behavior among sub-Factor s of exercise stress. For time constraints, physical and mental management have an effect. It showed that mental management had an effect on functional discontent and career concerns. This shows that mental management affects all Factor s of exercise stress among the sub-Factor s of self-management, so it is considered that the more thorough mental management is, the less exercise stress is received.

Body management is physical management such as the prevention and treatment of physical conditions and injuries of demonstration members[3]. Mental management means overcoming negative Factor s such as anxiety and raising confidence[24][25][26].

A study by Park Do-heon and Shin Jong-hoon also shows that among the Factor s of self-management, it affects exercise stress in mental management[27]. Among self-management, mental management appears to be insufficient compared to other Factor s, and Taekwondo demonstrators are also seen to be struggling with mental management. For demonstration and competition results with the best skills, a lot of effort is required to improve exercise performance to the best through continuous consultation with coaches and through the provision and utilization of mental management programs[28]. In addition, Kim Yoon-man and Kim Yoo-mi

reported that self-management affects exercise stress, providing positive support for the results of this study[24].

Second, it was found that all Factor s did not affect the effect of self-management of college Taekwondo demonstration members on performance. These results were the same as those of Yoon Jung-ho et al. that did not significantly affect body management and interpersonal management among sub-Factor s of self-management, but showed differences in training management and mental management[29].

Third, it was found that all Factor s did not affect the effect of the exercise stress of college Taekwondo demonstration members on their performance.

This can be seen as a result of the difference between the two evens, Taekwondo Poomsae and demonstration. However, in the results of this study, time constraints showed the most negative results for performance among the sub-Factor s of exercise stress. Among Taekwondo demonstrations, technical breaking training requires a lot of practice to use the most complete kicks. In addition, there is a high risk of injury during the act of kicking while falling from a high place or rotating a lot. It can be psychologically affected by anxiety in acquiring these skills within a set period of time. Therefore, it is necessary to develop a training method for the coaches' efforts and systematic demonstration team members.

5. Conclusion and Suggestion

This study is meaningful in analyzing and investigating in detail the effects of self-management of college Taekwondo demonstrators on exercise stress and performance. For the purpose of this study, a survey was conducted on 253 students of the national college Taekwondo demonstration team. Data were analyzed using SPSS 26.0 to derive research results, and the results of this study are as follows.

First, as a result of examining the relationship between exercise stress and self-management of members of the college Taekwondo demonstration team, it was found that mental management had an effect on unfair behavior among sub-Factor s of exercise stress. For time constraints, physical and mental management had an effect. It was found that mental management had an effect on functional discontent and career concern.

Second, it was found that all Factor s did not affect the effect of self-management of college Taekwondo demonstration members on performance.

Third, it was found that all Factor s did not affect the effect of the exercise stress of college Taekwondo demonstration members on their performance.

The results of this study showed that the self-management of college Taekwondo demonstration members has a great influence on exercise stress, and among them, mental management was the most important Factor for exercise stress.

However, there is a limit to generalizing the subject of this study. Therefore, follow-up studies on Poomsae, competition, demonstration athletes, or middle and high school student athletes and the national team demonstration team members should be conducted to lead to comprehensive and more informative studies.

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7. Appendix

7.1. Authors contribution

	Initial name	Contribution
Lead Author	HS	-Set of concepts ☑ -Design ☑ -Getting results ☑ -Analysis ☑ -Make a significant contribution to collection ☑ -Final approval of the paper ☑ -Corresponding ☑ -Play a decisive role in modification ☑
Corresponding Author*	YC	-Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑ -Participants in Drafting and Revising Papers ☑ -Someone who can explain all aspects of the paper ☑

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Impact of Taekwondo Athlete Leader's Leadership Type (Transformative, Servant) on Sport Attitude and Perceived Competitiveness

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Abstract

Purpose: *In this study, we analyze the influence of leadership of a leader on sports attitude and perceived competitiveness in taekwondo athletes, and provide a practical basis for changing the physical and emotional attitudes of athletes and improving their competitiveness. Attempts to provide materials.*

Method: *In 2021, the Korean Taekwondo Association was registered as a player registration, and while participating in the 51st Korean Taekwondo Association Long-term Group Opposition Taekwondo Tournament, players enrolled in high school were selected as recruitment teams and an online questionnaire was distributed. Finally, a total of 232 copies of materials were used. As for the data processing method, frequency analysis, exploratory factor analysis, reliability analysis, correlation analysis, and multiple regression analysis were performed using Excel 2016 and SPSS 21.0, and the following conclusions were drawn based on the results.*

Results: *First, among the leadership types of taekwondo competition leaders, servant leadership had a positive impact on sports attitude (physical) factors. Second, of the types of leadership of taekwondo athletes, transformative leadership has had a positive impact on sporting attitude (emotional) factors. Third, the leadership of taekwondo athletic leaders (transformative, servant) had a positive impact on the perceived competitiveness factors. Fourth, the sports attitude (physical and emotional) factors of taekwondo athletes had a positive effect on the perceived competitiveness factors.*

Conclusion: *Based on the restrictions of this research, I would like to present the direction to the next research as follows. First, since this study was conducted on athletes in the details of taekwondo, it is somewhat difficult to generalize to all taekwondo people. Therefore, in subsequent studies, it will be judged to be more diverse if the results are derived not only from the competition but also from the birds, demonstrations, and the leadership of the defeat leader. Secondly, while this study is registered as an athlete of the Korea Taekwondo Association, it is somewhat difficult to represent all athletes because the population is composed of high school athletes. Therefore, in the subsequent research, it is judged that various results will be obtained if the athletes in the field of physical education who are not registered as athletes and the athletes who retired and belong to the university or elementary school are included in the research.*

[Keywords] ***Taekwondo, Leadership, Sports Attitude, Perceived Performance, Impact***

1. Introduction

TAEKONDO is currently the national flag of the Republic of Korea and is a national sport in both name and reality with 9 million domestic unit certificates[1][2]. Taekwondo details are classified into large competitions, varieties, and test fields[3][4]. Among them, the competition is an official Olympic event that competes with the opponent for taekwondo technology and chooses to win[5][6].

As with any sport, the relationship between leaders and goodness is close, but the Taekwondo

sport is a sport that is particularly influenced by leaders[7]. In the midst of sudden changes during the Taekwondo competition, the leaders have no choice but to instruct the players according to the situation and to be closely related to their competitiveness and results in order to make full use of their tactical strategies[8]. In addition, the leaders take on the role of a helper who not only for the competition, but also presents motivation and vision so that the athletes can continuously perform taekwondo, and helps them to achieve it at the same time. The weight of leaders is increasing[9][10].

In this way, Taekwondo competition leaders have a great influence on the players in many parts and are positioned as important players and as the weight increases, the players become more. The leadership that can maximize the psychological and physical effects is further emphasized[11][12].

Leadership is the contribution of a leader to achieving the goals set by the member, and to achieve the common goals of the organization and the individual, one member within the group or organization is another. Brings accidents and behavioral changes to members. It is defined as the coming influence[13][14].

In detail, leadership types are divided into two types of transformational and servant leadership, which transformative leadership evokes the passion, vision and potential of athletes, shares ways to reach the goals of the Taekwondo team, and athletes. It can be said to be true transformative leadership when it exerts spiritual influence on us[15]. And another servant leadership is a leadership type that emphasizes the individual interests of the athletes more than the individual interests of the leader in order to train and obtain satisfactory results for the athletes[16].

Announced that leadership leadership will greatly contribute to team performance. Over the years, Taekwondo leader leadership (transformative, servant) has been a study of various weirdos[13][17][18][19][20]. Leader leadership with players It can be seen that it acts as an important factor for the competition[21][22][23].

In addition, although the influence of leadership leadership leads to positive and negative attitudes to players, announced that the type of taekwondo leadership affects training attitudes[24], announced that the type of leadership of the martial arts leader has a great influence on the training attitude, proving that leadership can change the attitude[25]. Attitude is a belief system that an individual has, and attitude acts as an important factor that is directly linked to competitiveness for athletes who compete with the reaction that they will have based on many years of experience` and evaluation of the surroundings[26]. In addition, attitudes will lead to actions rather than staying in the belief system, but) announced that the training attitudes of athletes are related to competitiveness, and investigated the close relationship between attitudes and competitiveness. In this way, attitude has long influenced various eccentrics such as behavioral intentions and competitiveness[27][28][29][30][31][32][33]. However, research is being conducted on athletes in almost all other sports, and research on attitudes and competitiveness of Taekwondo athletes who change suddenly is inadequate.

Due to the recent Corona 19 (COVID-19) virus that occurred in 2020, the current Taekwondo tournament has been canceled and is shrinking. In addition to the cancellation of the competition, the stress and anxiety of college entrance exams are being weighted, and the leadership of the instructor acts as a psychologically and physically important factor for the athletes, and the affirmation for the taekwondo created by it. Taekwondo is judged to contribute significantly to the perceived competitiveness.

Therefore, this study investigates the relationship between the leadership type (transformative / servant) of taekwondo athletic leaders on sports attitudes and recognized competitive-

ness, and is an empirical basic material for positive sports attitudes and improvement of competitiveness. It is meaningful to provide. Specific research problems to achieve such research objectives are as follows.

first. Taekwondo competition leader leadership (transformative, servant) will affect sporting attitude (physical). Second, the leadership of taekwondo athletes (transformative, servant) will influence the sporting attitude (emotional). Third, the leadership of taekwondo athletic leaders (transformative, servant) will affect perceived competitiveness. Fourth, sporting attitudes (physical and emotional) will affect perceived competitiveness.

2. Research Method

This study was selected as a high school athlete in the population while participating in the 51st Korea Taekwondo Association Long-term National Group Taekwondo Tournament held in May 2021, and was selected as a high school athlete by utilizing the convenient sampling method. After explaining the purpose of the research and obtaining consent, we distributed an online questionnaire through SNS, e-mail, and cacao talk. A total of 250 online questionnaires were distributed and 247 were collected, and 232 of the collected questionnaires were used for the final analysis, excluding the 15 questionnaires that were answered dishonestly. The general characteristics of the research subjects are as shown in <Table 1>.

Looking at gender, 145 males (62.5%) and 87 females (37.5%) have a high male ratio, and the ages are 74 (31.9%) in junior high school and 158 (68.1%) in high school. rice field. .. The areas of residence are Seoul 38 (16.4%), Gyeonggi Province 60 (25.9%), Incheon 34 (14.7%), Chungcheong Province 29 (12.5%), Jeolla Province 33 (14.2%), and Gyeongsang Province 23. (9.9%)), appeared in 15 people (6.5%) in Gangwon-do. The last exercise career was less than 1 year 11 (4.7%), less than 3 years 52 (22.4%), less than 5 years 43 (18.5%), less than 7 years 69 (29.7%), 7 years or more 57. It was people (24.6%).

Table 1. Demographic characteristics.

Division	Contents	Personnel	Frequency
Gender	Male	145	62.5
	Female	87	37.5
School	Middle	74	31.9
	High	158	68.1
Residence	Seoul	38	16.4
	Gyeonggi-do	60	25.9
	Incheon	34	14.7
	Chungcheong-do	29	12.5
	Jeolla-do	33	14.2
	Gyeongsang-do	23	9.9
	Gangwon-do	15	6.5
Athletic career	1 year	11	4.7
	3 year	52	22.4
	5 year	43	18.5
	7 year	69	29.7
	More 7 years	57	24.6
Sum		232	100

3. Research Tool

The study variables consisted of three variables: leadership type (transformative, servant), sporting attitude, and perceived competitiveness, and all questions were measured on a 7-point Likert scale.

As for the questions in the questionnaire, the leadership type is based on the study[34], and the questions used in have been corrected and used for security[35][23], and the sports attitude is The research and recognized competitiveness of[33][36][37], “Transformative” was corrected and used for security[38][39][40]. Therefore, the final questions used in this study were 4 demographic questions, 9 leadership type-related questions, 6 sports attitude questions, and 3 perceived competitiveness questions, for a total of 22 questions.

4. Verification of Validity and Reliability of Measurement Tools

An exploratory factor analysis was performed to verify the validity of the measurement tool used in this study. The analysis selected only questions with a factor loading value of. 5 or higher and examined the Cronbach`s α in-product consistency to verify reliability. It was confirmed that the constructs used in this study exceeded the standard value of. 7 presented by and all of them ensured reliability[41].

The results of the exploratory factor analysis of Taekwondo competition leader leadership factors are shown in <Table 2>. The problem of measuring leadership factors was a total of two subfactors: first, the transformative leadership factor had an eigenvalue of 4.106 and a variance of 45.620%, and second, the servant factor had an eigenvalue of 2.828 and a variance of 31.425%. In addition, the factor loading value of the measurement question loaded on the two factors exceeded .5, the cumulative variance ratio appeared at 77.045%, and the question measuring the leadership type of the taekwondo competition leader was measured relatively reasonably. You can see that.

Table 2. Exploratory factor analysis result.

Questionnaire	Transformative	Servant
Transformative 1	.905	.238
Transformative 2	.889	.168
Transformative 4	.879	.103
Transformative 3	.878	.165
Transformative 5	.871	.215
Servant 2	.044	.901
Servant 1	.090	.832
Servant 4	.325	.765
Servant 3	.250	.754
eigenvalue	4.106	2.828
Dispersion(%)	45.620	31.425
Accumulate(%)	45.620	77.045
Cronbach's α	.943	.850
KMO=.839, Bartlett's test of sphericity test:x^2 =1625.883, df=36, p=.000		

The results of the exploratory factor analysis of sports attitude factors are shown in <Table 3>. The problem of measuring sports attitude factors was a total of two subfactors: first, physical factors had an eigenvalue of 2.847 and a variance of 47.449%, and second, emotional factors had an eigenvalue of 2.532 and a variance of 42.204%. Furthermore, the cumulative variance ratio was 89.653%, indicating that the problem of measuring sports attitude factors was measured relatively reasonably.

Table 3. Results of exploratory factor analysis on sports attitudes.

Questionnaire	Physical	Emotional
Physical 2	.943	.257
Physical 3	.941	.262
Physical 1	.939	.235
Emotional 1	.300	.892
Emotional 2	.156	.882
Emotional 3	.275	.876
Eigenvalue	2.847	2.532
Dispersion(%)	47.449	42.204
Accumulate(%)	47.449	89.653
Cronbach's α	.973	.904
KMO=.792, Bartlett's test of sphericity test:x^2 =1515.250, df=15, p=.000		

The results of the exploratory factor analysis of the recognized competitiveness factors are shown in <Table 4>. The question to measure the perceived competitiveness factor was shown as a single factor with an eigenvalue of 2.783 and a variance of 92.753%, and the question to measure the recognized competitiveness factor was measured relatively reasonably.

Table 4. Results of exploratory factor analysis of recognized competitiveness.

Questionnaire	performance
Performance 2	.968
Performance 1	.961
Performance 3	.960
Eigenvalue	2.783
Dispersion(%)	92.753
Accumulate(%)	92.753
Cronbach's α	.961
KMO=.778, Bartlett's test of sphericity test:x^2 =779.491, df=3, p=.000	

5. Data Processing Method

The data collected was analyzed using the Excel 2016, SPSS 22.0 program. First, a frequency analysis was performed to confirm the demographic characteristics of the survey subjects. Next, we used Cronbach's α to verify the reliability of the measurement tool. Third, an exploratory factor analysis was performed to verify the constitutive validity of the questions used in this study. Fourth, correlation analysis and multiple regression analysis were performed to investigate the correlation between the factors.

6. Research Results

6.1. Correlation analysis

The results of correlation analysis to investigate the relationships between variables are shown in <Table 5>. The analysis showed that all the correlation coefficients between the variables were statistically significant. Correlation values for all variability showed statistically significant correlations from a minimum of .198 to a maximum of .601.

Table 5. Correlation analysis.

Variable	Transformative	Servant	Physical	Emotional	Performance
Transformative	1				
Servant	.512**	1			
Physical	.198**	.289**	1		
Emotional	.256**	.229**	.505**	1	
Performance	.363**	.321**	.601**	.511**	1

Note: **p<.01.

6.2. Impact of leadership leadership on sports attitude (physical)

A multiple regression analysis was performed to analyze the effect of taekwondo instructor leadership on sports attitude (physical). Analysis results It was shown that among the leadership types, the servant leadership type (β = .254) had a significant effect. The F-value was shown at 10.768, indicating that the model was statistically significant.

Table 6. The effect of leadership style on sports attitude (physical).

	B	SE	β	t	p
Transformative	.071	.077	.068	.920	.358
Servant	.263	.077	.254	3.438	.001

R=.294. R^2= 0.87, F= 10.768***

Note: ***p<.001, **p<.01.

6.3. Effect of leader's leadership on sports attitude (emotional)

A multiple regression analysis was performed to analyze the effect of taekwondo leader leadership on sports attitudes (emotional). Analysis results It was shown that among the leadership

types, the transformative leadership type (β = .189) has a significant effect. The F-value was shown at 9.686, indicating that the model was statistically significant.

Table 7. Effect of leader's leadership on sports attitude (emotional).

	B	SE	β	t	p
Transformative	.155	.061	.189	2.548	.011
Servant	.107	.060	.132	1.780	.076
R=.280. R^2= 0.79, F= 9.686***					

Note: *p<.05.

6.4. Effect of leader's leadership on perceived performance

Multiple regression analysis was performed to analyze the effect of Taekwondo leader leadership on perceived competitiveness. Analysis results It was found that among the leadership types, transformative leadership (β = .269) and servant leadership (β = .184) had a significant effect in that order. The F- value was shown at 21.076, indicating that this model was statistically significant.

Table 8. Effect of leader's leadership on perceived performance.

	B	SE	β	t	p
Transformative	.254	.067	.269	3.791	.000
Servant	.171	.066	.184	2.590	.010
R=.296. R^2= 1.57, F= 21.076***					

Note: ***p<.001, **p<.01, *p<.05.

6.5. Effects of sports attitudes on perceived performance

Multiple regression analysis was performed to analyze the effect of taekwondo athletes' sporting attitudes on perceived competitiveness. Analysis results It was found that among the leadership types, physical attitude (β = .460) and emotional leadership (β = .278) had a significant effect in that order. The F- value was shown at 81.756, indicating that this model was statistically significant.

Table 9. Effects of sports attitudes on perceived performance.

	B	SE	β	t	p
Physical	.414	.053	.460	7.853	.000
Emotional	.321	.068	.278	4.749	.000
R=.647. R^2= .419, F= 81.756***					

Note: ***p<.001.

7. Argument

This study investigates the relationship between the leadership of taekwondo athletes (transformative, servant) and the perceived competitiveness of sporting attitude (physical, emotional), and attempts to discuss the following through the results.

First, among the leadership (transformative, servant) types of taekwondo competition leaders, it was found that servant leadership focused on sports attitude (physical). These results support the results of a study that announced that servant leadership had a positive impact on attitudes[42][43][44][45].

Of the leadership types, Servant Leadership solves psychological problems such as worries and problem-solving measures that players have rather than the personal interests of the leader, and imposes weight as a leader.

Instead, it is judged that the players' sense of burden was reduced in order to get closer to each other, and that the stable mind was influenced by the systematic physical attitude. Recognizing this point, middle and high school competition leaders across the country can hear from athletes as service and reduce the burden they are currently perceiving through ethical factors such as mutual respect and justice. It is judged that the sports (physical) attitudes perceived by athletes will rise naturally if the factors that can be taken are understood and servant leadership is exercised appropriately.

Second, among the leadership (transformative, servant) types of taekwondo competition leaders, transformative leadership was found to be significant for sporting attitudes (emotional).

These results show that the transformative leadership of cycle leaders has a positive impact on player attitudes, the study and the transformative leadership of sports center leaders contribute significantly to job attitudes[46]. They support the results of this study in agreement with[47].

Transformative leadership is leadership to change the existing attitudes and behaviors of athletes[48], pursuing innovation and change, presenting new visions and motivating them. Is defined as. Thus, transformative leadership, unlike servant leadership, means leadership that makes players aware of their beliefs, the importance and value of their goals, and their ability to reach further developments in competitiveness and outcomes.

High school team competition leaders and officials from all over the country recognize the importance of the results of this study, present a sense of mission and vision to the athletes, and respect and value the athletes so that they can trust the leaders more.

It is judged that the view must be planted. Finally, if the athletes are constantly praised and encouraged for their efforts, it is determined that the leadership of the leader will greatly increase the sporting attitude (emotional) that the athletes perceive.

Third, it was found that among the leadership types of taekwondo competition leaders, there was a significant effect on the competitiveness recognized in the order of transformative leadership and servant leadership. These results show that the leadership of golf leaders contributes significantly to competitiveness. And Taekwondo players' competitiveness and leadership of leaders are very close[49][50]. This is consistent with the research conducted by[51], which clarified the relationship, and supports the results of this research.

The leadership of all sports leaders, not just taekwondo, is positioned as a part of the players' daily activities and attitudes, as well as the direct connection from the tournament to competitiveness, so the importance of leader leadership is always emphasized. Has been done. Therefore, the gyorugi leaders of each team across the country recognize that their leadership greatly affects the performance of players, and rather than overuse, they exercise leadership after identifying individual tendencies and characteristics in advance so that players can show better performance through leadership. it is judged that it should be.

The results of this study show that all leadership types have a significant impact on perceived competitiveness, but a closer look at the results shows that transformative leadership is better

than servant leadership. You can see that the significance probability is low. These results also show that transformative leadership is more effective than servant leadership in enhancing the competitiveness recognized by athletes. Therefore, in order to improve the competitiveness of the athletes, it is judged that the competitiveness recognized to increase the competition goals and beliefs that the athletes can aim for and the cohesiveness of the team will be greatly increased.

Fourth, it was found that the sports attitude of the players had a positive effect on the perceived performance. The results of this study are consistent with the study that the positive attitude of sports players affects perceived performance, supporting the results of this study[52][53]. Therefore, Gyorugi leaders in each region of the country should be more particular about their leadership so that athletes can form positive sports attitudes. As mentioned earlier, sports attitude is a belief system that individuals have accumulated through long-term experience.

8. Results and Suggestions

In this study, we analyze the influence of leadership of a leader on sports attitude and perceived competitiveness in taekwondo athletes, and provide a practical basis for changing the physical and emotional attitudes of athletes and improving their competitiveness. Attempts to provide materials. In 2021, the Korean Taekwondo Association was registered as player registration, and while participating in the 51st Korean Taekwondo Association Long-term Group Opposition Taekwondo Tournament, players enrolled in high school were selected as recruitment teams and an online questionnaire was distributed.

Finally, a total of 232 copies of materials were used. As for the data processing method, frequency analysis, exploratory factor analysis, reliability analysis, correlation analysis, and multiple regression analysis were performed using Excel 2016 and SPSS 21.0, and the following conclusions were drawn based on the results.

First, among the leadership styles of Taekwondo Gyorugi leaders, servant leadership had a positive effect on sports attitude (physical) factors. Second, among the leadership styles of Taekwondo Gyorugi leaders, transformational leadership had a positive effect on sports attitude (emotional) factors. Third, the leadership (transformative, servant) of the Taekwondo Gyorugi leader had a positive effect on the perceived performance factors. Fourth, sports attitude (physical, emotional) factors of Taekwondo players had a positive effect on perceived performance factors.

Based on the restrictions of this research, I would like to present the direction to the next research as follows.

First, since this study was conducted on athletes in the details of taekwondo, it is somewhat difficult to generalize to all taekwondo people. Therefore, in subsequent studies, it will be judged to be more diverse if the results are derived not only from the competition but also from the birds, demonstrations, and the leadership of the defeat leader.

Secondly, while this study is registered as an athlete of the Korea Taekwondo Association, it is somewhat difficult to represent all athletes because the population is composed of high school athletes. Therefore, in the subsequent research, it is judged that various results will be obtained if the athletes in the field of physical education who are not registered as athletes and the athletes who retired and belong to the university or elementary school are included in the research.

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10. Appendix

10.1. Authors contribution

	Initial name	Contribution
Lead Author	BH	-Set of concepts ☑ -Design ☑ -Getting results ☑ -Analysis ☑
Corresponding Author*	KC	-Make a significant contribution to collection ☑ -Final approval of the paper ☑ -Corresponding ☑ -Play a decisive role in modification ☑
Co-Author	HY	-Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑ -Participants in Drafting and Revising Papers ☑ -Someone who can explain all aspects of the paper ☑

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Sports Scientific Approach for Martial Arts Development

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Abstract

Purpose: *Martial arts can be related to the scientificization of the sporting process in the case of the body and the scientificization of the mind in the case of the mind, considering the two major flows of training the body and mind.*

Method: *Scientificization related to physical training can promote future-oriented sports science with activation of convergence based on existing sports science, and cultivation of the mind can suggest scientificization to pursue new areas of philosophical thinking and the spiritual world. Therefore, based on the holistic training for the training of body and mind, it is made up of an academic approach for comprehensive scientificization. In the course of attempts for academic development and social contribution, various fields of science are promoting field-oriented basic guidelines, systematic review, high-level technology and qualitative evaluation, along with efforts to find evidence-based principles.*

Results: *Martial arts activities are carried out in the form of sports activities, promoting optimization and maximization of physical fitness and technical factors, and are based on related physiology, nutrition, epidemiology, psychology, sociology, motor control and learning. In addition, the academic approach of sports science, including the physical conditioning and training theory of athletes, and industrial and environmental engineering related to efficient facilities, equipment, implement, and environment, will be the main content.*

Conclusion: *The scientific approach for the future-oriented activation of martial arts requires the establishment of an intensive scientific support system for concrete scientificization in terms of the practical value and utilization of martial arts activities based on the establishment of academic identity. In addition, for the science of martial arts, it is necessary to promote advanced convergence science, globalization centered on trends and popularity in Korea, systematic nurturing of research personnel related to martial arts sports, establishment of a cluster of martial arts sports-related infrastructure, and popularization and industrialization of martial arts sports.*

[Keywords] ***Martial Arts, Scientific Development, Academic Development, Body, Mind***

1. Introduction

The dictionary meaning of martial arts is 'a systematic training method for training the mind and body'. Of course, it is closer to us as it has been transformed into a fighting sport by emphasizing the competitive part, but it can emphasize the importance of the fundamental meaning and value that puts greater weight on the discipline of the body and mind. The reason why martial arts are emphasized as a physical training or sport is because the original form can be found in the mixed martial arts of the ancient Greek 'Pankration' and the ancient Korean 'Subagdo'. Meanwhile, as religious and philosophical ideas are included, the importance of spiritual discipline is emphasized together.

According to the historical evidence of Korean martial arts, the martial arts of the Three Kingdoms period is mainly described as a training event for the warriors, and in the Chosun Dynasty period, it is described as a martial art form as a sport. In addition, even in those days, it is possible to find a part related to the spiritual cultivation of martial arts while being linked to the religious part. Taekwondo, which plays a key role in modern martial arts, has been called by various names such as 'Taekkyeon', 'Subag', 'Taekseom', and 'Takgyeon' since ancient times. It has been widely practiced as the basis of martial arts training.

After the liberation, it was systematically established and unified under the name 'Taekwondo' in 1954. The Korea Taekwondo Association was founded in 1961, an official sport from the 44th Jeonju National Sports Festival in 1963, and designated as the national flag of Korea in 1971. It is developing into a global sport, including the adoption of an Olympic sport.

Martial arts have been regarded as an attack and defense technique for the survival of the state and individuals in its historical background, as well as a technique for cultivating the mind and body[1][2][3]. It can be seen that the development of martial arts in modern society has been led by the process of competition through sports shoes such as karate, taekwondo, muay thai, and wushu. The main content related to the science of martial arts can flow into fragmentary parts related to martial arts as a game while being related to sports science. Therefore, for the science of martial arts, establishing the identity of martial arts must be preceded as an important part.

In the case of Taekwondo, in relation to the essential purpose of martial arts training, it is regarded as realizing humanity through self-reflection through poomsae, practice of sparring with etiquette, and defeat through concrete experiences of the interrelationship between skill and spirit. The importance has been emphasized[4]. However, it is almost impossible to dare to discuss the identity of martial arts in this paper.

Although it is fragmentary in relation to the identity of martial arts, considering the two major flows of training the body and mind, the body is progressed through scientificization focusing on the phenomena that appeared in the process of sports shoes, and the scientificization of the mind is related to mental cultivation can be described.

Based on the existing sports science, training of the body can promote future-oriented sports science with activation of convergence, and cultivation of the mind can suggest philosophical thinking and scientificization to pursue new areas of the spiritual world.

2. Basic Approach to Scientific Martial Arts

If you look at martial arts from an academic point of view, it has the characteristics of not allowing only a fragmentary approach while having organic relevance to the form of comprehensive studies built on various academic foundations. Of course, these arguments are also remarkably insufficient to be regarded as arguments based on objective arguments. Shim Seung-goo (2007)[5] asserts that 'more and more people are learning traditional martial arts for mind and body training, but academic systematization is still far away, and ‘Korean Martial Arts Collection’ is very important as the first work to compile traditional martial arts materials' did. The definition of martial arts is being tried from various perspectives, and if we look at the main contents, it has goals such as fighting skills, spiritual experience of religious mystery through spiritual aspects, and development of moral character including personality[6]. In addition, it can be seen as a training process[7][8], which has the main characteristics of morality of struggle and restoration of humanity by physical fitness and technology, and a method of training the mind-control through body self-discipline can be defined as[9][10].

Intensively, martial arts can be regarded as a holistic training for the body and mind, and it consists of the flow of human history based on comprehensive science. Therefore, the scientificization of martial arts can be largely accomplished through an academic approach to the two factors of body and mind. The science of martial arts should be considered in terms of human-centered characteristics, and should be approached within the scope so that the essence of martial arts is not distorted. Regarding the importance of the development of martial arts, Ahn Jung-deok and Song Kang-young (2008)[1] argued that Taekwondo is the most globalized cultural heritage of Korea with a clear identity as a traditional martial art, and that a new paradigm should be established to build the identity as a global martial arts sport. Here, we can suggest three important directions for the development of martial arts: identity establishment, globalization promotion, and construction of a new paradigm. Martial arts require a comprehensive analysis rather than a simple interpretation, including complex and diverse structures and functions based on physical activity, and requires subdivision and fusion of disciplines. In addition, generalization and popularization cannot be overlooked as the basic properties of martial arts science, but continuous challenges for innovation and change are required because science requires a challenge to uncertainty. The essential properties of martial arts have limitations and difficulties in scientific and systematic approaches, but as the most important approach to overcome them, the subdivision and systematization of theoretical and academic grounds is necessary to prove the essential mechanism of martial arts performance for its effects and values. Topics include improvement of physical characteristics centered on the body, which constitutes the core system of martial arts, strengthening the functions of martial arts factors, disease prevention and treatment for health improvement, and positive change in the mental world through mental training[11][12].

In the course of most recent attempts for academic development and social contribution, various fields of science are promoting field-oriented basic guidelines, systematic review, high-level technology and qualitative evaluation, as well as efforts to find evidence-based principles. In order to develop the importance of the role and value of sports science, which has recently been expanded in its scope, an active approach that can present detailed academic grounds and mechanisms is required[13]. In addition to the attempts to systematize and diversify the evidence-based science of human health promotion and physical training, which martial arts pursue, questions and answers related to changes in body and mind are collected in the process of martial arts activities. In addition to the analysis and evaluation of the validity and applicability of the evidence, it should proceed as a process of grafting changes in actual martial arts activities[13].

The importance of effort to present the academic basis of martial arts can also be found in the column of Lee Seung-heon (2017)[14], who pioneered brain science research while inventing the 'Five Laws of the Brain Operating System'. He said ‘I started doing it, and I especially concentrated on martial arts such as Taekwondo and Hapkido. The first effort to control various thoughts and emotions that occur in the brain and live as the master of the brain started with training to focus on the body and train the body.’ 'Sports science' refers to all research related to physical education, and when the term 'science' is used in the sense of a rational method, it can include all modern scientific research methods regardless of divisions in the humanities, society, and nature[15]. Therefore, all these fields can be considered holistically in the process of trying to make martial arts scientific. Jeon Hyunjoo (2017)[15] secured the status of its existence by pursuing a form developed on the identity of physical education in relation to the concept of sports science, and, like all studies, the reality of a unique and specific domain through rationality. She said that it can exist as a science only by securing realism. There is a need to receive support from active academic research activities centered on martial arts in the process of attempting to scientifically develop martial arts. The content of the course available to martial arts can be achieved through scientificization and specialization in the same context as sports science.

The most basic attempt in the scientific approach for the development of martial arts requires constant academic research. What is particularly emphasized in this process is the establishment of the identity of the martial arts, the study of the history and philosophy of the martial arts, the cross-cultural study of the country, and the study of the demands and changes of society. In addition, integrated research on martial arts movements, techniques, inner training center, educational functions, health martial arts, artistry, and modern science should be continued [16]. As described above, the scientific approach of martial arts must be premised on an attempt to establish an academic identity, and must develop the characteristics of a comprehensive science integrated with the adjacent disciplines along with the humanities, social sciences, and natural sciences)[16].

The basic direction for the approach for scientificization of martial arts is the process of making changes and development of martial arts from a systematic, empirical, future-oriented point of view. What is emphasized in this process is the need to clarify identity and roots based on an ideological basis. The most common approach of scientificization to establish identity is to deeply explore and consider the historical and philosophical foundations, and a procedure to clearly confirm historicity and identity will be required. A good example of an attempt to analyze historicity is a method of systematically organizing contributions to the development and change of related fields based on the research results of major scholars, or a qualitative study[17]. In particular, this attempt will help to secure the historicity by examining how the detailed major field of sports science has contributed to the development of practical martial arts. In order to establish a rational methodological foundation for the scientificization of martial arts, the process of development and verification of analysis methods such as body shape, motion, and technology performed in martial arts activities through measurement, evaluation and analysis will be required, and now it is also required a big data analysis technique)[15].

Accurate analysis for the improvement of technical factors of martial arts activities, analysis and correction of causes of motion errors, attempts of biomechanical analysis including presentation of excellent models, application of feedback by biomarkers for skill mastery, and efficient technique learning methods The use of learning theories is included. The biomechanical approach is recently converging with bioengineering, and the role of new products related to martial arts sports in the design, injury prevention and rehabilitation process is growing.

The biomechanical approach plays an important role in the process of analyzing the motion of most martial arts activities, the mechanism of body damage, the development of new equipment, and the application of wearable techniques and convergence fields such as virtual reality. In particular, detailed analysis of the physical movements that are the basis of martial arts activities became possible. For example, using a high-speed camera, a three-dimensional motion capture system, a ground reaction force, and an electromyography, the force exerted by the muscles, the angle and speed of the joint, the quantitative and qualitative comparison of motion performance, and the inefficiency of the motion can be analyzed. In addition, analysis of fast motions that cannot be seen with the naked eye and three-dimensional motions can be analyzed. Based on this, development of new technology, correction of motion, and analysis of overall motion were made possible. Martial arts activities have a high possibility of injury in the course of performing them, so scientific analysis in this field is required, and the importance of various experts is emphasized.

Recently, the problems raised by the electronic protect tools of Taekwondo are representative examples that suggest the need for biomechanical research. The psychological approach, considering the importance of values related to the mental training effect of martial arts activities, is based on accurate analysis of personality, anxiety level, concentration, self-confidence, attitude, cognitive function, etc. In addition, psychological training and counseling

were promoted to achieve psychological stability and to overcome stress[18]. Looking at practical examples of scientific approaches to increase the value related to the effectiveness of martial arts activities, the first example is Attention Deficit Hyperactivity Disorder (ADHD), which is recently considered as one of the serious diseases of the youth, and its prevalence is significantly increasing. Martial arts activities can suggest their value as an alternative to drug treatment and psychotherapy, but the relevant evidence is still insufficient.

In addition, the value of martial arts activities can be presented in the process of developing programs for preventing muscle and nervous system damage or diseases or for rehabilitation.

3. Advanced Fusion, Promotion of Complex Scientificization

Based on the development of a muscular nervous system training protocol using martial arts activities and big data collection through wearable sensors, detailed factor analysis of martial arts activities on the muscular nervous system will be possible. In order to make such an attempt possible, it suggests the importance of a scientific approach to martial arts activities, and at the same time, it can increase the possibility of realization through active convergence with various surrounding disciplines centered on sports science.

Figure 1. Martial arts and various academic fusions.

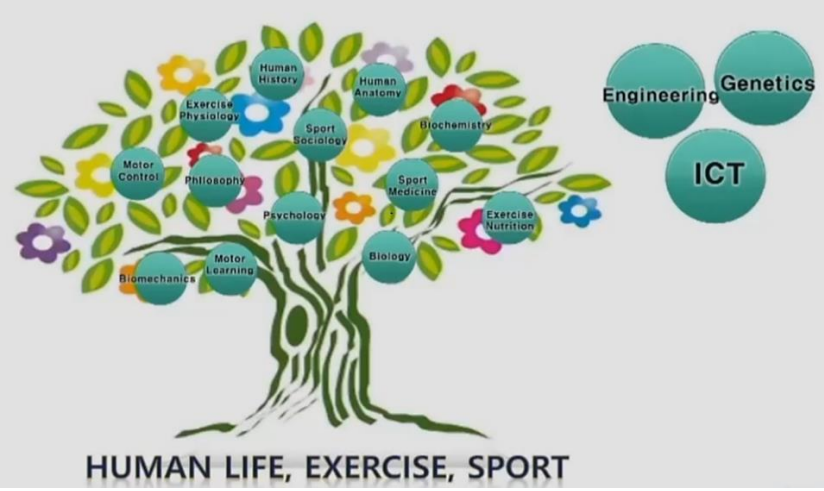
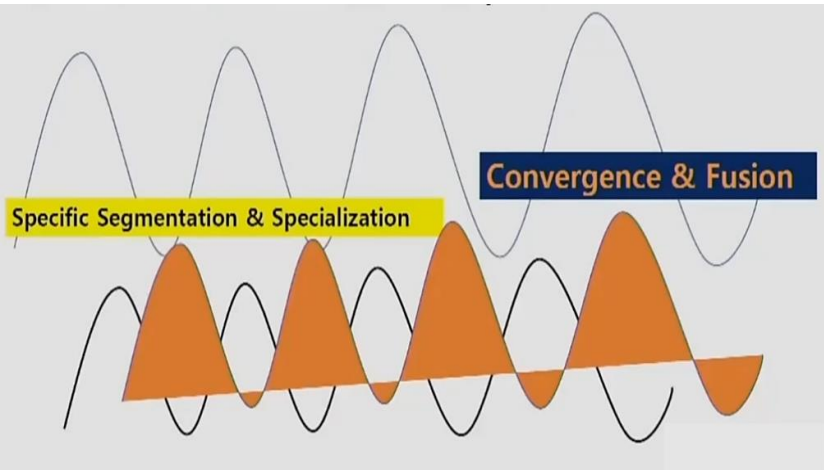


Figure 2. Periodic wave of academic development.



For the science of martial arts, it is necessary to promote advanced convergence science, globalization centered on trends and popularity in Korea, systematic nurturing of research personnel related to martial arts sports, establishment of a cluster of martial arts sports-related infrastructure, and popularization and industrialization of martial arts sports. ICT convergence and complex scientificization comprehensively promote cutting-edge science centered on martial arts and a new health industry. In addition to the overall nurturing of martial arts sports-related professionals, globalization of martial arts sports, the fusion of sports industry and culture, and infrastructure for martial arts sports, global talent discovery and scientific talent training, expansion of the base of martial arts sports, and promotion of projects to revitalize and popularize martial arts clubs. Innovative tasks for the science of martial arts sports include sports science that approaches policy and system, convergence of cultural industries, realization of a healthy life through sports activation, ICT innovation capability and use of IT and software, and affinity for the increasing aging population, building a global sports network, and strengthening the competitiveness of the tourism industry. Based on the recent convergence of sports with culture, construction, technology, service, and media, etc., using the part that broadens the spectrum as a domestic core nurturing science and technology, through the convergence of sports with industrialization technology and marketing know-how, the need to foster global competitiveness is emphasized. In particular, as the main flow of the 4th industrial revolution, the activation of convergence with new fields that are inducing innovation in society as a whole should be included as an essential task in the scientific approach of martial arts.

In order to increase the value of overall health promotion as well as the positive value of mental health promotion, martial arts activities must be organized and diversified based on academic evidence, as well as questions and answers from the field are collected and the validity of the collected evidence. It is necessary to promote scientificization to increase the possibility of use and utilization[13]. The science of martial arts activities for health promotion requires active use of big data[19] and artificial intelligence, which have been predicted for a long time with the advent of the 4th industrial revolution. Of course, there will be conflicts with claims that emphasize the importance of human-centeredness. As the robot industry, the internet of things, virtual reality, genetics, and big data are used, and machine learning and deep learning are combined with the science of martial arts, their role will be further expanded, and a new form of science for health promotion is required)[13].

4. Promotion of Globalization of Martial Arts Activities

Efforts for global information, which are important parts for the development of martial arts, should be further emphasized. As in other fields, the importance of globalization has been emphasized for a long time in the martial arts field. In this regard, the establishment of a global system with the core of international advancement and exchange of excellent human resources is emphasized. Efforts to perform the international hub function of martial arts sports should be actively promoted. Promotion of MOUs and joint projects with world-class research institutes in related fields centered on martial arts sports, exchange of researchers, and holding joint symposiums should also be actively promoted. Organization and human resources for discovering outstanding talents, training and training for professional leaders, research in related fields, and promoting international projects, and build an international cooperation system through a global network. The important tasks to be dealt with for the promotion of international research are the grounds for receiving national support and support from various sponsors, a plan to raise financial resources for continuous and developmental operation, and the preparation of a more efficient and practical organizational structure and operation plan.

5. Nurturing Research Manpower for the Science of Martial Arts and Establishment of Related Infrastructure

One example is the training of professional research personnel for the science of martial arts. In particular, it is necessary to develop various educational programs to develop the qualifications of leaders and to improve their coaching ability, and qualification test and re-education programs that can directly improve the practical skills of leaders will be needed. Based on this, training abroad to produce excellent leaders, qualitatively and quantitatively developed education is required through the recruitment of excellent overseas coaching programs and leaders. In particular, training professional leaders through systematic programs including dream leaders is an important task for the science of martial arts. In the process of nurturing professionals, international exchanges should be paralleled, and domestic leaders should be dispatched overseas together with the invitation of excellent foreign leaders. Considering the revitalization of the 4th industry, attention should be paid to nurturing relevant professional manpower in order to promote science for ICT convergence, which has emerged as a new field. A new infrastructure for the scientific development of the martial arts field is required. In relation to the institutional or systemic infrastructure, a future-oriented linkage system must be established together with a specialized institution or a new system that can exclusively promote and promote martial arts. In addition to the hardware approach centered on infrastructure, development of new martial arts programs and educational programs for various martial arts instruction, changes in the environment and culture related to martial arts, and development of university education programs for nurturing new talents to promote martial arts science development, etc. In particular, this is required for the software change that promotes the science of martial arts, segmentation, systematization, and diversification centered on the academic evidence that is the basis for it should be promoted. It is difficult to manage and nurture talents related to martial arts sports due to the lack of a professional scientific research support system for martial arts sports. There is a need to establish a system for scientifically and systematically attracting, managing, and nurturing competitive martial arts-related talents scattered in each region. It is said that mid- to long-term measures should be prepared for this, and a more systematic and scientific human resource nurturing system is urgently needed, and a more active science support system is required.

6. Popularization and Industrialization of Martial Arts Sports

Based on the increased awareness of the importance of public health after Corona 19 pandemic, it will be possible to create a new opportunity for revitalizing martial arts sports while emphasizing the mental and physical training effect of martial arts sports.

The policy direction for popularization of martial arts sports can include the development of sports clubs, the systematic training of leaders, and the recommendation of martial arts sports activities in the family unit. Considering the seriousness of the recent health status of adolescents, it is necessary to suggest new values and roles for the physical and mental cultivation of martial artists and to foster them as a martial arts education program. Considering the reality that the normalization of school sports for young people is highly emphasized, from a policy point of view, it can be suggested to actively utilize martial arts sports to revive school sports. Active use of martial arts sports for revitalization of school physical education is the most effective for strengthening the physical fitness of children and adolescents in the growing age. In order to improve youth health and strengthen physical fitness[20][21][22][23][24], where the important value of martial arts sports activities is presented, the introduction of a youth physical fitness certification system to promote youth physical activity opportunities and induce physical fitness improvement, to promote the vitalization of club activities for each school[25][26][27].

In order to systematically foster club sports through martial arts sports, it is necessary to promote the systematic development of life sports such as the linkage between adult club sports and school club sports, various martial arts sports classes, and martial arts sports classes for club members. Strategic nurturing of martial arts sports clubs should be promoted, and popularization programs such as sports classes, camps with athletes and friends, and commercialized clinic programs for health improvement through the prevention and treatment of specific diseases should be developed.

Considering the basic development model of popularization, it is expected that it will greatly contribute to the improvement of public health through the popularization of martial arts if appropriate clustering is established by regionalization by district or region. By inducing a close relationship between martial arts sports and the event business and tourism industry, it can help revitalize the economy through the brand value of martial arts sports. We will promote the construction of a comprehensive leisure culture town where culture, art and leisure coexist, centering on martial arts and sports-related shopping malls. In addition, the establishment of an information network considering the big data of martial arts sports, establishment of a certification system for martial arts sports equipment, and promotion of linking and convergence between martial arts sports and local tourism will be promoted.

7. Conclusion

Since the physical activity of martial arts is the basis, it is expected that the literal translation will be further expanded when considering the two characteristics for training the body and mind, including very complex and diverse structures and functions. In addition, scientificization based on comprehensive analysis rather than simple interpretation is required, and the subdivision and convergence of independent disciplines coexist or repeat periodically. The scientificization of martial arts can be largely accomplished through an academic approach to the two factors of body and mind[28][29][30].

Considering martial arts as a form of sport and applying an academic approach related to human body structure and function analysis, parts related to the optimization of the structure and function of human beings who are the subject of martial arts activities will be included. Martial arts activities consist of a process of optimizing and maximizing physical and technical factors. Therefore, the academic approach of a wide range of sports science such as conditioning and training theory based on physiology, nutrition, epidemiology, psychology, sociology, motor control and learning, and industrial and environmental engineering related to the creation of efficient training conditions is the main contents. The scientific approach for the future-oriented activation of martial arts is basically a physiological approach centered on the body based on the establishment of academic identity, a kinematic approach to human movement based on a mechanistic worldview, and a psychological approach for an analysis of the value and importance of the spiritual realm, etc.

In order to analyze and develop martial arts activities based on an academic approach, an attempt to make more specific science is required in terms of the practical value and utilization of martial arts activities. Future-oriented promotion of science support projects for specialized martial arts sports, including the establishment of an intensive science support system in the long term, is urgently needed. In particular, for the science of martial arts, it is necessary to promote advanced convergence science, globalization centered on trends and popularity in Korea, systematic nurturing of research personnel related to martial arts sports, establishment of a cluster of martial arts sports-related infrastructure, and popularization and industrialization of martial arts sports.

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9. Appendix

9.1. Authors contribution

	Initial name	Contribution
Lead Author	JP	-Set of concepts ☑ -Design ☑ -Getting results ☑ -Analysis ☑
Corresponding Author*	KK	-Make a significant contribution to collection ☑ -Final approval of the paper ☑ -Corresponding ☑ -Play a decisive role in modification ☑
Co-Author	JK	-Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑ -Participants in Drafting and Revising Papers ☑ -Someone who can explain all aspects of the paper ☑

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The Effect of the Leader's View of Education Perceived by Taekwondo Practitioners on the Emotional Reaction and Educational Impact

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Abstract

Purpose: *The purpose of this study is to examine and understand the influence of the Taekwondo leaders' view of education on the emotional reaction and educational impact of the practitioners, and provide the basic data for developing an educational program for the practical education of Taekwondo and the efficient management of Taekwondo.*

Method: *In this study, 230 Taekwondo studio practitioners were surveyed in 2021 and the convenience sampling was used for the sampling method, while the survey was conducted by using the Self-Administration Method. Among the collected questionnaires, 218 questionnaires were used as the valid samples, excluding the data with insincere responses or omission of some of the details of the survey. The measurement tool is a questionnaire, and the data processing is the SPSS 23.0 Program, a statistical package program, and the frequency analysis, reliability verification, factor analysis, correlation analysis, and the multiple regression were used.*

Results: *In this study, as a result of the factor analysis and reliability verification performed, view of education was classified into liberal factors (α=.947) and conservative factors (.856), and emotional reaction was classified into positive factors (α=.943) and negative factors (α=.892), while educational impact was classified into physical factors (α=.953) and emotional factors (α=.968). Furthermore, the effect of view of education on the emotional reaction and educational impact is such that view of education (liberal factor and conservative factor) influences the emotional reaction (positive factor and negative factor), and the view of education (liberal factor and conservative factor) influences the educational impact (physical factor and emotional factor), while the emotional reaction (positive factors, negative factors) influences the educational impact (physical factor and emotional factor).*

Conclusion: *The conclusion obtained from undergoing the research process is that the Taekwondo leader's view of education influences the emotional reaction and educational impact of practitioners, and the Taekwondo leaders would need to have the correct view of education and the view of education reflective of the current trend and the needs and desires of practitioners, and based on which, they ought to strive not only to increase the positive emotions and decrease the negative emotions, but also improve the physical and emotional health of the practitioners.*

[Keywords] ***Taekwondo, Practitioners, Leader's View of Education, Emotional Reaction, Educational Impact***

1. Introduction

Taekwondo, where education is conducted with a focus on the Taekwondo studio, influences the practitioners' physical health and lifestyle, mental health including stress relief, and social development such as cooperation and justice, and is also recognized worldwide as Korea's representative cultural product[1][2][3][4][5].

As known through numerous previous studies and experts, the sports participants are significantly influenced by their leaders, and the sports leaders suggest future directions and visions for them to achieve the goals of a team or individual participants, and endeavor to provide guidance and help them realize their vision[6]. That is, it means that the sports participants can not only achieve the effect of the exercise because of the leaders, but are also influenced by continuous participation, etc. Since the leaders who perform various roles can directly influence the performance and results of participants, they are drawing attention[7].

Taekwondo education as such is also conducted by the leaders as with other martial arts and sports events. The Taekwondo leaders provide Taekwondo skills and the functional qualities of having Taekwondo coaching experience, and for them, it is very necessary to have managerial qualities to this end, as well as critical qualities to determine and act right and wrong, and also decide on the meaning and value of Taekwondo, further to their character requirement[8][9][10]. In the case of Taekwondo leader, it may be said that the importance and significance of Taekwondo leader are increased such that they play a role in guiding the character and personality of the practitioners beyond simply instructing the skills of a specific sport called Taekwondo[11].

In particular, the view of education among the qualities of leader may be said to be a value system or belief system related to education, and the judgment of the actor is always involved across all conscious actions of human beings including education, and it is the value or belief system which provides for the basis of such judgment. In particular, the sports leader's view of education makes the participant trust the leader, practice the skills he or she guides all the more, and accept the trusted leader's tactics even under actual sports situations[12]. Such trust in the leader increases the quality of the relationship between the leader and the participants, and the importance of trust in the leader for the participants is a means of causing and achieving their performance by believing and following the leader's view of education and the leadership for each participant[13].

Hence, this study seeks to provide the basic data for the effective management of Taekwondo studio and the development of educational programs for the practical education of Taekwondo studio by examining and understanding the influence of Taekwondo leaders' view of education on the emotional reaction and educational impact of practitioners.

2. Research Method

2.1. Subjects and sampling technique

In this study, 230 Taekwondo studio practitioners were surveyed in 2021, and convenience sampling was used as the sampling method, and the survey was conducted by using the Self-Administration Method. Among the collected questionnaires, 218 questionnaires were used as valid samples, excluding the data with insincere responses or omission of some of the details of the survey.

2.2. Measuring instrument

The measurement tool used for this study was questionnaire, and the view of education factor was the questionnaire used for the studies of Kyungsook Kim and Jiseon Hahm (2001), Myeonghwan Hahm and Bangsoo Kang (2018), and Youngho Park (2015)[14][15][16], and especially in the study of Youngho Park (2015), the Cronbach's α coefficient turned out to be .901 for the liberal view of education and .838 for the conservative view of education[16]. As for the emotional reaction factors, the questionnaires used for the study of LeMinjeong Lee (2020), Jeonghak Lee, Yoongyeong Hwang, Seungjae Yim (2021), Inseon Hwang and Sangil Lee (2021), and Kookhwa Kim (2021) were used[17][18][19][20], and in particular, in the study of Kookhwa

Kim (2021), the Cronbach's α coefficient turned out to be .944 for the positive response and .880 for the negative response. As for the educational impact factors, the questionnaire used for the studies of Younghwan Seo, Insook Ha, Changmo Kim, Seonha Jo, Gong Kim (2013), and Gyujin Kim (2020) was used[21][22], and in particular, in the study of Gyujin Kim (2020), the Cronbach's α coefficient turned out to be .972 for physically and .918 for emotionally[22].

2.3. Analysis of data

The data processing for this study was conducted with the SPSS 23.0 Program, a statistical package program, and the statistical validation was performed according to the purpose of data analysis as follows.

First, the frequency analysis was performed to examine and understand the general characteristics by using the SPSS/PC+23.0 program.

Second, to validate the reliability of the questionnaire, the Cronbach's α coefficient was calculated.

Third, factor analysis was performed to classify the factors of view of education, emotional reaction, and educational impact.

Fourth, the correlation analysis was performed to examine and understand the conventions between the variables.

Fifth, the multiple regression analysis was performed to examine and understand the effect of view of education on the emotional reaction and educational effect.

3. Results

3.1. Validity and reliability of the questionnaire

In this study, the factor analysis was performed to increase the content validity and verify the construct validity. Among the factor analysis techniques, principal component analysis (PCA) was used to highlight the mutual independence between the factors. As for the factor rotation, the Varimax method, which is an orthogonal rotation, was used. As for the factor extraction, only the factors with an eigenvalue of 1.0 or higher were selected, and the factor loading indicative of the extent of correlation between the variables and factors was limited to only questions of 0.5 or higher. Reliability was calculated by item analysis for each variable and the Cronbach's α coefficient, which provides the reliability of all variables for a single concept.

Table 1. Factor analysis and reliability of the view of education.

Questions	Liberal	Conservative
Q. Must have knowledge while participating in social reality on one's own.	.786	.028
Q. Must be interested in building a society of justice.	.721	.026
Q. Must foster an independent human being.	.698	.157
Q. Must learn on one's own.	.652	.093
Q. The leader centric class is not helpful for the practitioners' voluntary practicing attitude.	.619	.096
Q. Traditional norms must be educated.	.076	.865
Q. Must teach traditional knowledge.	.091	.745

Q. Tend to control the freedom of practitioners too much.	.082	.667
Q. The contents instilling the spirit of our people must be emphasized.	.050	.614
Q. Must be led by leaders.	.247	.595
Eigen value	5.869	5.431
Pct of var	29.026	25.552
Cum pct	29.026	54.578
Cronbach's α	.947	.856

In <Table 1>, as a result of the factor analysis performed on the view of education, it was classified into liberal factors and conservative factors. The eigenvalue of the liberal factor turned out to be 5.869 and the eigenvalue of the conservative factor turned out to be 5.431, and the ratio at which 2 factors explained the overall variables turned out to be 54.578%. The reliability of the view of education turned out to be .947 for the liberal factor and .856 for the conservative factor.

As a result of factor analysis performed on emotional reaction, in <Table 2>, the negative factors and positive factors were classified, and the eigenvalue of the positive factor turned out to be 5.762 and the eigenvalue of the negative factor turned out to be 4.925, while the ratio at which the 2 factors explaining the total variable turned out to be 55.813%. The reliability of emotional reaction turned out to be .943 for the positive factor and .892 for the negative factor.

Table 2. Factor analysis and reliability of the emotional reaction.

Questions	Positive	Negative
Q. Interesting when practicing.	.884	-.213
Q. Full of energy when practicing.	.813	-.166
Q. Active when practicing.	.785	-.174
Q. Excited when practicing.	.760	-.148
Q. Encouraged when practicing.	.741	.012
Q. Enthusiastic when practicing.	.711	-.076
Q. Nervous when practicing.	-.112	.819
Q. Afraid when practicing.	-.086	.771
Q. Confused when practicing.	-.048	.724
Q. React sensitively when practicing.	-.120	.712
Q. Worried when practicing.	-.156	.687
Eigen value	5.762	4.925
Pct of var	29.836	25.977
Cum pct	29.836	55.813
Cronbach's α	.943	.892

Table 3. Factor analysis and reliability of the educational impact.

Questions	Physical	Emotional
Q. Makes body healthy.	.820	.019
Q. Evenly develops body.	.797	.138
Q. Balances body.	.731	.207
Q. Makes body flexible.	.682	.165
Q. Purifies the mind.	.367	.725
Q. Helpful for the mental health.	.147	.684
Q. Energizes.	.246	.636
Q. Facilitates the sense of stability.	.352	.598
Eigen value	5.675	4.985
Pct of var	28.761	25.408
Cum pct	28.761	54.169
Cronbach's α	.953	.968

In <Table 3>, as a result of the factor analysis performed on the educational impact, it was classified into the physical factor and emotional factor analysis, and the eigenvalue of the physical factor turned out to be 5.675 and the eigenvalue of the emotional factor turned out to be 4.985, and the ratio at which the 2 factors explaining the whole variable turned out to be 54.169%. The reliability of educational impact turned out to be .953 for the physical factors and .968 for the emotional factors.

Table 4. Correlation analysis.

	Liberal	Conservative	Positive	Negative	Physical	Emotional
Liberal	-					
Conservative	.389**	-				
Positive	-.254**	-.127**	-			
Negative	.374**	.541**	-.329**	-		
Physical	.477**	.298**	-.310**	.355**	-	
Emotional	.361**	.324**	-.239**	.493**	.462**	-

Note: **p<.01.

As a result of the correlation analysis performed by using SPSS, as illustrated in <Table 4>, while some factors demonstrated a negative correlation, most of the constituent concepts demonstrated a positive (+) correlation, and given which, the direction of the relationship between the variables presented by the research hypothesis turned out to be consistent.

3.2. Effect of the view of education on the emotional reaction

Table 5. Effect of the view of education on the positive.

Independent variable	Dependent variable	Non-standardized coefficient		Standardized coefficient	t	R^2	F
		b	Std.E	β			
Liberal	Positive	.256	.071	.213	3.357**	.289	54.325***
Conservative		.387	.056	.347	4.876***		

Note: ***p<.001 **p<.01.

<Table 5> illustrates the fact that the liberal and conservative factors of the view of education have a significant effect on the positive emotional reaction, and also have an explanatory power of 28.9% with a coefficient of determination for R^2=.289.

Table 6. Effect of the view of education on the negative.

Independent variable	Dependent variable	Non-standardized coefficient		Standardized coefficient	t	R^2	F
		b	Std.E	β			
Liberal	Negative	-.343	.075	-.236	-3.678***	.274	39.586***
Conservative		.194	.070	.178	5.748***		

Note: ***p<.001.

<Table 6> illustrates the fact that the liberal and conservative factors of the view of education have a significant effect on the negative emotional factors, and the coefficient of determination for R^2=.274, which has an explanatory power of 27.4%.

3.3. Effect of view of education on the educational impact

Table 7. Effect of the view of education on the physical effect.

Independent variable	Dependent variable	Non-standardized coefficient		Standardized coefficient	t	R^2	F
		b	Std.E	β			
Liberal	Physical	.493	.086	.468	5.783***	.225	43.254***
Conservative		.324	.062	.247	2.371**		

Note: ***p<.001 **p<.01.

<Table 7> illustrates the fact that the liberal and conservative factors of the view of education have a significant effect on the physical effect, and the coefficient of determination for R^2=.225, which has an explanatory power of 22.5%.

Table 8. Effect of the view of education on the expressive effect.

Independent variable	Dependent variable	Non-standardized coefficient	Standardized coefficient	t	R^2	F

		b	Std.E	β			
Liberal	Emotional	.378	.079	.336	5.123***	.308	36.741***
Conservative		.255	.077	.258	3.647***		

Note: ***p<.001.

<Table 8> illustrates the fact that the liberal and conservative factors of the view of education have a significant effect on the emotional effect, and the coefficient of determination for R^2=.308, which has an explanatory power of 30.8%.

3.4. Effect of emotional reaction on the educational impact

Table 9. Effect of emotional reaction on the physical effect.

Independent variable	Dependent variable	Non-standardized coefficient		Standardized coefficient	t	R^2	F
		b	Std.E	β			
Positive	Physical	.356	.064	.319	4.286***	.238	47.921***
Negative		-.216	.051	-.263	-2.732***		

Note: ***p<.001.

<Table 9> illustrates the fact that the positive and negative factors of the emotional reaction have a significant effect on the physical effect, and the coefficient of determination for R^2=.238, which has an explanatory power of 23.8%.

Table 10. Effect of emotional reaction on the expressive effect.

Independent variable	Dependent variable	Non-standardized coefficient		Standardized coefficient	t	R^2	F
		b	Std.E	β			
Positive	Emotional	.516	.058	.564	8.647***	.299	38.576***
Negative		-.074	.052	-.174	-1.467***		

Note: ***p<.001.

<Table 10> illustrates the fact that the positive and negative factors of the emotional reaction have a significant effect on the emotional effect, and the coefficient of determination for R^2=.299, which has an explanatory power of 29.9%.

4. Discussion

In connection with the results of this study, which demonstrated that the Taekwondo leaders' view of education have had an effect on the emotional reaction and educational impact of the practitioners, the leader's view of education not only enabled the participants to gain trust, but also create their attachment and immersion for the sports, while having such a strong influence on various factors such as performance achievement, activity satisfaction, and whether to continue or discontinue[23][24][25][26].

In particular, it was claimed that the participants' trust in the leader has a positive effect on their exercise performance capability, performance concentration, and performance achievement, while the leader's view of education and practice of it would be constructing a new frame of perception by overcoming negative interpersonal representation while interpreting it with flexibility.

This is also related to the Taekwondo leader's view of education based leadership style, and when the Taekwondo leader listens to the practitioners' opinions and resolves conflicts, the leader would feel good about Taekwondo itself and enjoy training, especially in the leader's democratic form. The guidance has been identified as an important factor for psychological satisfaction, and the satisfaction of the participants ought to be interpreted as satisfaction with the increase in the positive part and the satisfaction in the decrease in the negative aspects [27].

Taekwondo leaders ought to especially be aware of the following situations and address them. In order to raise the status of Taekwondo leader and strengthen core competencies, one ought to adhere to and focus on the basics as an educator. Currently, additional activities are required due to changes in the internal and external management environment of Taekwondo studio. Since the practitioners constantly demand the personal perfection of Taekwondo leaders, it is necessary to establish an appropriate educational program for the Taekwondo leaders to set examples for the practitioners, and the foundation for such would be to reflect the leader's educational philosophy or view of education thereto [28].

Overall, the development of Taekwondo is caused by the cultivation of qualified leaders based on the correct form of their educational philosophy, and the cultivation of qualified Taekwondo leaders with adequate professionalism is required by the time [29]. In particular, due to the globalization of Taekwondo, improvement is inevitable toward nurturing global Taekwondo leaders [30], and as the social demands for Taekwondo change and expectations for Taekwondo leaders change, the Taekwondo leaders themselves, including Taekwondo leader training institutions, will need to build a view of education which faithfully reflects the demands and expectations of the field for education and practice education accordingly.

5. Conclusion

The purpose of this study is to examine and understand the influence of Taekwondo leaders' view of education on the emotional reaction and educational impact of practitioners, and also provide the basic data for developing an educational program for the practical education of Taekwondo studio and the efficient management of Taekwondo studio.

The subject of this study was 230 Taekwondo studio practitioners in 2021, and convenience sampling was used for the sampling method, and the survey was conducted by using the Self-Administration Method. Among the collected questionnaires, 218 questionnaires were used as valid samples, excluding the data with insincere responses or omission of some of the details of the survey. The measurement tool is a questionnaire, and the data processing is a statistical package program, SPSS 23.0 Program, and the frequency analysis was performed to examine and understand the general characteristics, and the Cronbach's α coefficient was calculated to validate the reliability of the questionnaire. The factor analysis was performed to classify the factors of view of education, emotional reaction, and educational impact, correlation analysis was performed to examine and understand the conventions between the variables, and to examine and understand the effect of view of education on the emotional reaction and educational effect, the multiple regression analysis was performed.

The conclusions reached by undergoing such research process are as follows.

First, the view of education (liberal factor and conservative factor) influences the emotional reaction (positive factor and negative factor).

Second, the view of education (liberal factor and conservative factor) influences the educational impact (physical factor and emotional factor).

Third, the emotional reaction (positive factor and negative factor) influences the educational impact (physical factor and emotional factor).

Hence, it is apparent that the Taekwondo leaders' view of education has a significant impact on the practitioners' emotions and educational impact. Not only will the emotions increase and the negative emotions decrease, but also the efforts ought to be made toward improving the physical and emotional health of the practitioners.

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7. Appendix

7.1. Authors contribution

	Initial name	Contribution
Lead Author	HC	-Set of concepts ☑ -Design ☑ -Getting results ☑

Corresponding Author*	SJ	-Analysis ☑ -Make a significant contribution to collection ☑ -Final approval of the paper ☑ -Corresponding ☑ -Play a decisive role in modification ☑
Co-Author	BC	-Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑ -Participants in Drafting and Revising Papers ☑ -Someone who can explain all aspects of the paper ☑

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Research on the Difficulty of 9th Level Dan Promotion Test of Taekwondo

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Abstract

Purpose: *This study aims to analyze the essential Poomsae difficulty of Taekwondo 9th level Dan promotion test with the awareness of the problem. This will help standardize the Taekwondo curriculum in order to meet the Taekwondo education goals pursued by the Kukkiwon, the headquarters of the World Taekwondo.*

Method: *The literature research and in-depth interviews with people to be tested were performed to analyze the difficulty of essential Poomsae of Taekwondo 9th Dan promotion test.*

Results: *As a result of questioning and analyzing the level of difficulty of the 9th level Dan promotion winner, it was concluded that the level of difficulty of Illyo Poomsae of the 9th level Dan promotion test is not appropriate. Courses to be completed for Color and Black Belts must comply with the completion time of the essential course and the selection course. Basic courses for Black Belt (Poomsae, breaking, sparring, and KTA personality) must be completed as mandatory courses, and in-depth courses (KTA self-defence techniques, KTA practical hand skills, and KTA core exercises) must be assigned.*

Conclusion: *It is thought that Taekwondo 9th level Dan, the highest stage of the competition held at the Kukkiwon of the World Taekwondo Headquarters, should be educated to learn, guide, and evaluate Taekwondo according to the standard curriculum. However, the standardized Taekwondo curriculum should be distributed in consideration of the current Taekwondo training population, where the standardized Taekwondo curriculum has not been established. Taekwondo leaders will contribute to the educational use of Taekwondo by analyzing the essential Poomsae and curriculum of Taekwondo 9th level Dan promotion test and presenting the evaluation rules based on the Taekwondo standard curriculum.*

[Keywords] ***Taekwondo, Taekwondo Promotion Test, Poomsae, Kukkiwon, Grand Masters***

1. Introduction

Taekwondo is a traditional Korean martial arts and has been adopted as an official sport since the 27th 2000 Sydney Olympics. Since then, it has developed into a martial arts sport and, as of 2021, the National Taekwondo Association of a total of 210 countries has joined the Kukkiwon and the World Taekwondo Federation as members[1].

Taekwondo is not only divided into professional competition games, but also into Poomsae and exhibition fields. In particular, the competition game was adopted as an official Olympic sport, and also Poomsae game is also loved by people around the world with a larger population of athletes than those who perform the competition game and with the attention of many Taekwondo trainees. In particular, the importance of Poomsae is more emphasized in the test presented in this paper.

The difficulty of "Illyo" Poomsae, which is conducted as an essential Poomsae in the Taekwondo 9th leven Dam promotion test, is burdened with the various functions of Illyo Poomsae for trainees who are set to advance to the Taekwondo 9th level Dan promotion.

According to the World Taekwondo Headquarters, Kukkiwon's decision-making regulations, the purpose of this guideline is to contribute to the development of Taekwondo skills by prescribing all matters related to the training and operation of the Kukkiwon and conducting a fair evaluation of the Dan/Poom level promotion test.

The test is conducted continuously from the start of Taekwondo and, in particular, in the case of the 9th level Dan promotion, it is received executed only by the Kukkiwon after receiving the recommendation from the heads of each city and province's test implementation association.

High-level Dan promotion Domestic: 6th, 7th, 8th, and 9th level applicants must meet the following requirements[2].

a) It is limited to those who meet the requirements for Dan/Poom promotion and age term according to Articles 4 and 10 of the Taekwondo test rules (rank of Poom/Dan) and Article 13 of the Taekwondo test regulations (qualification for application).

b) b) The contents of the test should be prepared and submitted in practical and theoretical essay writing as follows. As described above, the 9th level Dan applicant should perform one of the designated Poomsae (Jitae, Cheonkwon, Hansoo) and essential Poomsae (Illyo).

c) c) The essay: The introduction, main topic, and conclusion are logically prepared in accordance with the regulations and submitted to the Kukkiwon.

Table 1. The requirements for dan / poom promotion test[2].

	Age term for Dan promotion	Age term for Dan promotion
Dan6th level	5 years (Dan 5th level : Dan promotion winner before 2017. 03. 31.)	30 years old (born before 1992. 03. 31.)
Dan7th level	6 years (Dan 6th level : Dan promotion winner before 2016. 03. 31.)	36 years old (born before 1986. 03. 31.)
Dan8th level	8 years (Dan 7th level : Dan promotion winner before 2014. 03. 31.)	44 years old (born before 1978. 03. 31.)
Dan9th level	9 years (Dan 8th level : Dan promotion winner before 2013. 03. 31.)	53 years old (born before 1969. 03. 31.)

Table 2. The contents of the test[2].

Division	Basic form	Poomsae		Sparring	Breaking	Essay	Interview
		Designated	Essential				
Dan 6th, 7th level	O	O	O	O	O	O	X
Dan 8th, 9th level	X	O	O	X	X	O	O

The problem is, it is necessary to study whether the above promotion regulations have appropriate difficulties for each training level.

It takes at least 39 years to train steadily for five days a week from the start of Taekwondo to be promoted to the 9th level of Dan, and he/she will reach the minimum age of 53 years. For most of the trainees, the Dan promotion and Taekwondo training have no connection, the age and duration of their old age will be longer if the promotion period is delayed.

Therefore, this study aims to analyze the essential Poomsae difficulty of Taekwondo 9th level Dan promotion test with the awareness of the problem presented above.

Many studies have been conducted in connection with Taekwondo.

Taekwondo training and curriculum[3][4][5][6][7][8], Taekwondo Competitions and events [9][10][11][12][13][14][15][16], Taekwondo organizations[17][18][19][20][21][22] etc., have been carried out. In addition, although the studies on Taekwondo promotion test have been conducted[23][24][25][26][27][28][29][30][31][32] researches regarding Taekwondo 9th Dan promotion test is insufficient.

Research on the difficulty of essential Poomsae for Dan promotion will help standardize the Taekwondo curriculum in order to meet the Taekwondo education goals pursued by the Kukkiwon, the headquarters of the World Taekwondo.

2. Understanding the Taekwondo Test

Taekwondo test must comply with the test regulations stipulated by the Kukkiwon, the headquarters of the World Taekwondo Headquarters.

The purpose of this test to stipulate the procedures for all the test and business processing according to the issuance of official Poom/Dan certificates at the Kukkiwon, the World Taekwondo Headquarters, from 1st to 9th stages, to cultivate reasonable Taekwondo skills and to grant systematic and standardized Poom/Dan[2]. Accordingly, those who is instructed and trained by the gyms or organization belonging to the National Association affiliated with the World Taekwondo Federation, and even in countries that are not affiliated with the World Taekwondo Federation, those who are instructed and trained as holders of official Dan certificates can be examined.

It is limited to the person who holds a certificate issued by a Taekwondo-like organization, who has pledged to comply with the regulations of Kukkiwon and whishes to receive Kukkiwon Dan among the people who of actively agreeing with its purpose, and a person whose training and period of stay has elapsed for at least six months if the applicant applies in a third country other than the host country.

Taekwondo 9th level Dan, the subject of this paper, currently receives the following pre-training and applies to the 9th level Dan promotion test: The specific focus of pre-education is the training of three types of Dan holder Poomsae: Jitae, Cheonkwon, and Hansoo according to the selection of designated Poomsae. In addition, an essential poomsae, Illyo, should be trained as well[2]. In this way, training is conducted to increase the accuracy and proficiency of poomsae movements in pre-education.

Table 3. 9th level dan (kukkiwon) detailed evaluation schedule[2].

Date and Time		Content	Place
03.02(Tue) (Pre-education)	~ 08:50	Gathering	Kukkiwon Lecture Room
	09:00 ~ 09:20	Orientation	Kukkiwon Lecture Room
	09:20 ~ 10:50	Martial Arts Education	Kukkiwon Lecture Room
	11:00 ~ 11:50	Poomsae Education	Kukkiwon Main Training Room
	13:00 ~ 15:50	Poomsae Education	Kukkiwon Main Training Room

	16:00 ~ 17:50	Self-Defence Technique Education	Kukkiwon Main Training Room
03.03(Wed) (Pre-education, ceremony and test)	09:00 ~ 10:50	Poomsae Education	Kukkiwon Main Training Room
	11:00 ~ 12:00	9th level Dan award and opening ceremony	Kukkiwon Main Training Room
	13:00 ~ 15:00	1st 9th level Dan Promotion Test	Kukkiwon Main Training Room
	15:00	Ending and Clsing Ceremony	Kukkiwon Main Training Room

The person who has Poom or Dan should comply with the period after the promotion as shown in the table below in accordance with the provisions of Kukkiwon. However, in the case of Color Belt, the training period has not been established.

Table 4. Status of Dan registered with kukkiwon[2].

Classification	1 Dan	2 Dan	3 Dan	4 Dan	5 Dan	6 Dan	7 Dan	8 Dan	9 Dan
Korea	3,476,048	494,076	310,053	142,833	36,137	7,326	3,188	1,453	935
Overseas	540,505	143,717	65,711	27,743	13,001	5,055	2,858	746	212
Total	4,016,553	637,793	375,764	170,576	49,138	12,381	6,046	2,199	1,147

Table 5. Obligatory training period and age limit for promotion[2].

Poom/Dan to be promoted	Obligatory training period(years)	Age limit for promotion		Remarks
		1st Dan/up	1st Poom/up	
1st Poom			below age 15	∗ All applicants for promotion are subject to the requirements of obligatory training period and age limit. ∗ Those early beginners of Taekwondo, who have obtained Poom grades, will be given privileges of curtailed age limit up to the 5th Dan promotion.
2nd Poom	1 year		below age 15	
3rd Poom	2 years		below age 15	
4th Poom	3 years		below age 18	
1st Dan		age 15 and over		
2nd Dan	1 year	age 16 and over	age 15 and over	
3rd Dan	2 years	age 18 and over	age 15 and over	
4th Dan	3 years	age 21 and over	age 18 and over	
5th Dan	4 years	age 25 and over	age 22 and over	
6th Dan	5 years	age 30 and over	age 30 and over	
7th Dan	6 years	age 36 and over	age 36 and over	
8th Dan	8 years	age 44 and over	age 44 and over	
9th Dan	9 years	age 53 and over	age 53 and over	
10th Dan		age 60 and over	age 60 and over	

1) Poom may be granted to a successful trainee who is less than 15 years old, and Dan to a successful trainee who is 15 or more than 15 years old. A Poom grade holder becoming 15 years old equal to a Dan grade holder (If one passes the age of 15, he may ask for the change of certificate from Poom to Dan to the Kukkiwon)[2].

2) If Poom holder who has passed the age of 15 applies for a promotion to a next higher Dan grade, the required period of training shall be calculated from the first day when he obtained the present grade. However, when a third-Poom holder wants to be promoted to be promoted to the-4th Dan, his age shall be over 18[2].

3. Taekwondo Evaluation Status

The test is conducted by judges selected by the Kukkiwon, the headquarters of the World Taekwondo. The rating and qualification requirements of the judges are as follows[2]:

Table 6. The rating and qualification requirements of the judges[2].

Division	Qualification requirements (Dan)	Recommendation	Note
Level 1	9th level	Head of the Kukkiwon	Those who passed the evaluation after completing the training of the judges of the Kukkiwon.
Level 2	8th level	Head of the Association of Nation, City, Provincial	Those who passed the evaluation after completing the training of the judges of the Kukkiwon.
Level 3	6th and 7th level	Head of the Association of Nation, City, Provincial	Those who passed the evaluation after completing the training of the judges of the Kukkiwon.

* Qualification requirements for overseas judges may be separately determined.

The holder of the judge's certificate acts as a judge after being nominated and recommended for the Poom/Dan promotion judging contest held by the National Association and the association entrusted with the right to perform the test.

The training of judges should conduct theories (test regulations, scoring tips) and practical skills (basic form, Poomsae, sparring, breaking) and so on above each order (24 hours), only those who pass the theory and practical evaluation after completing the training of judges will be granted a certificate.

3.1. Regulations for judging the promotion of Poom/Dan of the Kukkiwon

The Kukkiwon is the highest organization that oversees the test approval, test delegation, test execution, test supervision, the assessment of Poom/Dan, issuance of Poom/Dan, and the rights of punishment. Therefore, the World Taekwondo Federation should cooperate so that each national association can smoothly carry out the promotion of Poom and Dan test work of the Kukkiwon[2]

3.2. Recommendation authority for evaluation

a) The head of the relevant national association has the right to recommend the test of Kukkiwon's Poom/Dan promotion for the applicants, if it is recognized by the headquarters that the National Association controls more than 70% of its members and executes smooth test work. However, individual rights of recommendation are not allowed[2].

b) The National Association, whose right to recommend for approval and review has not yet been finalized, has the individual recommendations for the Kukkiwon until the time to create conditions as in Paragraph 1 above[2].

c) For trainees instructed by certified professionals in countries not affiliated with the World Taekwondo Federation, it is recommended by the instructor in accordance with the confirmation of public institutions[2].

3.3. Composition of the judging committee

a) For the efficient execution of the test work of Poom/Dan promotion, the test organization is organized and operated as follows[2]:

Table 7. Organizing and operation the test organization[2].

Test Composition	Qualification of Test Judge	Applicants
Usual Judging Committee	Over 6th level Dan	Under 5th level Dan
High Level Judging Committee	Over 7th level Dan	Under 6th level Dan
High Level Judging Committee	Applicant of 9th level Dan	Over 8th level Dan

b) If there is no person with higher than 6th levels in the National Association, the examination should be conducted after obtaining in advance the approval from the main office.

c) The judges are organized as 5 or more persons according to the size of the test and are located in a place where it is easy to observe the movements of the applicant.

d) The essay judges should be organized into five persons according to the size of the test and absolutely evaluate the essay.

3.4. Analysis of the 9th level Dan promotion test

The 9th level Dan promotion test consists of the essay, Poomsae, and interviews. In the case of the difficulty problem, we need to analyze the Illyo Poomsae, which is an essential Poomsae of 9th level. Ilyeo Poomsae is a Poomsae based on the deep martial arts truth in which the spirit and movement are united with the completion of Taekwondo training[33]. It starts with a close stance and ends with a close stance, and consists of 23 movements and forms. In particular, due to the age limit of 53 or older, it is not easy to accurately express the movements of No. 6, 7, 13, 14, 19 and 23 of the Illyo Poomsae.

Such movements are possible only when trained steadily over a long period of time. In particular, for the movements No. 7 and 14, the balance should be well maintained with the femoral muscle endurance and core exercise. In addition, for the movements No. 19 and 23, the body's state of staying in the air should be able to be maintained. The movement No. 6 requires a right foot to jump out, and step on, and left hand left fingertip body thrust with right ham stance and a shout. The 7th movement is a right-footed one-legged stand, slowly kicking sideways with left foot and blocking the frame of the right fist. In the 13th and 14th movements, the opposite foot and hand movements of the 6th and 7th movements are performed. The 19th movement takes a step forward with the right foot kick, runs with the left foot, kicking sideways, and stands on the right heel to block the face with crossed arms. The 23rd movement takes a step forward with the left foot kick, runs with the right foot, kicking sideways, and stands on the left heel to blocks the face with crossed arms. As a result of questioning and analyzing the level of difficulty of the 9th level Dan promotion winner who performs the above operation, it was concluded that the level of difficulty of Illyo Poomsae of the 9th level Dan promotion winner is not appropriate.

4. Relationship between the Kukkiwon Curriculum and the Test

There are about 12,000 gyms for Taekwondo education in Korea, the suzerain country of Taekwondo, and it is estimated that more than 80 million foreign trainees are present in 208 countries. According to the standard curriculum for Taekwondo presented by the Kukkiwon and the Korea Taekwondo Association, it is divided into Color Belt and Black Belt. Training to improve should be conducted for the level of difficulty of training according to the standard curriculum development stage of Taekwondo gym and the skills that meet the Taekwondo learning goals of each Dan promotion as follows[34]:

1) Color Belt consists Level 1 to Level 9 and a training period of 40 hours (2 months) for each level (2 months x 9 classes = 18 months) is required. It takes 18 months if training five days a week.

2) When guiding the essential course and designated course of Color Belt and Black Belt, it must be guided including the movement elements of Taekwondo such as use area, warming-up stance, bending, flipping, stepping, jumping, blocking, pushing, subtracting, standing, grabbing, punching, thrusting, chopping, kicking, hitting, avoiding, special Poom.

3) In the case of the selection course, at least one of the basic subjects for Color Belt (KTA Taekwondo physical strength, KTA Taekwondo gymnastics, and KTA Taekwondo demonstration) should be trained. However, it is recommended to select basic subjects (in order of KTA Taekwondo physical strength, KTA Taekwondo demonstration, KTA Taekwondo gymnastics) preferentially for the selection process for Color Belt.

4) Black Belt consists of level 1 to 14, and a training period of 80 hours (4 months) for each level (4 months x 3 classes = 12 months) is required. Black Belt must complete 240 hours (12 months) for each item. It takes 12 months if training for only 5 days a week.

5) When guiding the essential course and designated course of Black Belt, it must be guided including the movement elements of Taekwondo such as use area, warming-up stance, bending, flipping, stepping, jumping, blocking, pushing, subtracting, standing, grabbing, punching, thrusting, chopping, kicking, hitting, avoiding, special Poom.

6) In the case of the selection course, basic courses for Black Belt (pumsae, breaking, sparring, and KTA personality) must be completed as mandatory courses, and in-depth courses (KTA self-defence techniques, KTA practical hand skills, and KTA core exercises) must be assigned. However, it is recommended to select preferentially the basic subjects (KTA Taekwondo physical strength, KTA Taekwondo demonstration, KTA Taekwondo gymnastics, and no technology) in the selection course for Black Belt.

7) Black Belt consists of level 1 to 14, and a training period of 80 hours (4 months) for each level (4 months x 9 classes = 36 months) is required. Black Belts require 720 hours (36 months) of completion time for each item. It takes 36 months if training five days a week.

8) When guiding the essential course and designated course of Color Belt and Black Belt, it must be guided including the movement elements of Taekwondo such as use area, warming-up stance, bending, flipping, stepping, jumping, blocking, pushing, subtracting, standing, grabbing, punching, thrusting, chopping, kicking, hitting, avoiding, special Poom, and it must be observed the completion time for each unit presented in the standard taekwondo curriculum, including the movement elements of Taekwondo[13].

9) In the case of the selection course, basic courses for Black Belt (pumsae, breaking, sparring, and KTA personality) must be completed as mandatory courses, and in-depth courses (KTA self-defence techniques, KTA practical hand skills, and KTA core exercises must be assigned. However, it is recommended to select preferentially the basic subjects (KTA Taekwondo physical

strength, KTA Taekwondo demonstration, KTA Taekwondo gymnastics, and no technology) in the selection course for Black Belt[14]. For Black Belts, level 1 meets 240 hours, level 2 meets 480 hours, level 3 meets 720 hours, level 4 meets 960 hours, and the training period and completion time from level 5 to 9. In particular, those who train with the goal of winning the 9th level Dan promotion must steadily train for at least 38 years. Since Taekwondo training and improvement in skills are proportional, the standard curriculum for Taekwondo presented by the Kukkiwon and the Korea Taekwondo Association should be observed. In addition, the level of difficulty of the evaluation items is required during the test according to the stage of growth and development. In the case of Poomsae, it is necessary to maintain the accuracy, proficiency, and dignity as a 9th leven Dan.

5. Conclusion

Through this study, the following conclusions have been obtained:

For Illyo, an essential Poomsae of Taekwondo 9th level Dan promotion winner, in particular, for the movements No. 7 and 14, the balance should be well maintained with the femoral muscle endurance and core exercise. And, for the movements No. 19 and 23, the body's state of staying in the air should be able to be maintained.

The movement No. 6 requires a right foot to jump out, and step on, and left hand left fingertip body thrust with right ham stance and a shout. The 7th movement is a right-footed one-legged stand, slowly kicking sideways with left foot and blocking the frame of the right fist. In the 13th and 14th movements, the opposite foot and hand movements of the 6th and 7th movements are performed. The 19th movement takes a step forward with the right foot kick, runs with the left foot, kicking sideways, and stands on the right heel to block the face with crossed arms. The 23rd movement takes a step forward with the left foot kick, runs with the right foot, kicking sideways, and stands on the left heel to blocks the face with crossed arms.

As a result of questioning and analyzing the level of difficulty of the 9th level Dan promotion winner, it was concluded that the level of difficulty of Illyo Poomsae of the 9th level Dan promotion test is not appropriate.

Courses to be completed for Color and Black Belts must comply with the completion time of the essential course and the selection course.

Basic courses for Black Belt (pumsae, breaking, sparring, and KTA personality) must be completed as mandatory courses, and in-depth courses (KTA self-defence techniques, KTA practical hand skills, and KTA core exercises) must be assigned.

In the case of Black Belts (Poom. Dan), the level 1 must meet 240 hours, the level 2 must meet 480 hours, the level 3 must meet 720 hours, the level 4 must meet 960 hours, the level 5 must meet 1200 hours, the level 6 must meet 1440 hours, the level 1 must meet 1920 hours, the level 8 must meet 2160 hours, in other words, each training period and completion time must be satisfied from levels 1 to 9.

Therefore, in this study, it is thought that Taekwondo 9th level Dan, the highest stage of the competition held at the Kukkiwon of the World Taekwondo Headquarters, should be educated to learn, guide, and evaluate Taekwondo according to the standard curriculum. However, the standardized Taekwondo curriculum should be distributed in consideration of the current Taekwondo training population, where the standardized Taekwondo curriculum has not been established.

Taekwondo leaders will contribute to the educational use of Taekwondo by analyzing the

essential Poomsae and curriculum of Taekwondo 9th level Dan promotion test and presenting the evaluation rules based on the Taekwondo standard curriculum.

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6. Appendix

6.1. Authors contribution

	Initial name	Contribution
Lead Author	SC	-Set of concepts ☑ -Design ☑ -Getting results ☑ -Analysis ☑ -Make a significant contribution to collection ☑ -Final approval of the paper ☑ -Corresponding ☑ -Play a decisive role in modification ☑
Corresponding Author*	HO	-Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑ -Participants in Drafting and Revising Papers ☑ -Someone who can explain all aspects of the paper ☑

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Kinetic Analysis of the Dwigongjungdorachagi in Taekwondo

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Abstract

Purpose: *The purpose of this study is to provide the basic data for technical performance by analyzing and presenting the differences in major kinematic factors in the jumping phase, flight phase, and finally striking phase for national team and non-national team male demonstration members.*

Method: *As for the subjects of this study, 6 members of the national team and 6 members of the non-national team who had more than 3 years of demonstration experience were selected and tested. Before entering the experiment, a consent was secured from each subject, the experimental procedure was explained, and kinematic data were collected by using 14 high-speed digital cameras. For the statistical processing of this study, the mean and standard deviation (M±SD) were calculated by using Excel 2018, and the statistical program (SPSS 22.0, SPSS Inc., Chicago, IL, USA) was used to verify the difference in kinematic variables of dwigongjungdorachagi motion. The Shapiro-Wilk verification was conducted to confirm the normality of the collected data, and according to the results, an independent sample test (independent t-test), test (Mann-Whitney U-test), and the correlation analysis were performed.*

Results: *There was a statistically significant difference in P3 ($p<.05$) of the required time phase. There was a statistically significant difference in E4 ($p<.05$) of the (Z) movement displacements. There was a statistically significant difference in the right E4 ($p<.05$) of the right ankle joint angle. The correlation coefficient between the body center's displacement and flight time showed a high correlation and showed a statistically significant difference ($r=.953$, $P=.001$). The correlation coefficient between the angular velocity and the body center's displacement showed a high correlation and showed a statistically significant difference ($r=.809$, $p=.001$). The correlation coefficient between the angular velocity and flight time showed a high correlation and a statistically significant difference ($r=.809$, $p=.001$).*

Conclusion: *As a result of the experiment, the swing speed of the arm and the angle of the knee joint before jumping during dwigongjungdorachagi provided a great force to project the human body into the air and also had the effect of increasing vertical ascent. Hence, it is apparent that the coordination of movements is a very important factor.*

[Keywords] ***Dwigongjungdorachagi, Center of Mass, Time Required, Angle, Velocity***

1. Introduction

Taekwondo demonstration has recently expanded and developed towards sports and performing arts beyond their existing role as a publicity tool. Taekwondo demonstration as a sport is recognized as a representative sport of Taekwondo along with Poomsae and Gyeorugi [1][2][3][4].

Starting from the World Taekwondo Hanmadang hosted by Kukkiwon in 1999, the Taekwondo Breaking Tournament has been gradually recognized as a competition as the demonstration

divisions have been established for the university-sponsored Taekwondo competitions such as Korea National Sport University, Kyunghee University, and Yongin University president's tournament since 2014, which are moving toward development[5][6].

Breaking in the Taekwondo demonstration is an effective way to show the destructive power and technological prowess of Taekwondo and occupies a large portion of the entire demonstration program[7]. In the early days of Taekwondo demonstration, breaking with power breaking through thick pine boards or tile flooring accounted for a large share, yet as technology has developed, recently, high-level technical breaking with outstanding splendor such as rotational breaking, multi-stage breaking, and multi-directional breaking account for a large share[8][9][10].

Among which, dwigongjungdorachagi is a technique of kicking in the air while moving backwards based on the horizontal axis in order to strike a high target from the same place. It is a skill which may be kicked with one or both feet, and can sometimes be kicked by stepping on an assistant, and is a high-level skill achieved through the coordination of various physical factors and the whole body[11][12][13].

Recently, as various competitions have been activated and high-level breaking techniques for excellent results have taken a large part in the competition, many players are now using the dwigongjungdorachagi technique. Due to the advancement of new technologies, the dwigongjungdorachagi technology, which requires a high jump, has become one of the important new technologies[11]. Since the dwigongjungdorachagi has the ability to jump high and the technical system to perform kick movements in the air, it is essential to understand the correct technique, and it may be very dangerous for a beginner who does not have strength and posture to imitate it only by means of a method[14][15][16]. In fact, technical breaking is reported to be the factor which causes the most injuries among all demonstration techniques such as poomsae, self-defense fighting, and power breaking[17][18].

Examining the previous studies related to dwigongjungdorachagi for performance improvement, investigated the joint range of motion that occurs during the process of gathering forces before takeoff to strike a target, and consequently, they reported that the movement of the hip joint was an important factor in jumping and jumping[11]. Suggested that the ground motion for the maximum rise of COM in a jump is a very important variable[19]. Evaluated the technical performance after applying the training program to improve the completeness of the dwigongjungdorachagi technique[20]. Reported on an ideal kinematic model of the forward kick motion in the back midair and reported on the main techniques used[21]. In a previous study of vertical jumping and dwigongjungdolgi, reported that it is advantageous when performing excellent jumps to show a large extension moment at the hip and ankle joints excluding the knee in excellent inter-individual jumps[22]. Reported that the mechanical output of the hip and ankle joints and proper joint coordination related to the timing of joint extension are the major factors influencing the intra-individual performance differences of vertical jumps[23]. Reported that the successful aerial projections can affect the number of rotations and body control of aerial projections by controlling the moment of inertia and angular velocity of body fragments with the conserved angular momentum[24].

As such, previous studies have been conducted to improve technology, and important kinematic factors have been identified and various solutions for problems have been presented. However, until now, the studies of dwigongjungdorachagi are insufficient, and hence, the understanding of the technology is insufficient.

Hence, the purpose of this study is to provide the basic data for technical performance by analyzing and presenting the differences in terms of major kinematic factors in the jumping phase, flight phase, and striking phase targeting the national team and non-national team male demonstration members.

2. Research Method

2.1. Research subjects

The subjects of this study were the 6 members of the national team and 6 members of the non-national team selected, with more than 3 years of demonstration experiences. The general characteristics of the study subjects are as illustrated in <Table 1>.

Table 1. Participants characteristic. (N=12)

N	Age	Height	Weight	Career
Skilled(6)	23.33±1.03	170.67±3.33	63.83±4.79	12.50±2.59
Unskilled(6)	22.50±1.05	170.17±3.13	65.67±4.41	9.83±1.94

2.2. Measuring tool

The measuring tool and analytical equipment used in this study are as illustrated in <Table 2>.

Table 2. Measuring tools.

Instrument	Model	Company	Technique
Camera	Ventag v16 vero v2.2	VICON	3D motion capture
Soft ware	Nexus 2.9.2	VICON	Analyze process
	KWON3DXP	VISOL	

2.3. Experimental procedures

For this study, adequate space was secured in the exercise room of K University, and 14 high-speed digital cameras (VICON MX Motion Capture Systems Ltd., UK) were installed at 5m intervals from the subject performing the motion to the left and right, and front and rear at 45°. The shooting speed of the camera was set at 300Hz, and it was synchronized and saved in the dedicated software (Nexus. 7, VICON Motion Systems Ltd., UK).

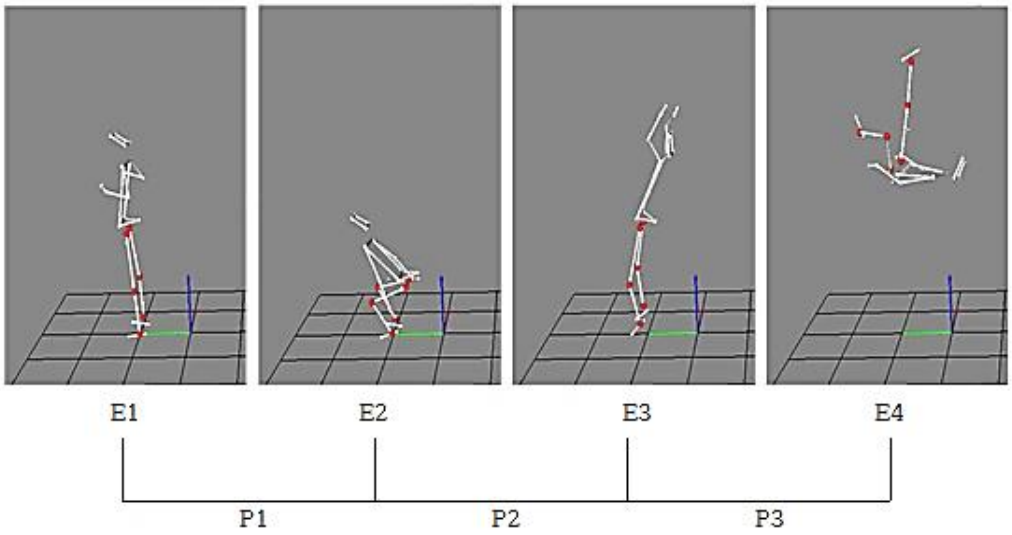
Before entering this experiment, a consent was secured from each subject and the procedure of the experiment was explained. The subjects took their tops off and wore black tights for their bottoms. For the body modeling for motion analysis, 39 markers were attached to the joint points and segmental surfaces of the left and right body parts. Thereafter, after standing calibration, the markers attached to the inner side of the joints that could interfere with the motions of the subjects were removed before the subjects performed the motions[25][26][27].

In order to adapt to the experimental environment, the experimenter was given sufficient warm-up and sufficient practice for the experimental movement to ensure that the correct movement could be exhibited. The dwigongjungdorachagi movement was performed 4 times for each subject, and the three Taekwondo referees (with international referee qualifications and experience in international refereeing) selected three high-quality movements for the most accurate and highly complete technical moves, and analyzed them.

2.4. Analytical event

The motion of dwigongjungdorachagi was set in 3 phases and 4 sections, and the definition of each is as provided in <Figure 1>.

Figure 1. 4 event and 3 phases.



2.4.1. Phase

Phase 1: The moment of descension of the center of gravity

Phase 2: The moment of ascension of the center of gravity

Phase 3: The strike event after ascension

2.4.2. Event

Event 1: Ready posture

Event 2: The moment when the knee is maximally flexed just before the jump

Event 3: The moment of take-off as the foot falls off the ground with a jump motion

Event 4: The moment the target position is struck

2.5. Data Processing

For the statistical processing in this study, the mean and standard deviation (M±SD) were calculated by using Excel 2018, and a statistical program (SPSS 22.0, SPSS Inc., Chicago, IL, USA) was used. The Shapiro-Wilk verification was performed to confirm the normality of the collected data, and according to the results, an independent sample test (independent sample test) was performed, and to analyze the effect on kinematic variables according to the movements of the national team and non-national team demonstration members, independent sample verification (independent t-test), test (Mann-Whitney U-test), and correlation analysis were performed. The significance level of all statistics was set as α=.05.

3. Research Result and Discussion

3.1. Time variable analysis

The results of analysis of the time required for each group are as follows <Table 3>.

Table 3. Lead time by each phase. (unit: sec)

	Skilled	Unskilled	*t/Z*	*p*
P1#	1.44±0.22	1.48±0.46	-.206	.841
P2#	0.33±0.05	0.31±0.03	.936	.371
P3#	0.33±0.03	0.26±0.03	3.643	.005*
M±SD#	2.09±0.21	2.05±0.50	.196	.849

Note: Mean±SD, #:Mann-Whitney U-test, §:Independent-test, p-value:p<.05.

In the time required for the phase (P1), the unskilled person showed a greater time required than the skilled person, but there was no statistically significant difference. The time required for the phase (P2) was greater for the skilled than for the unskilled, yet there was no statistically significant difference. The time required for the phase (3) was greater for the skilled than for the unskilled, and there was a significant difference (p<.05).

Examining the total execution time for each phase, the knee of the national team demonstration member took longer than the knee of the non-national team demonstration member, yet there was no statistically significant difference.

Given the nature of the Taekwondo event, the required time is delayed because the demonstration member jumps high above the ground and strikes the target with a more accurate motion[28], and it provides a basis for accurately expressing skills through the flight time[20]. In the study of[11], the dwigongjungdolgi's unilateral and two-footed kicks were the kicks which required holding time, yet the difference was not significant[21]. This study showed contradictory results in that the time required for the dwigongjungdorachagi was longer than that for the dwigongjungdolgi. This is because the national team member's knee is kicked with high jumping ability and has a long flight time, and the non-national team member's knee focuses on rotation rather than kicking.

3.2. Dwigongjungdorachagi's movement displacement for the center of body

3.2.1. dwigongjungdorachagi's movement displacement for the center of body

The results of the analysis of movement displacement for the center of body during dwigongjungdorachagi's movement are as follows <Table 4>.

The displacement of the center of gravity up and down (Z) was found to be greater in the national team member's knee than in the non-national team member's knee in E4, and there was a statistically significant difference (p<.05).

In terms of E1, E2, and E4, there was a numerical difference between the national team member's knee and the non-national team member's knee, yet there was no statistically significant difference.

Reported that the successful period of the dwigongjungdolgi movement was found to increase the up-and-down movement rather than to show a lot of movement backward to obtain high airspeed and to improve the skill level based on it[29]. Reported that the interaction of the arm and the leg due to the recoil of the arm during the vertical jumping motion affects the vertical displacement[30].

In view of such results, it seems that the national team member's knee significantly and rapidly moved the movement displacement of the body center through the interaction of arms and legs in order to perform the perfect movement and affected the moment of inertia, and consequently, it is determined that the kick was executed quickly and accurately by raising it and increasing the flight time accordingly.

Table 4. Center of mass. (unit: com)

		Group	Mean±SD	*t*/*Z*	*p*
Z	E1#	Skilled	.9795±.02207	1.357	.205
		Unskilled	.9497±.04891		
	E2#	Skilled	.5742±.06998	-.993	.344
		Unskilled	.6098±.05269		
	E3#	Skilled	1.1120±.04545	2.025	.070
		Unskilled	1.0327±.08449		
	E4#	Skilled	1.4353±.09215	2.636	.026*
		Unskilled	1.3093±.07234		

Note: Mean±SD, #:Mann-WhitneyU-test, §:Independent-test, p-value:p<.05.

3.3. Dwigongjungdorachagi's lower limb angle analysis

The results of analysis of the change in angle for the lower limbs during the dwigongjung-dorachagi are as follows <Table 5>.

Examining the hip joint angle, there was a numerical difference between the national team member's hip and the non-national team member's hip in E1, E2, E3, and E4, yet there was no statistically significant difference. It is determined that there is no difference in joint movement since it has a very similar mechanism during dwigongjungdorachagi between the national team member's hip and the non-national team member's hip.

Examining the Knee joint angle, there was a numerical difference between the national team member's hip and the non-national team member's hip in E1, E2, E3, and E4, yet there was no statistically significant difference.

Examining the angle of the ankle joint, the national team member's knee was greater than the non-national team member's knee in the right E4, and there was a statistically significant difference ($p<.05$). In terms of E1, E2, and E3, there was a numerical difference between the national team member's knee and the non-national team member's knee, yet there was no sta-tistically signifi-cant difference.

Reported that the knee joint flexion angle with respect to the jumping height caused a better vertical jumping performance at the knee angles of 64 and 90 degrees[31], and also reported that it provides a great force for projection, and hence, the results were similar to those of this study[29]. Reported that during dwigongjungdorachagi, the knee joint extended after maximum flexion, and after take-off[11], it reached the landing by repeating flexion extension, and that the knees will need to be folded again to facilitate the mid-air rotation. In light of such results, it is determined that complex knee and ankle joint movements in which the national team mem-ber's knee is folded in mid-air rotation and the knee and ankle are stretched for a short time to kick the target occurred, which is a major factor influencing the perfect kicking motion.

Table 5. Lower limb joint angle. (unit: deg)

			Group	Mean±SD	*t*/*Z*	*p*
Hip	E1	R§	Skilled	133.95±5.30	-.320	.749
			Unskilled	133.44±2.68		
		L#	Skilled	135.03±5.87	.720	.488
			Unskilled	133.21±1.99		
	E2	R#	Skilled	62.99±5.02	.065	.985

			Unskilled	62.90±10.06		
		L#	Skilled	60.57±6.85	.383	.697
			Unskilled	62.43±9.06		
	E3	R§	Skilled	134.09±7.80	-1.441	.150
			Unskilled	127.57±4.71		
		L§	Skilled	132.09±6.58	-1.121	.262
			Unskilled	128.66±3.013		
	E4	R#	Skilled	97.68±6.91	.498	.629
			Unskilled	93.09±21.47		
		L#	Skilled	68.23±14.38	-2.221	.051
			Unskilled	91.60±21.40		
Knee	E1	R#	Skilled	169.37±4.60	.887	.554
			Unskilled	166.80±6.18		
		L§	Skilled	169.75±5.47	-.961	.337
			Unskilled	167.85±5.27		
	E2	R#	Skilled	73.11±12.98	.406	.363
			Unskilled	81.41±16.96		
		L#	Skilled	72.29±12.12	.271	.241
			Unskilled	82.30±15.51		
	E3	R§	Skilled	141.46±3.47	-1.441	.150
			Unskilled	141.89±15.52		
		L§	Skilled	141.01±7.56	.067	.948
			Unskilled	140.55±15.07		
	E4	R#	Skilled	155.32±8.20	.335	.067
			Unskilled	123.13±41.89		
		L#	Skilled	69.79±5.41	-1.922	.055
			Unskilled	106.04±43.94		
Ankle	E1	R#	Skilled	97.97±4.09	.246	.586
			Unskilled	99.49±5.24		
		L#	Skilled	97.39±4.20	.433	.964
			Unskilled	97.48±3.12		
	E2	R#	Skilled	71.42±6.37	.951	.206
			Unskilled	76.14±5.70		
		L#	Skilled	69.74±4.79	.187	.370
			Unskilled	74.09±10.28		
	E3	R#	Skilled	128.60±6.83	.238	.245
			Unskilled	122.08±10.98		
		L#	Skilled	126.59±12.31	.824	.429
			Unskilled	120.17±14.61		
	E4	R#	Skilled	132.75±8.53	3.546	.005*
			Unskilled	105.04±17.13		
		L§	Skilled	117.92±10.86	-.961	.337
			Unskilled	110.53±14.95		

Note: Mean±SD, #:Mann-WhitneyU-test, §:Independent-test, p-value:p<.05.

3.4. Dwigongjungdorachagi's shoulder angular velocity analysis

3.4.1. Change in shoulder angular velocity of back midair round kick

The results of analyzing the change in shoulder angular velocity during the dwigongjung-dorachagi are as follows <Table 5>.

Table 6. Shoulder angular velocity. (unit: deg/s)

		Group	Mean±SD	*t*/*Z*	*p*
Shoulder Angular Velocity	R#	Skilled	1156.54±115.88	.644	.534
		Unskilled	1114.31±111.25		
	L§	Skilled	1121.92±126.38	-.160	.873
		Unskilled	1145.78±135.22		

Note: Mean±SD, #:Mann-WhitneyU-test, §:Independent-test.

Examining the shoulder angular velocity, there was a numerical difference between the national team member's knee and the non-national team member's knee in P1 through P3, yet there was no statistically significant difference.

In the in dwigongjungdolgi movement, the movement of the upper limb plays a very important role since it promotes and controls the movement pattern and momentum [29].

Reported that the use of arm swings in vertical jumps is an important factor in determining the flight time[32]. In this study, too, it is determined that the speed of the arm increases the momentum of the upper extremity when moving the arm that is extended backwards forward quickly, thereby increasing the vertical upward force, which is considered to be a major factor in the success of dwigongjungdorachagi.

3.5. Correlation between body center's displacement, flight time, and shoulder angular velocity according to dwigongjungdorachagi

<Table 6> shows the results of analyzing the correlation between the body center's displacement, flight time, and shoulder angular velocity during dwigongjungdorachagi. As for the Pearson's correlation coefficient, the correlation coefficient between the body center's displacement and flight time was .953, the correlation coefficient between angular velocity and the body center's displacement was .809, and the correlation coefficient between angular velocity and flight time was .709, indicating a high correlation. Meanwhile, as a result of performing statistical verification, a statistically significant difference was found at the 95% confidence level. Hence, it was confirmed that the shoulder angular velocity acts as a factor in the increase in flight time and the body center's displacement.

Table 7. Correlation between body center's displacement, flight time, and shoulder angular velocity according to dwigongjungdorachagi.

	Body Center's Displacement	Flight Time	Shoulder Angular Velocity
Body Center's Displacement			
	-		
Flight Time	.953		
	P<.001	-	
	[.898, .988]		
Shoulder Angular Velocity	.809	.809	
	P<.001	*P*<.001	-
	[.698, .987]	[.453, .973]	
Mean	1.37	0.61	1135.43
SD	0.10	0.07	110.52

4. Conclusion and Recommendations

The subjects of this study reached the following conclusions based on the results of kinematic analysis of Taekwondo's dwigongjungdorachagi for 6 national team demonstration members and 6 non-national team demonstration members with over 3 years of demonstration experience.

1) Time required for dwigongjungdorachagi

There was a statistically significant difference in P3 ($p<.05$) of the required time phase.

2) Dwigongjungdorachagi's body center displacement

There was a statistically significant difference in E4 ($p<.05$) of the forward and backward (Z) movement displacements.

3) Dwigongjungdorachagi's lower limb angle

There was a statistically significant difference in the right E4 ($p<.05$) of the right ankle joint angle.

4) Dwigongjungdorachagi's kinematic correlation

The correlation coefficient between the body center's displacement and flight time showed a high correlation and showed a statistically significant difference ($r=.953$, $P=.001$). The correlation coefficient between the angular velocity and the body center's displacement showed a high correlation and showed a statistically significant difference ($r=.809$, $p=.001$). The correlation coefficient between the angular velocity and flight time showed a high correlation and a statistically significant difference ($r=.809$, $p=.001$).

Gathering the conclusions as such, the swing speed of the arm and the angle of the knee joint before jumping during dwigongjungdorachagi provided a great force for projecting the human body into the air and showed the effect of increasing the vertical lift. Hence, it is apparent that the coordination of movements is a very important factor. However, there is a limitation in not being able to measure physical factors in the study. In the future research, physical factors during the dwigongjungdorachagi movement, an analysis of differences according to success and failure, and follow-up studies to articulate the causal relationships ought to be conducted, which is expected to significantly contribute to the improvement of demonstration performance.

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6. Appendix

6.1. Authors contribution

	Initial name	Contribution
Lead Author	JL	-Set of concepts ☑ -Design ☑ -Getting results ☑ -Analysis ☑
Corresponding Author*	BH	-Make a significant contribution to collection ☑ -Final approval of the paper ☑ -Corresponding ☑ -Play a decisive role in modification ☑
Co-Author	HL	-Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑ -Participants in Drafting and Revising Papers ☑ -Someone who can explain all aspects of the paper ☑

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