



저작자표시-비영리-변경금지 2.0 대한민국

이용자는 아래의 조건을 따르는 경우에 한하여 자유롭게

- 이 저작물을 복제, 배포, 전송, 전시, 공연 및 방송할 수 있습니다.

다음과 같은 조건을 따라야 합니다:



저작자표시. 귀하는 원저작자를 표시하여야 합니다.



비영리. 귀하는 이 저작물을 영리 목적으로 이용할 수 없습니다.



변경금지. 귀하는 이 저작물을 개작, 변형 또는 가공할 수 없습니다.

- 귀하는, 이 저작물의 재이용이나 배포의 경우, 이 저작물에 적용된 이용허락조건을 명확하게 나타내어야 합니다.
- 저작권자로부터 별도의 허가를 받으면 이러한 조건들은 적용되지 않습니다.

저작권법에 따른 이용자의 권리는 위의 내용에 의하여 영향을 받지 않습니다.

이것은 [이용허락규약\(Legal Code\)](#)을 이해하기 쉽게 요약한 것입니다.

[Disclaimer](#)

스포츠 매니지먼트 석사 학위논문

How Technology has Influenced in Taekwondo:

Examination of how Electronic Protectors have Altered Taekwondo's
Technique.

과학기술이 태권도에 미치는 영향:

전자호구를 통한 태권도 기술적 측면의 변화 검토

2019년 8월

서울대학교 대학원

체육교육과

Arturo Rolando Alvarez Cardenas



이 논문은 문화체육관광부와 국민체육진흥공단 지원을 받아 수행된 연구임

This work was supported by Ministry of Culture, Sports, and Tourism and Sports Promotion Foundation

Acknowledgements

Before starting, I would like to thank all the people and places who have accompanied me throughout Taekwondo, sports and university.

To the Seoul National University for being my home throughout this course of my master's degree.

I am grateful to the program "Dream Together Master" specially the director Prof. Ph. D. Joon-Ho Kang, for giving me the opportunity to be here to deal my Master in "Global Sports Management", and to acquire the knowledge to change the world of the sport, as well as the sport changes to the world.

To my Advisor Ph. D. Sun-Yong Kwon for teaching me the procedure and for giving me the support to finish my thesis of Mastery in time and form.

To my tutor Yun-Jung Kim for the support always of the work of my thesis.

To all the professors who were part of this program, who contributed to the knowledge of my master in Global Sport Management.

To DTM's staff for doing a wonderful work since my arrival to Korea and making this program succeed (Mr. Hyunsuk Cha, Mr. Changwon Oh, Ms. Seul Lee, Ms. JoungHwa Son)

To Korea Sports Promotion Foundation for investing in my education.

To my classmates of 4th batch, for showing the way.

To my classmates of 5th batch of DTM, specially to the Latin people who were there always in the good and in the bad moments, moments of smile and moments of work (David Hodgson from Costa Rica, Paulina Pino from Ecuador and Mauricio Hernández from Colombia) Thank you, classmates, to each of you for coming to my life, I keep the best things of you, the best of each country, race, culture and religion; with all of you, the world became a larger place, but simultaneously it became a more attainable place.

(An apologize a for these cultural shocks that we had, but we knocked down these barriers across the world language... the language of sport).

To the Universidad del Valle de México for being my soul mater where I graduated as bachelor's in Administration of the Sport & Recreation (Generation 2011 – 2015)

Thanks to my dojang “Dinastía de Guerreros Taekwondo”, for the whole support shared to me from my white belt, up to my current black belt 5th. Dan.

To all my team who formed a part of Jalisco Team (2005 - 2015), to my Mexico National Team (2007 - 2008) all the Sabon Nim who someday shared their knowledge by means of a training and the whole world of taekwondoists that I have run up along this way.

Finally, to mention the most important persons of my life:

To the Kwan Jang Nim Arturo Álvarez Hernández, for all his knowledge that he has shared with me in the discipline of the Taekwondo and he was the fact that induced me in this infinite way of the Martial Arts.

To my father, Arturo Álvarez Hernández (yes, is the same person), who was the supporter to continue the way of the martial arts 365 days of the year, 7 days of the week, 24 hours of the day, inside and out of the dojang, inside and out of home.

My mom, Sorel Cárdenas García, that despite not knowing a lot of Taekwondo, she was always present in my Taekwondo's growth; taking the role of nutritionist, my driver, my cheer and psychologist.

To my brothers (Román and Roldán) for being the best team of Taekwondo that a brother could have.

And finally, thank you South Korea, for opening the doors of your land for my personal enrichment. I declare you as my second native country, thank you for the opportunity, thanks for believing in me.

감사합니다, 대한민국... 화이팅!!!!

Sincerely Randy (란디)

Abstract

How Technology has Influenced in Taekwondo:

Examination of how Electronic Protectors have Altered Taekwondo's Technique

Arturo Rolando Alvarez Cardenas
Global Sport Management
Department of Physical Education
The Graduate School
Seoul National University

A study was conducted on 196 stakeholders of Taekwondo Stakeholders from different backgrounds; to investigate their opinion about the new way of fight Taekwondo with electronic protectors. It was investigated whether they train in the same way than before, if they enjoy the new way of fight Taekwondo with electronic protectors and if is really a necessary tool to referees because it has changed a lot in the last years since Taekwondo starts to use this technology.

Electronic protectors are new technology that World Taekwondo starts to use officially in the World Championship Copenhagen, Denmark, 2009. It starts a new evolution of Taekwondo, the athletes start to use their creativity, invented new kicks that are not part of the regulation of Taekwondo, kicks without techniques, changing the way of fight this sport, doing a passive Taekwondo, with kicks effective to mark score, but less effective in a real combat. Data were gathered through a self-reporting questionnaire. The main method of analyzing data used consisted

of quantitative research with a survey, this method is considered to be a suitable approach to analyze the research questions. Descriptive data and frequencies. In addition to some other analysis which used to validate the entries. The study found certain opinions which are linked with the new way of fighting Taekwondo with electronic protectors related to the new way of training Taekwondo. However, this study found as well a few of opinions and situations in which World Taekwondo did not put attention and significance until after being analyzed using the data collected from the sample. Moreover, some opinions were to a certain extent related with the study's groupers (athletes, coaches and referees) with different role in Taekwondo (Kyorugui, Poomsae and Kyokpa).

Key Words: Taekwondo, Technique, Electronic Protectors, Technology in Sports, Combat, Martial Arts.

Student Number: 2017-24079

Table of Contents

Acknowledgements	i
Abstract	iv
Table of Contents	vi
Lists of Tables	viii
Lists of Figures	ix
Chapter 1. Introduction.	1
1.1 Background	1
1.2 Research Purpose	6
1.3 Significance	6
Chapter 2. Literature Review	8
2.1 Taekwondo	8
2.1.1 Origins of Taekwondo	9
2.1.2 What is Taekwondo?	11
2.1.3 Modalities of Taekwondo	13
2.1.4 From Traditional Taekwondo to Taekwondo as a Sport	14
2.2 Technology & Taekwondo	22
2.2.1 Impact of Technology	22
2.2.2 Technology in Taekwondo	24
2.2.3 Why the Update of Taekwondo	27
2.3 Research Questions & Hypothesis	33
Chapter 3 Method	35
3.1 Introduction	35
3.2 Approach	36

3.3 Research Sample	36
3.4 Survey.....	36
3.3 Variables	37
Chapter 4. Results	39
4.1 Descriptive Statistics.....	39
4.2 Results of Hypotheses	40
4.2.1 Results of Hypothesis 1	40
4.2.2 Analysis of RQ1 & H1	41
4.3 Results of Hypothesis 2.....	42
4.3.1 Analysis of RQ2 & H2	43
4.4 Results of Hypothesis 3.....	44
4.4.1 Analysis of RQ3 & H3	45
Chapter 5. Discussion	47
5.1 Summary of Significant Results	47
5.2 Hypothesis' Analysis (Conclusion)	50
5.3 Limitations.....	51
5.4 Implications	51
5.5 Conclusion	52
Appendix	54
References	55
초록	60

Lists of Tables

Table 1. Hypothesis 1.....	41
Table 2. Hypothesis 1.....	41
Table 3. Hypothesis 2.....	43
Table 4. Hypothesis 2.....	43
Table 5. Hypothesis 3.....	45
Table 6. Hypothesis 3.....	45

Lists of Figures

Figure 1. Hypothesis 1.	41
Figure 2 Hypothesis 2	43
Figure 3 Hypothesis 3	45

Chapter 1. Introduction.

1.1 Background

Sport has been taking an important place in daily life, it is present in different aspects of the society because of the several benefits that sport brings to different stakeholders, such as to improve health, governmental structures, educational systems, training schools, Regardless of the objectives that are proposed, it is a tool that intervenes globally in human development, sport industry and so on. (Torres, 2017)

Due to the impact that sport has, it has evolved dramatically with the use of technology as a fundamental tool. This research will start describing approaches related to sport industry, the involvement of technology in sports and the influence of the use of technology in Taekwondo. (Haake, 2009)

Sports Industry

The industry of the sport constitutes a very wide business that it includes from health to the sale of rights of diffusion and the agreements of sponsorship. In this industry, there are numerous interested parts, from clubs, brands, leagues, and media (Schaefer, 2012)

Business and sport marketing have generated a lot of new works, a new way to see the sport as a business, a sportsman turns in a sport brand, such like Michael Jordan, Tiger Woods or Usain Bolt; moreover, some athletes have used his name to do a brand of casual clothing, as Cristiano Ronaldo or David Beckham, to name but a few.

However, this huge development of sport as industry does not have positive results only, there other consequences and different points of view about it. Mariano Durán, president of the congress, has indicated that "The relation between brands and sport can be excellent, but also it can manage to be perverse, the commercial brands have been used by the different groups been

interested in the industry of the sport to guarantee his position, which has led an increasing merchandising of the sport". (Durán, 2014)

The global sports industry is worth up to \$620 billion nowadays. With growth that is faster than global GDP, its long-term prospects appear strong.

Llewellyn added that the most recent information "suggests that the global income proceeding from the sale of income and the agreements of emission and sponsorship in 2014 came closer 80.000 million dollars", to that is added the sale of goods, sports articles, clothes and equipment to reach 700.000 million. (Durán, 2014)

Technology & Sports

A fundamental factor of sport's industry is technology. Talking about technology, it is considered that this impact reaches almost every aspect within this modern society, and sport industry is not the exception. Sports industry's development is directly related with the integration of technology within its development tools. As technology evolves, sport makes use of it and evolves too.

The technology has been the result of years of work for the need to improve the daily life quality. Among the changes of the world with the arrival of the technology, one of the most common is the sports industry. Thanks to this nowadays the sports are more popular, today there are more people involved in sport than before. Since technology was implemented, sport has spread little by little, beginning with live transmissions or even the video replay, these tools that were aimed at improving the sport performance of the athlete in order to obtain better records and thus, to be more competitive and make the difference in those small details so difficult to reach. These new technologies will change depending on the sport in which they are implemented, but

there was a moment when it exceeded the line of the sports' nature. In this way, the world has changed, the sport has changed then the way to do it too.

Here, we can wonder “How has technology influenced the way of playing sports?” Technology has already covered the sports industry and consequently, the most recognized brands of sports applied this tool too in order to create new technologic products and distribute them among sports. When technology arrived to the International Sport Federations the organizations decided to implement the use of technology into sports, the rules had to be modified to adapt to the new system, which did not favor all sports, some changes of rules altered the nature of the sport. The technology's impact that has had on the sport is vast, positive and negative too.

Examples of the implementation of technology in sport are the designs of uniforms to achieve greater comfort and to improve marks. Also, video cameras in each competition to help referees to take better decisions.

In social media now, they can live broadcast through the internet to social networks in the mobile devices of all the followers in anyplace.

According to the specialist in Sports Marketing Gerardo Molina, the sector of the world economy that moves the most of the money is the sport sector, followed by that of the technology, here we have the 2 biggest industries working, but in spite of being the two major industries, it might not always be well that they work together. (Molina, 2014)

But even if the technology has changed the rules of sports, in some cases this change is good, in another is not the same. This research will be focused on Taekwondo and the influence of technology on it, this is going to be explored thoroughly hereinafter.

Taekwondo & Technology

A few years ago, the protections in taekwondo were to protect fighters' health against the high risk for head and face caused by the kicks' impact, now the fighters only need a slight touch to score.

Herbert Perez, an ex-national team member from the U.S.A. described the new style of taekwondo as "Millennial Taekwondo" because new fighters do not want to take risks during the fight. He opined about the fight of Taoyuan of Taipei vs, Bianca Walkden from Great Britain, in the final fight of WT Grand Prix Series 3, 2018.

Herbert Perez expressed "We have a problem here: No steps and bad technique gets you to bet a superior attacking fighter even if they are not much better". He said that they think like: "I will not actually move when someone attacks cause I can lift my leg", and this is true, the new players fight in defense style and not offensive style, they are attentive to take care of the score, not in doing more.

Where is the intention to do a better kick? Where is the essence of a Martial Art that was created by Korea to defend the invasion of another civilization?

We must remember that taekwondo is a tradition, a culture, not only a game, the effort is physical in athletes, referees must be honest and professionals with abilities and capacities to do a good job, because they were athletes too, sensors in the protectors to capture the impact, gloves, protection, helmets, protection equipment has a largely impacted on how player play, it has changed the rules of sports and the way of training.

One of the objectives of sports is the physical activity, if we allow technology to get too involved, the human effort might be lower, while one of the reasons of sport is the physical activity and the exercise.

If we put the terms sport and martial arts, we must consider that it is a fundamental division in martial arts.

As a matter of fact, Taekwondo consists of many different components, loosely consolidated into two main divisions: “traditional” taekwondo (forms/self-defense), which is associated with conventional martial arts training, and sparring/competition taekwondo, which is considered a combat sport, techniques and methods invented and developed in Korea over the past fifty years.

It has a great division between self-styled, which often emphasizes the spiritual characteristics of martial arts and adheres a fundamental objective of self-defense; before the objective of the martial arts was to defend a whole country from the invaders, in addition, the spiritual peace, wellness, self-control of mind and body.

The modernist side of Taekwondo emphasizes the methods associated with sports training. This division is manifested by the different training methodologies followed by the two fields. There is also a lot of conflict and confusion about how to deal with sports aspects on a philosophical level.

This comparison is to understand the difference between traditionalist and modernist taekwondo, which represents the root that caused many changes in this sport. This research’s framework will describe the change that taekwondo has had since the entry of technology into this martial art.

It is considered that Taekwondo needs a change in the system due to the use of technology this sport is losing its essence, respect and the principal objective of the taekwondo. All the sports evolve, but this one is losing its main essence with the arrival of the technology and the influence of the COI in the sports when taekwondo was in its best moment.

The use of electronic protectors has affected the way of fighting in Taekwondo. Thus, the International Taekwondo Federation has been constantly changing the fights' rules in order to try to keep the old style of taekwondo, instead of removing the electronic protectors.

1.2 Research Purpose

The purpose of this research is to investigate the perspectives of athletes and coaches about the new way of fighting in taekwondo, and about the taekwondo attractiveness comparing before and after the use of electronic protectors. Furthermore, the opinion of referees, in order to know if it is a necessary tool for them to sentence better the matches.

The methodology to be applied for the present research is quantitative which involves gathering data to create a questionnaire and describing the results in a form of tables, charts, and graphics. The respondents are taekwondo athletes, coaches, and referees from Mexico.

1.3 Significance

For taekwondo, the use of technology brought significant changes. This evolution has been influenced by historical and political aspects, by competitive, social and cultural forces which cannot be ignored in any comprehensive analysis. Especially for societies where taekwondo is considered part of the society itself, as it is the case of the Republic of Korea, where the Taekwondo is not only a sport or martial art, it is culture and history among the Korean population.

Martial Arts are one of the first and foremost physical activity, the essential and fundamental element is the practical training, physical activity is the foundation on which the mental and spiritual aspects of martial arts have their basis. Moreover, only with a focus on the sports angle, the spiritual aspects of Martial Arts may be the ultimate objective of many practitioners and instructors.

The significance of this research lies on the valuable approach it will provide to continue the right path to develop taekwondo, especially for societies where this sport has a high social impact.

Chapter 2. Literature Review

In the literature review, the researcher will describe a theory related to the topic from different sources; for example, books, articles, journals and data bases.

First, the researcher will analyze the opinion of Taekwondo's Masters, through books. This will provide the conceptualization that experts have about the new way of practicing taekwondo.

Secondly, the definition of taekwondo lifestyle, the basic concept, and characteristic of sports lifestyle. Is the new way of practicing martial arts considered as a lifestyle?

In addition, the position of martial arts' lifestyle and other related terms, such as action sports and sport for all in general. Likewise, this part will also cover the theories of how significant sports lifestyle and youth participation are.

Furthermore, it will talk about the participation of taekwondo in the Olympics as a sport. Was the incorporation of taekwondo in the Olympic Games an evolution or a setback?

Finally, all these interconnected theories allow formulating questions that will be examined thoroughly with the quantitative research.

2.1 Taekwondo

As J. Caputo defined:

“Taekwondo rejects that concept of sport, where the aim is only the victory without considering proceeding or the means. From the point of view of the Taekwondo, the sport is not an aim in itself, but an important way that, as it was said, collaborates to generate better martial artists and persons raised for benefit of the society”. (2018)

2.1.1 Origins of Taekwondo

Taekwondo is a martial art created by General Choi Hong Hi in the Republic of Korea in 1955, which is based on Taekkyeon, a much older traditional martial art from the Korean peninsula, and Japanese Shotokan karate. (Southwick, 1998) In order to understand what is taekwondo, it is important to analyze the meaning of Martial Arts.

2.1.2.1 What are “Martial Arts”?

Martial Arts are different methods of combat without weapons, used in its origin in wars in the Far East and in accordance with philosophical concepts in Eastern Asia, especially in Buddhism Zen. At the beginning of century VI B.C. a priest and Indian knight carry the Buddhism Zen to China together with a system of self-defense exercise. The exercises evolved into a form of boxing that, along with Zen, spread throughout China and in the twelfth century it reached Japan. (Chova Blasco, 2007). It is important to understand the meaning of Martial Arts from its etymology.

Martial

Martial whose word derives from the Latin *martialis* that represents Mars, the god of the war in Greek mythology. So, the martial art concept alludes to systems for war and fight (Rocio, 2001)

Art

Etymologically, the word art comes from the Latin *ars, artis*, and this in turn from the Greek *τέχνη (téchne)*, which means "technique".

Art is any form of creative expression that a human being can have. It is about expressing feelings, emotions and perceptions about their experiences and creativity through an infinity of forms and techniques. (“What is art?,” n.d.)

2.1.2.2 History of Taekwondo

Within Korea there were five major martial art academies or Kwans. They were called Mooduk Kwan, Jido Kwan, Changmu Kwan, Chungdo Kwan, and Songmu Kwan.

The way of teaching and employing many of the techniques varied as much as the schools and in 1946 an attempt was made to unify Dojangs and standardize instructional methods. Some of the leaders wanted to uphold the martial art character of the schools while others wished to create a combat sport.

In 1955 a board of instructors, historians and prominent society members sat down to coordinate all the schools and select a name for the hopefully unified art. In April 1955 a new name was from a group of names by the board, it was Taekwondo. (Southwick, 1998)

In 1955 Taekwondo is a martial art created by General Choi Hong Hi in the Republic of Korea. (Goldman, 2002)

On the 30th of November 1972, Kukkiwon was established

On the 28th of May 1973, the World Taekwondo Federation was established.

On the 17th of September 1988 Taekwondo participated in the XXIV Seoul Olympics as a demonstration sport.

On the 27th of September 2000 Official Olympic event of the XXVII Sydney Olympic Games.

(“Taekwondo Museum,” 2013)

Taekwondo Nowadays

Taekwondo today is just as exciting as ever. This martial art is under the leadership of World Taekwondo, headed by the Dr. Chungwon Choue since 2004, (He is the second president of the WT, after occupying the place of Un Yong Kim 1973 – 2004)

Has grown into an international art and sport practiced in over 194 countries worldwide.
(“Taekwondo Museum,” 2013)

With the effort and variety of techniques and abilities of taekwondo, this received enough attention from UNESCO, and this was the first Martial Art to be in World Heritage Site in 2011, this was almost the first intangible World Cultural Heritage.

(“Intangible Heritage - Culture Sector - UNESCO,” n.d.)

Up to 2016, 80 million soul practice taekwondo in the world. With an active presence in 209 countries of the world, the Taekwondo continues leading the list of the martial arts most practiced.

Currently Taekwondo is part of Olympic program at XXXII Summer Olympic Games, Tokyo 2020.

Some of the current situations that is happened in actual taekwondo are similar in his history, the technology of new weapons as gunpowder delays the development in taekwondo, the arrive of technology has done easier the human work, but the sports are human effort, physical activity.

I will talk about “How technology has influenced in Taekwondo”, it is an Examination of electronic protectors have altered Taekwondo’s technique.

2.1.2 What is Taekwondo?

Taekwondo is a general martial art that trains the mind and body. Physically, mostly hands and feet are used for learning attack and defense, while, mentally, this traditional Korean martial art, now a world sport, promotes completion of one’s character through training.

Taekwondo originally had forms known as Poomsae, Kyokpa, Self-Defense Techniques, Kyorugi, The Kyorugi forms were adopted for the Games, and recently the Poomsae as well.

Practiced regularly, it provides resistance, greater agility and a harmonious development of the physique, it does not only use physical training but also mental and spiritual. (“Taekwondo Museum,” 2013)

Plato believed that humans could be divided into 3 parts: the body, the mind and the soul. The body is the physical part of the human being that is only related to the material world, and through which we are able to experience the world we live in; it wants to experience self-gratification; it is mortal, and when it dies, it is truly dead. The mind is directed towards the heavenly realm of Ideas, and is immortal. It is with our minds that we are able to understand the eternal world of the Forms; when it “dies”, it returns to the realm of Ideas. The soul is the driving force of the body, that it is what gives us our identity. (Plato, n.d.)

2.1.2.1 Etymology of Tae Kwon Do

The name Taekwondo is derived from the Korean words:

"Tae" (태) meaning tread (foot), denotes various foot techniques of taekwondo. By training the lower body based on leg movements including kick, stretch, and stepping, from "Tae" we can develop overall physical balance, quickness, and agility.

"Kwon" (권) meaning fist. Denotes precise hand techniques. By training the upper body using the fist, elbow, and palm, one can learn a proper posture and breathing to obtain a healthy body.

"Do" (도) means way, it denotes mental training in Taekwondo. It emphasizes the proper way of being, through training of the mind and completing character. So, literally Taekwondo means "the way of the foot and fist". (“Taekwondo Museum,” 2013)

The name Taekwondo, however, has only been used since 1955 when Naming Committee designated the name “Taekwondo” while the arts' roots began 2,333 years b.C. in Korea. Known as a martial art and way of life, the evolution of Taekwondo was a direct result of the happenings in Korea long ago, and knowledge of the history is an important step in understanding Taekwondo. (Southwick, 1998)

2.1.2.2 Philosophy of the Taekwondo

Philosophically, Taekwondo has as the main aim to train people to acquire greater self-confidence in themselves, the Taekwondo player learns to forge his own spirit through resignations and, above all, perseverance; Taekwondo training is to develop the body and complete the character. Proper training of Taekwondo can result in proper habits, healthy body, and upright mind and indomitable spirit. (“Philosophy of Taekwondo,” n.d.)

2.1.3 Modalities of Taekwondo

The basis of this martial art is the learning that leads the person to relate and also help the others to overcome each other, regardless of overcoming, the athlete must be formed and live situations as well as different experiences in the martial world to transfer them to other situations of his life.

Taekwondo player gains confidence in himself in training to face all the difficulties that may arise, something that is achieved through physical-sporting practice but with special emphasis on the ethical and moral aspect.

Taekwondo trains the body, mind, and soul, then it becomes a complete sport that helps to develop in perfect balance through its 4 modalities:

Poomsae (품새): is used as an element that shows the power and moderation of Taekwondo including designated and creative Poomsaes.

Poomsaes are the basics postures of Taekwondo.

Kyokpa (격파): strong power and high techniques are shown to display the spirit of Taekwondo.

Is a training method to the scientific system of Taekwondo techniques and spirit of challenge and concentration, and the power varies depending on the body part and range of movement. Kyokpa is the completion of Taekwondo training that uses the mindset power, and technique. Trainees can obtain proper techniques and strong mental power through Kyokpa.

Self – Defense Techniques (호신술): Self-defense expresses the practical features of Taekwondo most effectively and can deliver the value of Taekwondo as martial art.

Also, you can obtain skills to protect yourself and the weak by overcoming the opponent’s threat.

Kyorugui (겨루기): is a process of training attack and defense skills based on basic postures of poomsaes. Through kyorugui training, one can develop distance, control, judgment for setting the target, speed for effective attack, and conditioned reflex to the opponent’s move.

Kyorugui is conducted according to certain rules. By specializing techniques that can be used in actual games, it shows the powerful and active sides of taekwondo. (“Taekwondo Museum,” 2013)

2.1.4 From Traditional Taekwondo to Taekwondo as a Sport

2.1.4.1 Traditional Taekwondo

Throughout this study, “Traditional Taekwondo,” refers to a school that uses training methods which preserve and pursue conventional self-defense oriented martial arts objectives. As a fundamental training methodology, traditional taekwondo stresses the practice of basics forms, and repetitive patterns and stance postures that tend to be somewhat static in execution. Moreover, training routines and policies to be conservative in nature with an emphasis on copying the teacher as closely as possible. (Moenig, 2016)

2.1.4.2 Taekwondo as a Sport

In contrast, the full-contact, sparring-based, training activities that feature competitions and sporting character as a central basis, this term refers only on the sparring style practiced by the World Taekwondo Federation, which is recognized as an Olympic sport.

World Taekwondo has marketed taekwondo dojangs and recreational clubs retain many traditional taekwondo training elements, as well, in addition, World Taekwondo has introduced a variety of new activities such as demonstration Taekwondo and aerobics, while “Olympic Style Tae Kwon Do” represents really only the “sparring/competition element” of the WT.

“competitive sports” in contrast to “recreational sports” I want to emphasize that those students who train taekwondo as a recreational sport, nevertheless can and should engage in sparring competitions.

I avoided the term “modern taekwondo” in connection with “competition taekwondo,” because “traditional taekwondo” also developed some new training elements and activities in modern times such as demonstration Taekwondo, modern forms contests, and artistic performance. These elements are often loosely related to traditional Taekwondo in terms of technique, methodology, and spirit.

In addition, these elements are often practiced and supported by the same practitioners that regard themselves as followers of traditional Taekwondo. (Moenig, 2016)

The World Taekwondo Federation defines Taekwondo in this way:

“WT leads the most inclusive and accessible combat sport, which combines the values of an ancient Asian heritage with the values of a global elite sport. Taekwondo evolves on a solid base, mixing the traditional and the modern. The values recognized by practitioners and partners are the strength of our sport. They are distilled from those found in our society: the search for pleasure,

surpassing oneself, perseverance, moral and physical strength, and respect for others”. (“About WTF - World Taekwondo,” 2015)

2.1.4.3 Taekwondo Population

Eighty million enthusiasts practice taekwondo in the world. This one is the number that arises from the last report carried out by Taekwondo's World Federation (2016)

With an active presence in 209 countries of the world, the Taekwondo continues leading the list of the martial arts most practiced in the planet, in agreement to the following continental distribution of national associations members of the World Taekwondo Federation.

Medical instructors who constitute this record number for the combative sports are a product of the great opening that the taekwondo had in this 21st century, on having overturned principally to the Olympic international movement.

From the most basic foundations constituted in the Academies, Clubs, and Schools of Taekwondo, the practicing basics have found a great incentive to develop in the area of the Taekwondo, motivated by the great media repercussion of the Olympic Games.

And after five Olympic successful cycles in which it has informed our sport, the results could mark a notable trend. (Sánchez, 2016)

Taekwondo, which became a world sport, is now practiced in total five continental unions and 209 members states as of June 2018. In addition to training the mind and body, Taekwondo practice the Olympic spirit of peace and harmony, and also is spreading around the world a martial art that teaches proper growth and sense of community to the youth.

2.1.4.4 Expansion of Taekwondo Around the World

The Federation International of Football Association realized a survey that threw a surprising result both for the bulky number and for the fans' increase of the most popular sport of

the planet. According to the survey effected by the FIFA among its 207 associations member, there is a total of 270 million persons who play football, of ruled form, in the whole world. (“Cuántas personas juegan al fútbol en el mundo - Infobae,” 2018)

If we do a comparative with the Taekwondo, is a third part of the most popular sport in the world, is really a great population. But World Taekwondo has more associations’ members than Football. Taekwondo is the most popular martial art on the planet.

Countries that practice Taekwondo:

Continent	Countries
Africa	52
America	45
Asia	43
Europa	50
Oceania	19

The number of black belts in the world.

Continent	Black Belts
Africa	32,407
America	305,898
Asia	8’060,420
Europa	109,509
Oceania	25,939

Expansion to Africa

After the government began to dispatch masters from the late 1960's, the local governments invited them to instruct the police and military.

Taekwondo began to spread largely from the 1990's. Among total 50 African member countries, 2 joined the World Taekwondo Federation during the 1990's and 25 since 2000. The continental federation of taekwondo in Africa is the Africa Taekwondo Union (AFTU) and is located in Cairo, Egypt.

Expansion to America

Individual masters who personally went to America started to spread the sport. 14 countries during 1970's, 11 during the 1980's, and 16 during 1990's joined World Taekwondo Federation, which continuously grew and development. The continental federation of taekwondo in America is the Pan American Taekwondo Union (PATU).

Expansion to Asia

In the 1960's, it was promoted and spread by masters sent by the government. The active promotion resulted in 18 countries joining the World Taekwondo Federation during 1970's. In the 1990's, when it was confirmed as an official Olympic event, 13 countries joined and it continued to be spread widely. The continental federation of taekwondo in Asia is the Asian Union of Taekwondo (ATU) and is located in Seoul, South Korea.

Expansion to Europe

This continent has the largest number of member states in the World Taekwondo Federation. Activated since it was selected as a demonstration event for the 1988 Seoul Olympics. Among the current 50 European members states, 23 joined during 1990's.

The continental federation of taekwondo in Europe is the European Taekwondo Union (ETU) and is located in Oldenzaal, Netherlands.

Expansion to Oceania

Mostly spread by master who went to study. Among 19 Oceanian members states, 12 joined after 2000. The continental federation of taekwondo in Oceania is the Oceania Taekwondo Union (OTU).

2.1.4.4.1 Evolution of taekwondo as a sport

Taekwondo tries a more pacific and united world, without distinction of races or creeds, across the exercise of its principles and of its moral culture.

The practice of the Taekwondo is not opposed to the sports competition. Very on the contrary, it is promoting it, since finds in the sport a series of virtues that are identified deeply by the own purposes of the martial art.

Improvement of the own performance, health, fellowship, honor. The sports challenge and the challenges in general, they strengthen the spirit of the martial artist. (Caputo J., 2018)

The influence of sport in taekwondo as a martial art has been distinctive in the last years if we compare, XXIX Olympic Games Beijing 2008, vs. XXX Olympic Games London 2012, and after XXXI Olympic Games Rio 2016, in two editions of Olympic games, it was on of the most notable.

After implementing the electronic protector in London 2012, and seeing the change in the way of fighting the taekwondo which has a lot of details to improve, it is decided to add the electronic helmet, with a similar result in the way of fight, scores of kicks not clear, scoring in the marking to the minimum contact, increasing the number of kicks and lowering the quality.

Altering the form of the area, changing the squared form to octagonal.

One of the most notable, the color of dobok, changing the white pants to bolds colors, now fighters will be able to use pants of any color.

In the dobok is the soul of Korea and the ancient centuries of tradition are alive, the dobok has a significance in each one of its pieces, name, and color.

Dobok has a history, Taekwondo has a beginning more sacred and more ancient than the sports brands that produce today the dobok, for this reason, it has that form and those colors, the sports marketing should not influence in that way by the beginning of the martial arts.

Our dobok deserves a treatment of respect, is our outfit in the way of realization of taekwondo, in the battles, in our victories and defeats, it keeps the sweat that we spill in our training that multiplies for years of sacrifice with the time, brands must not come to impose a "new mode" in one of the most important events as Olympic Games where the people are more focus on our sport as in any other event, especially now that increasingly people see the Olympics due to the scope that has had now by the technology of internet.

"The Dobok of Taekwondo must demonstrate humility, purity, and simplicity". (Soto, 2016)

Taekwondo has had more changes since 2005 to 2013, than since 1969 to 2005. The Olympics are one of the best things that have happened to Taekwondo, with Olympic Games, Taekwondo starts to be more famous, and the sports brands start to invest in this sport, but it has influenced in a lot of changes on taekwondo, and something of this, are versus of beginning of Taekwondo and martial arts, little by little the marketing started influencing in taekwondo and the changes were abundant, treating that the taekwondo was mating to being similar to other sports, leaving aside that our sport is a martial art, up to the taekwondo, it is the one and only martial art that uses technology in its competitions, on another hand the combative sports in Olympic Games as the boxing, it has initiated since Rio 2016, to remove the helmets of the competitions, to make

it more similar to the professional, more spectacular style. The professional Taekwondo TK5 has been a success last years, because it has a spectacle inside and outside of the area, being a style of it fights faster, aggressive and spectacular, without technology using directly in the athletes, looking for a way for taekwondo to have this style, it will have a major success, being a spectacular sport, preserving its martial style at the moment of fighting. Pure Taekwondo is enough.

2.1.4.4.2 Characteristics of Taekwondo Old vs. New

When Taekwondo began with the first World Championships, the rules were totally different, points had different value, kick in body or head was the same point as punch, the rules have been evolving with the time, it was evolving constantly, in Olympic Games Sydney 2000, it was reached two points in the head and one point in body, removing the point of punch in body, that was only used to cut or to take distance; this way was kept even in Olympic Games Beijing 2008, the last official competence of taekwondo with conventional chest guards.

The fights were more continuous, attractive and spectacular because the fighters were focused on scoring more, if we see the fights now, they are interested in taking care of the points, not in accumulating more. Usually the fighters do Taekwondo in a defensive style, before the Olympic Games, all the athletes had totally a different style, some athletes preferred to fight with direct kicks, other with spin kicks, exchanges of kicks, some preferred to fight fast, others preferred to fight strong, others smartly and each fighter had their own style.

Measuring of old and new style: If we compare old taekwondo versus the new one, the rules are different, techniques are different, now athletes have invented new kicks without techniques, the new logic of taekwondo, does not care if is a good kick, now is not necessarily a real punch with precision, technique, and power; the new style of taekwondo is only to connect the sensor of

breastplate with the sensor of foot, it does not matter if it is a good or bad technique in the kick, if it is strong or not, to put the sensors together is enough, these are the rules.

New Taekwondo makes the athletes win with less kam-jeong, for this reason, they are more focused on not having a kam-jeong than making a good kick or a good fight, as said before, in the interest is to fight in a defensive style, and it does a slower Taekwondo, fights without risk. Adidas and DaeDo were interested in this project and they worked to design a better technology.

The first time in Olympic Games that the protectors with sensors were introduced was at London 2012, three years after the debut of electronic protector (World Championship Denmark 2009), they were the first Olympic Games with electronic breastplate, changing a little bit some rules, the athletes were adapting to a new system of competence.

Four years after, at the Rio Olympics in 2016, competitors began wearing an electronic helmet that electronically scores kicks to the head.

That's not the only change: Taekwondo fighters now enter an octagonal mat instead of a square, competitors are being scored an extra point for any kick where they turn their backs as a way to encourage use constantly spinning techniques for the first time. (Soong, 2016)

But again Taekwondo has problems, the rules have been changing constantly and this is not good for athletes, coaches, and public.

2.2 Technology & Taekwondo

2.2.1 Impact of Technology

“The technology is a social work strength because it implies the utilization of scientific procedures under the command of the capital.” (Katz, 1997)

The technology is innovation with exponential growth in the last years that catches us constantly. But the question is: how does it influence us as a society? It is necessary to think the

question from several angles or perspectives, let's see how it has affected us in terms of the informatics development, the virtual relations grew sharply in recent years. Everything is due to the technology, but, is there some problem with this computational subject matter? The answer is “yes”. The disadvantage is the constant dependence on sticking to virtual life.

As Jawaaz Ahmed said:

“Technology has changed our lives, increasing the speed of time. We, as humans, have invented and developed technologies to make the best of our lives. Now technology is changing our lives every second. Robots are our new models, and in the end, robots can control this world. Technology is now trying to enter our body.”

“Technology is now trying to enter in our body”, (Ahmed, 2017) it is the case of new electronic equipment in sports, in this case in taekwondo.

“Technology is the flower of life, not the killer of productivity. We look like human robots and this is the greatest example of how technology has changed our lives positively and negatively”.

Technology must be a tool to help the daily life and seize the best of it, but now we start to “look like robots” and this is the way that technology impact negatively in physical activity.

“New technologies and inventions are the results of our curiosity, creativity, and problem-solving techniques”. (2017)

The World Taekwondo Federation searched the way of problem-solving with the wrongs of referees in the moment of scoring the fights because the human eye cannot see all the details, and they do not mark all the points.

Now, electronic protector marks the points, but taekwondo become static and slower, where is the advance? this technology is a tool to help judges, not athletes, not Taekwondo. If there are a lot of referees qualified and good in their job, why are the sensors doing all the work? these devices are the only ones that are marking the scores.

To avoid the monotony in techniques and fair play, we can mix both jobs, referees doing their work, and referees marking the points.

Then, there are the researchers that came to recognize the need to examine both negative and positive aspects of the technology in our lives. The concept of technology showed that it now is part of all that we do in our lives, now we depend on technology in our daily life, the sports must be part of our daily life, for this reason, the technology entered in the sports too. The technology in the sport is in use or is thought used to improve the different areas of which it is difficult to differ to the human eye or simply to perfect the quality of a sport, but that does not favor to all the sports equally, is the case of martial arts.

Taekwondo has been one of the sports that has evolved the most. It is the most popular martial art, for such reason more technology has been implemented in its competition, and it has been affected the most.

2.2.2 Technology in Taekwondo

There's a technological revolution occurring in taekwondo that is changing the look of the sport and it might take time to get used to it.

Tradition is giving way to modern rules that are aimed to bring more excitement to the sport and help to provide a fairer scoring system. But with each change, the sport moves away from the ancient martial art in which is rooted in, the one that emphasizes powerful kicks absent in some of the modern matches. (Soong, 2016)

What would the Korean army think with regard to the latest changes in Taekwondo? What would they think about what has brought the current evolution of a Martial Art that was created by the dynasties Koguryo, Silla, and Paekje to defend his country from the invasion of Japan in 1592?

The skills in the martial arts were the only qualifications needed to belong to the military forces, because the kingdom needed the capacities of national defense after conquering the peninsula, therefore, Taekwondo is a sport that can damage with its technique. Taekwondo is a sport in which technology is not needed to carry it out, at the beginning of this discipline, one was not using the technology, they were not using any weapons, only body versus body, even in the first world championships, the breast-plate was only used to distinguishing the red or blue fighter, not for protection, later for the safety of the athlete, one started using a breastplate for protection; now the purpose of the breastplate is to mark points and is the electronic breast-plate, a system is doing the work of referees, and it is not doing it better.

It is always important to study Taekwondo's Fighters because they are the essence of this sport, especially Koreans because they are the founders of this martial art.

How many of the competitive fighters agree with the implementation of the technology in his sport?

Some of the new fighters commonly mention the expression that "It is necessary to adapt to the new technology", they are the new faces of the Martial Arts. They said that if all the world evolves, they have to evolve, but the reality is that one of the essences of the sport is the physical activity, which diminishes very much with the technology. The problem is that the new taekwondo is better for them, the high and thin bodies have better scope to touch a breastplate, but not to really damage in one fight as the classic fighters of any martial art.

Taekwondo had a great evolution in its area many years ago, it would have been an evolution for the health of fighters because taekwondo was a sport with a serious kicks, the evolution must have a limit, and this limit has been overstepped by having wanted to replace electronic technology instead of referees.

It could be that modifications in rules that the World Taekwondo Federation does sometimes are enough, but not a whole change in way of fighting, what the new system of electronic breastplate has done.

2.2.2.1 Investment in Electronic Equipment

LaJust, DaeDo, Adidas, and KP&P, have invested a lot of money to be the brand of electronic protectors of Taekwondo, if they are present in electronic protectors, they going to be the brand that stands out the most in the events, if its logotype is in the breastplate and helmet, it will be present in publicity for a long time in pictures, videos, social media, T.V., etcetera.

Unfortunately, the brands have been changing the style of taekwondo, they are only interested in promoting its brand, but not really in doing a sport more competitive, spectacular, or thinking about creating better athletes with more and new abilities, the technology is hindering taekwondo. They are trying put in a better position its brand, no matter what they affect directly in the sport.

Why have not they invented equipment that does not have the necessity to score the points without changing technique? is it because they do not want? No, because this is not possible; Taekwondo is a sport that measures the capacity of fight body to body, not with the system on, taekwondo was invented to fight strong, its essence is aggressiveness, fight as a warrior, it does not matter to be careful in defending oneself taekwondo players know that is more important to

attack than to defend, and this new system of taekwondo is doing a passive taekwondo, the new fighters are interested in taking care of points, not in doing more.

How can the World Taekwondo Federation recover the investment of the electronic chest guards? More conventional chest guards will be sold. The sport tends to do spectacle to them, to invite more people to see a show, with chest guards the spectacle got lost, to remove the electronic chest guards will be the best investment of Taekwondo.

We can see now that one of the sports with most spectators is Mixed Martial Arts, this sport is a spectacle because is the closest to a real fight, the sports of fight are the most spectaculars, these sports are one of the most popular in the world, both are under top 15 with major television hearing, this is a great advantage for taekwondo as a combat sport, taekwondo was one of the most popular sports in Olympic Games, but it has been losing popularity for the way of fight this martial art, it could be one of the most popular on T.V. if we use good marketing and do this sport with stronger fights.

2.2.3 Why the Update of Taekwondo

The update is so important in anyplace, the world is constantly renovating with technology, and as already mentioned, sport will not be the exception.

Each year, International Olympic Committee, demands an update to International Federation of sports that participate in Olympic Games, it needs new equipment, new technology in Olympic Games.

Taekwondo all the time has had controversy in its sport, as in all the sports, mainly in the combat ones. Taekwondo was in one of the best moments, but there was a problem with referees in XXIX Olympic Games Beijing 2008, when Ángel Matos from Cuba kicked a referee in the face, in an event that promotes the union and peace, in a place where people from around the world was

seeing the event, including children, it was a bad example for them, this alarmed even more the International Olympic Committee, if Taekwondo does not do anything, it might have problems in Olympic Games, IOC asked to fix this problems, Taekwondo was already working in electronic protectors, but this process was accelerated. After one year in the World Championship Denmark 2009, WTF presented for the first time electronic chest guard, brand LaJust, a chest guard heavy and difficult to mark, it was the new technology in taekwondo, it was the beginning of a new era of taekwondo, then, Adidas, DaeDo, and KP&P entered to the market, each brand trying to be the best, as all projects, they had wrongs, it has been changed very fast, each year the rules change several times, the athletes must change the way of fight and then the way of training, it makes that the level of taekwondo does not advance, a lot of changes of taekwondo, change of style, and the team will be changing of athletes constantly.

In the case of taekwondo, it was because of the risk to be removed from Olympic Games after the problem with the Cuban Angel Matos in Beijing 2008, for this reason, Committee Olympic International ask to the World Taekwondo Federation new technology to mark fights in a clearer way, and World Taekwondo starts to search a new way to score its matches in a more transparent way.

The spectacle of Olympic Games must be in constant change in all events and taekwondo had a time that did not change much in itself, and IOC asks for a revolution.

World Taekwondo searched a new technology in its sport. If taekwondo would not have implemented electronic chest guards, perhaps it would have been removed from Olympic Games; we could say that electronic protector was the savior of taekwondo in Olympics. Therefore, it was the “why the update of taekwondo?”

2.2.3.1 The Significance of updating Taekwondo

The sports have been updated with the time, to give a major spectacle and a major performance to the athletes; even in order that some athletes with disabilities could adapt, we can see cases where Paralympic athletes use prothesis and can compete in the conventional category, as Oscar Leonard Carl Pistorius; the technology works to give them the tools and reach their aims.

But on some occasions these technologies have been rejected, here I investigated some examples in the most popular sports as it is the Swimming. The case of technology in another sport, swimming: why are the suits of polyurethane prohibited in the competitions if they help the athletes to give a few better marks? The International Federation of Swimming (FINA) prohibited the use of 10 swimsuits of high technology months before the world championship of swimming that was carried out in Rome, Italy in the year of 2009.

18 months before, more than 100 records of swimming were broken, something before I never dress and awaited little.

In the last international competitions more than 75 % of the successful competitors used swimsuits of high technology, FINA decides to check the characteristics suits made by the suppliers, in order to evaluate the standards of the articles. The major controversy turns concerning the suits of cutlery totally of polyurethane that help the flotation since the former suits had only sheets made with this material.

The FINA warned that the swimsuits that should be used in competitions must not cover the neck, to spread beyond the shoulders and the ankles.

As it informed, "the material of the suit must not include elements or systems that create effects of catching the air or the water during his use, not even being made for it".

The opinions about the decision of the FINA are polarized. Whereas there exist, swimmers who defend the suits bath of high technology because they allow them a major performance, there are those who think that finally the day to prohibit them came.

"The integrity of the sport is the man in the water. The swimsuit must be neutral and not a help to swim". (BBC, 2009)

2.2.3.2 Efficacy of this update

The electronic protectors in taekwondo have done an easier work for the referees, but at the same time, the athletes have changed the way of training and then the way of the fight, doing a static taekwondo, a taekwondo with less movements and variety, less speed and strength; more precise in score, less precise in kicks, a fair system on score in points, unfair system in effort of the fighters. Now the fighters prefer not to take a risk in attack or to connect a good kick because they can lift the leg and mark points without greater effort, taekwondo is a sport of effort and effective kicks, taekwondo is more than just marking points, this requires extra effort, taekwondo is martial art with more variety in kicks, the new system is doing fights with fewer kicks in the combats.

Is more important the way of fighting taekwondo than making an easier system to do the work of referees, anyway there will be in area marking extra points for spin kicks and kicks to the head, we could use another technology, technology in body is not the only option to do a fair fight, a different system that does not change the way of fighting.

The real efficacy of the update using electronic protectors in taekwondo has been for the judges because they are actually doing the work of them, it is a tool for referees not for taekwondo, it has no efficacy for the athletes, contrariwise, is changing a lot the essence of taekwondo as a martial art.

The efficacy of electronic protectors is a tool considered in referees, with the intention of having an easier work and doing fair taekwondo, the referees do not have the capacity to see each detail in the fights, but we could use another system.

The technology does the boring works, the works that the people do not want to do, being referee is a work that the people of taekwondo want to do.

2.2.3.3 Update of Electronic Protectors

The first LaJust electronic breastplates did not mark easily, it took a lot of strength to mark and made the taekwondo fights more static, watching more power fights and fewer exchanges, losing their speed a bit.

Later with the DaeDo breastplates, you had the sensors a little more accessible to the instep, and for that reason it marked with more frequency, the athletes found the way to stick on the appropriate sensors and have even come up with inventing kicks aiming to mark points, kicks without force, speed, technique or power, just a kick that touches the sensor in short distances, when taekwondo is a martial art to fight from long distance.

After KP&P arrived with a new system in the way of marking the points, currently are the official brand in the tournaments of Taekwondo, this protector has a better system, but these brands must strive more to make a system to do a better Taekwondo.

MMA fighters prefer taekwondo to learn how to handle kicks in their battles, as they describe them as high-impact kicks.

2.2.3.4 Taekwondo athletes' and spectators' decrease

The most important event of Taekwondo is the Olympic Games, it must be its best ranking. Despite its popularity, Taekwondo is not a common sport on television as football, basketball,

baseball, etcetera, sports that all the time is on TV, the people wait for a good event to see taekwondo, the best one is Olympic Games.

The spectators wait 4 years to see in action their idols of tatami, almost all taekwondo players see these fights in all the world, is the best moment to see the elite in action.

In XXIX Olympic Games Beijing 2008, Taekwondo was the 9 sport most popular in Olympic Games, this was because, in edition XXVIII Athens 2004, taekwondo did excellent work in its fights.

John-Paul Ford Rojas said in his article wrote on telegraph that the XXX edition of Olympic Games London 2012 was the most watched in all the history in Olympics.

The “reach” of the Games was 50.2 million, representing 87% of the population. Previously, football World Cups have reached 85%. (2012)

If the most watched part of the Olympic Games was “Bolt’s performance to win the men’s 100m” is because was an historic moment, where one page in Olympic history would be written, the same case in taekwondo, was one of the most important too, it was where the athlete Steven Lopez (the best taekwondo player in history) was the first taekwondo athlete in fight 4 continuous Olympic Games (Actually five with Rio 2016) breaking a new record in this sport.

The whole audience would not lose this historic moment of our sport, this time Olympic Games were different, the first Olympic Games with electronic protector, one part of the audience (taekwondo’s players audience) already expected a new way of fight with the new system, on another hand, the audience that does not practice taekwondo, were not updated with “new taekwondo” and they saw a very different sport, with less contact, most of the time using front leg with “cut” to assure score without risk. Because now a system counts a score, this system does not

have reasoning to count a kick with or without technic, the new system does not think only works. Fights without spectacle kicks without techniques not aiming to make spectacular fights are now in taekwondo, now an athlete is punished more when he falls down for an advanced skill tried than for a single skill. The spectators do not want to see to athletes doing an easy kick, this system is changing the rules constantly and making a sport with less movement, less spectacle, and a less real fight.

In Rio 2016 Taekwondo fall down three places, it was the 12 sport most popular in these games. Taekwondo was in Top 10 of sports most seen in Olympic Games, now Taekwondo is out of this list, is losing audience.

Based on Mindshare found that 75 percent of the 1,034 adults it polled planned to watch the Olympic Games in Rio 2016.

That's not quite Super Bowl-level viewership, but it ranks higher than the Oscars and the Emmys. It is a unifying event. It appeals to almost everybody.

61 percent for combat sports (just 49 percent of women). (Ariens, 2016)

2.3 Research Questions & Hypothesis

From the deep exploration about taekwondo and the influence of the use of technology on it, the researcher brings the following research questions:

RQ1. What are the perspectives of athletes, coaches, and referees of the new way of fighting with electronic protectors in taekwondo?

RQ2. Taekwondo's people enjoy the fights of Taekwondo in the same way conventional and electronic protectors?

RQ3. Are electronic protectors really a necessary and indispensable tool for referees?

According to the previously described research questions, three hypotheses are formulated:

H1: The effectiveness of using the electronic protectors in Taekwondo is the same from the perspectives of athletes, coaches, and referees.

H2: There is no difference in using the electronic protectors in Taekwondo on the attractiveness.

H3: The electronic protectors are not an indispensable tool for taekwondo referees.

Chapter 3 Method

The methodological considerations that were adopted for this study, will be explained in this chapter.

3.1 Introduction

The dependent variable for the research study is the attractiveness of Taekwondo. This is specified in accordance with Taekwondo Kyorugui (Combat). Independent variable is the attractiveness of Taekwondo after implementation of electronic protectors. The sub-independent variable is changed in techniques, changes in competition, changes in spectacle and changes of rules.

Independent variable information includes data that was collected using Google Documents and multiple-choice questions.

The commonly known statistical data analysis software SPSS (version 23.0) was used to retrieve numerical data that was designated from responses collected. Scores would then be calculated from athletes, coaches, and referees. To analyze how technology has influenced in Taekwondo, research will be conducted with actual and retirees Taekwondo fighters in Mexico and around the world. Thinking that the majority will be from Mexico, the approach will be only from this country.

The researcher will use quantitative research with a survey, this method is considered to be a suitable approach to analyze the research questions. (Bryman, 2006)

In this chapter, the research design used and the methodology followed, as well as the validity, reliability, limitations and ethical considerations of the research study will be discussed.

3.2 Approach

To serve the purpose of this study, a quantitative approach was followed. According to (Terre Blanche, Durrheim, & Painter, n.d.) a quantitative research approach allows the researcher or the examiner to obtain quantitative or objective data through the measurement of a particular phenomenon. The research design used for this examination was ground based on a Descriptive Statistics – Frequencies design, where three categories (which are distinct, however similar in nature) were compared on the various variables: combat, entertainment, and judgment.

3.3 Research Sample

In order to test the hypotheses of the study, it was required the comparison of three experimental categories. It will include taekwondoists from Mexico. To fulfill the purpose of the study, the taekwondoists of different categories and modalities will be included in the study, these will be the athletes, the coaches, and the referees; this study will determine through the division of the categories already mentioned, where the most abundant category are athletes, then coaches and finally referees, for this reason, the results in the tables will be divided by percentages.

The sampling method will be used by the researcher is “Convenience sampling”, a technique of sampling selection based on ease of access. (Etikan, 2016)

Through this research, a study of the martial artist and Taekwondo fighters will be conducted, and subsequently, those two elements of sports participation will be connected.

3.4 Survey

The researcher will collect the data by assessing the support of survey in Google Documents. It will be sent to two hundred fifty samples of Taekwondo’ fighters, coaches and referees. The survey will be designed with the purpose of measuring the satisfaction and opinion

of the athletes, coaches, referees, and audience in comparison to the chest guard conventional and electronic in taekwondo.

The questionnaire was first adapted to serve the purpose of the study, it was shared with two hundred fifty persons. After capturing and cleaning of data, specific participant responses were excluded. The remaining number of responses was: fulfilled by 235 persons, 29 around the world, 206 from Mexico. In total, the respondents were 196 (n=196) of the study is a population of Taekwondo's 98 athletes, 79 coaches and 19 referees in Mexico. Specific types of data analysis techniques were performed on these 196 responses.

Finally, the output collected from SPSS will be analyzed using descriptive analysis to find if the hypotheses planted before would be supported or dismissed by the data collected.

3.3 Variables

Due to the nature of the study or examination, the researcher formulated hypotheses to be tested. A quantitative approach was chosen to gather information and a questionnaire was used to test the validity of the hypotheses.

Procedures and Measures

Descriptive Statistics and Probability provides an accessible and thorough overview of the most important descriptive statistics for nominal, ordinal and quantitative data with particular attention to graphical representations. The main type of SPSS data analysis technique used was Compare Means, One – Way ANOVA. Using this analysis technique will compare the opinion between the role of taekwondoists (athletes, coaches, and referees) with the independent variable. Interpretation took place according to the output information received from the descriptive statistics and reliability test.

This method values obtained from different groups with different conditions are frequently compared in clinical studies.

Even when the researcher compares more than two groups, some researchers erroneously apply the t-test by implementing multiple T-tests on multiple pairs of means. When the researcher tries to compare means of three groups, A, B, and C, using the T-test, we need to implement three pairwise tests, i.e., A vs. B, A vs. C, and B vs. C. (Kim, 2014)

The Compare Means, One – Way ANOVA technique applied in my thesis with the program SPSS version 23.0 is the most exact method to find the result of my data. Compare Means statistical methods are also foundational in the sense that inferential methods are conceptually dependent and use them as their building blocks. (Seitz, Olson, Locke, & Quam, 1990)

Chapter 4. Results

4.1 Descriptive Statistics

Data from 196 participants were captured into the SPSS (23.0 version) statistical data program and cleaned. Responses from participants who left out many questions (N=54).

A total of 196 responses were then used for initial data analysis. The participants were divided into three distinctive categories. The study's Athletes (N=98), Coaches (N=79), and Referees (N=19) Various types of data-analysis were then applied. (Descriptive) statistics were collected from the data as well as tests for of the scales:

Highly Agree = 5

Agree = 4

Neutral = 3

Disagree = 2

Highly Disagree = 1

Exploratory took place on the scores of the 196 participants to check their opinion.

After cleaning, descriptive analysis techniques were used to compare the three categories concerning demographical data used in this study, which were then translated in terms of taekwondo.

To compare the means, one-way ANOVA statistical analysis for three categories was performed on the categorical and continuous demographical data collected by using the "ANOVA" function in SPSS. Compare Means statistics gathered included the number of participants per frequency, percent, a valid percent, and cumulative percent and subsequently divided percentage to each corresponding. Compare Means also included averages for modality, role, and country; In

addition, differences among Kyorugui (Combat), Poomsae and Kyokpa (Exhibition) - groupers of the study on certain demographical information provided were obtained.

4.2 Results of Hypotheses

4.2.1 Results of Hypothesis 1

The researcher shows in the table 1.0 and table 1.1 the next data about the H1: The effectiveness of using the electronic protectors in Taekwondo is the same from the perspectives of athletes, coaches and referees. Based on the results obtained from Table 1.0, it rejected the null-hypothesis. Therefore, we can conclude that the effectiveness of using the of electronic protectors in Taekwondo is not same from the perspectives of athletes, coaches and referees.

Protectors are not an indispensable tool for taekwondo referees. Athletes agree that in a real fight of personal defense, they do not get to be anything efficient, the direct kicks are the most used in a combat, the surest and the effective ones, therefore, we might mention that they are the base of the combat modality kicks, because it does not diminish the opponent at all, but it is effective to connect the sensors of the foot with those of the electronic protector.

Coaches consider that the new way of training Taekwondo is not the traditional martial art that they learned when they began in this sport, and they prefer to transmit the “old school” of Taekwondo.

Referees agree that electronic protector has changed the way of fighting Taekwondo, they have less work now, they think that the direct kicks have changed since the electronic protector is in use in combat.

Table 1. Hypothesis 1 results.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.044	2	1.022	3.218	.042
Within Groups	61.276	193	.317		
Total	63.320	195			

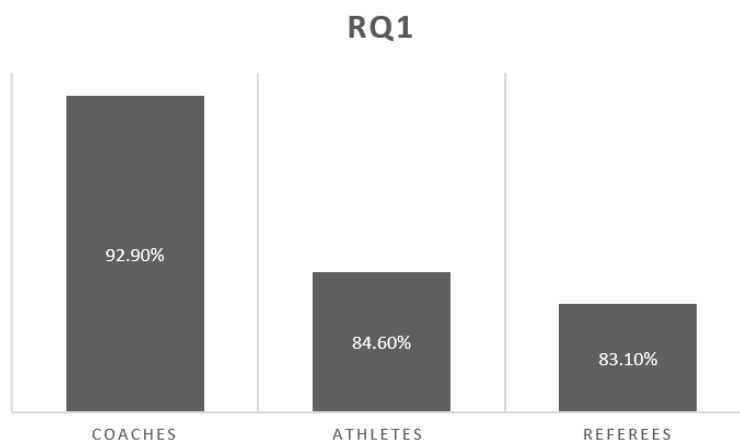
Table 2. Hypothesis 1 results.

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1 Athlete	98	1.6184	.58369	.05896	1.5013	1.7354	1.00	4.20
2 Coach	79	1.4051	.54723	.06157	1.2825	1.5276	1.00	3.60
3 Referee	19	1.5789	.52023	.11935	1.3282	1.8297	1.00	2.60
Total	196	1.5286	.56884	.04070	1.4483	1.6088	1.00	4.20

4.2.2 Analysis of RQ1 & H1

Figure 1 shows that 92.9% of coaches, 84.6% of athletes and 83.1% of referees agree that their perspective has changed its perspective of fighting Taekwondo negatively.

Figure 1. Hypothesis 1.



In order to answer the second research question and hypothesis, the researcher used the next questions:

- 1 - Do you consider that the use of electronic protectors has changed the way of fighting in taekwondo?
- 2 - Do you consider that the use of electronic protectors has changed the athletes' kicking technique to mark points in fights?
- 3 - Do you consider that the use of electronic protectors has changed the athletes' strength of kicks to mark points in the fights?
- 4 - Do you consider that the use of electronic protectors has changed the athletes' speed of kicks to mark points in the fights?
- 5 - Do you agree that the use of electronic protectors has changed the athletes' technique of direct kick?

4.3 Results of Hypothesis 2

The researcher shows in table 2.0 and table 2.1 the next data about the H2: There is no difference in using the electronic protectors in Taekwondo for the attractiveness. The null-hypothesis is accepted which means that there is no difference in using the electronic protectors. ceasing to be a sport that can attract public attention, because they are not currently performing a fight to show their fighting skills.

Some of them have changed their perspective of Taekwondo since the electronic chest guards were implemented, now they see taekwondo as a sport of tactics and not a martial art of combat. Taekwondoists think that before the fights were more dramatic, the kicks stronger, faster and more constant.

No technological implementation has been to worsen any situation in any aspect of the history of humanity, these negative consequences have always been for a poor adaptation to this or a premeditated abuse by the conscious fraction of the equation which is the human being. For another hand, some taekwondoists prefer fights with electronic protectors, because they are fairer and do not depend on the simple glance of some judges; electronic protectors make them feel more secure of the results to some fighters.

Table 3. Hypothesis 2

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.882	2	.941	2.868	.059
Within Groups	63.333	193	.328		
Total	65.215	195			

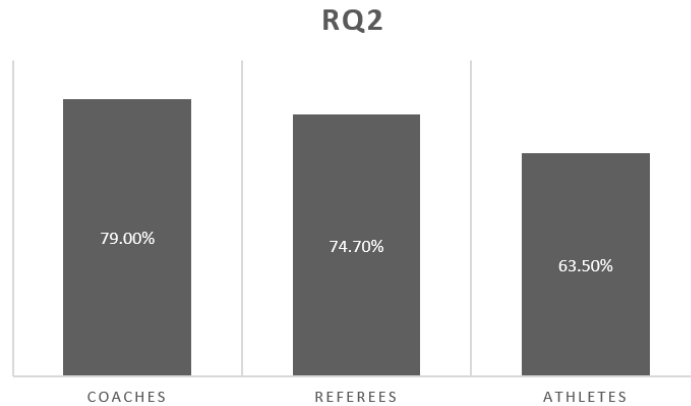
Table 4 Hypothesis 2.

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1 Athlete	98	2.3000	.56950	.05753	2.1858	2.4142	1.40	3.60
2 Coach	79	2.0937	.54334	.06113	1.9720	2.2154	1.40	4.20
3 Referee	19	2.2421	.70104	.16083	1.9042	2.5800	1.60	4.20
Total	196	2.2112	.57831	.04131	2.1298	2.2927	1.40	4.20

4.3.1 Analysis of RQ2 & H2

Figure 2 shows that 79.0% of coaches, 74.7% of referees and 63.5% of athletes agree that their perspective has changed its perspective of fighting Taekwondo.

Figure 2 Hypothesis 2



In order to answer the second research question and hypothesis, the researcher used the next questions:

- 1 - Do you think that the use of electronic protectors has influenced the attractiveness of taekwondo?
- 2 - Do you consider that taekwondo fights would be more entertaining if the electronic protectors are removed?
- 3 - Has your perspective of taekwondo changed after electronic protectors' implementation?
- 4 - Did you enjoy more taekwondo fights before electronic protectors' implementation?
- 5 - Do you prefer taekwondo fights with electronic protectors?

4.4 Results of Hypothesis 3.

The researcher shows in the table 3.0 and table 3.1 the next data about the H3: The electronic protectors are not an indispensable tool for taekwondo referees. Since the statistic value is not significant (< 0.660), The statistic results are accepted the null-hypothesis. Finally, concluded that the electronic protectors are not an indispensable tool for taekwondo referees

The Taekwondoists think that electronic protector is a very good tool to the referees in the moment of judging the fights of Taekwondo, sometimes, the human eye cannot see all the kicks that connect in the fights, for that reason electronic protector is a good idea to use in Taekwondo, but electronic protector is not a good device to supply the human resource in Taekwondo, to sentence this sport, must be for referees expert in Taekwondo, a system can not appreciate a combat as a referees.

They can use electronic protector as a tool, support by referees, because they are necessities in all the sports, especially in the sports of combat, it is needed more than one in the fights, and the new system wants to replace them totally.

Referees could do a fair job if they be part of the combat sentence, the capacity of referees does not depend of electronic protector, they can do it, the problem is if they have preference for another athlete.

Table 5 Hypothesis 3.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.336	2	.168	.417	.660
Within Groups	77.740	193	.403		
Total	78.075	195			

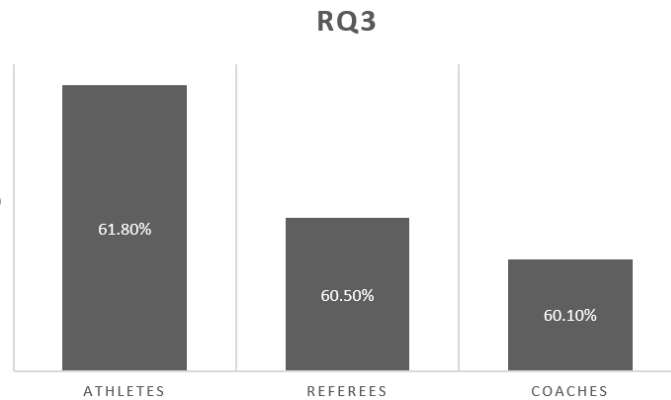
Table 6 Hypothesis 3.

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1 Athlete	98	2.3469	.63167	.06381	2.2203	2.4736	1.00	5.00
2 Coach	79	2.2595	.56535	.06361	2.1329	2.3861	1.00	4.00
3 Referee	19	2.3158	.88523	.20308	1.8891	2.7425	1.00	4.00
Total	196	2.3087	.63276	.04520	2.2195	2.3978	1.00	5.00

4.4.1 Analysis of RQ3 & H3

The figure 3 shows that 61.8% of athletes, 60.5% of referees and 60.1% of coaches agree that electronic protectors are not an indispensable tool for taekwondo referees.

Figure 3 Hypothesis 3



In order to answer the second research question and hypothesis, the researcher used the next questions:

1 - Do you consider that the electronic protector is a good tool for referees to judge taekwondo combats?

2 - Could referees do a fair job in fights if electronic protectors were removed of competition?

Chapter 5. Discussion

5.1 Summary of Significant Results

Following the researcher will summarize what is considered as the most remarkable findings:

- 1) The use of electronic protectors has changed the way of fighting in a less attractive way as it used to be before since there are fewer exchanges, less delivery in the fighting and less power in their kicks.
- 2) That the entertainment of the fights has gone down, it no longer attracts so much attention, because even in the Olympic Games and where is the elite of this sport, the fights before were better.
- 3) The electronic protectors are a good tool for arbitrators, however, they cannot be fully managed by themselves, but accompanied by human resources, to do a better job.
- 4) The comparisons of demographic predictors showed that the three participating groups have preference over fights before the electronic protectors.

The study's aim was to determine the effect of electronic protectors in relation to the new way of fighting Taekwondo. Using the previously selected methodology, the researcher could test his hypotheses. Certain steps were followed in order to have the most appropriate assessing tool of predictors which influence in the fights of Taekwondo.

According to the results described in chapter 4 and the analysis applied among chapter 5, it is considered in general terms that the use of electronic protectors is a factor that has influenced negatively the way of fighting in taekwondo, and consequently influences also in the way of training and judgment.

About the combat opinion, taekwondo stakeholders said that the battles are now more tactical and defensive, trying to take care of the points, however the best way to defend is attacking, the athletes are so focused on the electronic protector, and at the same time taking care that the opponent does not score points, they have made a taekwondo more defensive than offensive, because the electronic protector marks almost all the points, the judges comment that before, today's technology was not available, therefore, they were based only with the human eye to mark the combats, and the kicks that were with the well-deserved force, they would be marked, a weak kick would never be valid in the taekwondo of before, now the most minimal fret of sensor can manage to be marked, the sensors are done based on magnets, that is why a minimal attraction might do that the score marks, the athletes have not worried about doing a strong combat.

The polled ones comment that even if the kicks practically continue having the same speed, the combat is slower, they are focused on doing fewer kicks, they do not do so many exchanges anymore, and it has done a slower sport, they focus on throwing a sure kick while they take care of the electronic protector.

In the case of techniques, as the "pitchagui" have been modified, this one may be an ineffective kick to mark the sensor, so it has been replaced by the "fish kick", which does not cause harm, however, it is now more common because it makes points easier.

Apart from the fact that the direct kicks have been altered, some new kicks have been invented by the arrival of the electronic protector, since they are simple and sure kicks that connect and for such a motive, they are kicks used by all.

In attractiveness, with the argument that the electronic chest guards is stopping the development as athletes and as martial artists, Taekwondo caught the attention of the International Olympic Committee for being a very dynamic sport, but little by little it has been losing that style;

if the electronic protectors were removed, it would force the athletes to be more dynamic and, therefore, the coaches would be more creative, they would fight with that style that highlighted the strength, speed, exchange and it would result in more dynamic fights.

The referees think that the electronic protectors have been a good tool for them because they get to score points that the judges do not see, (although sometimes it does not mark points that the judges and the public see).

They are attracted to a more aggressive combat, besides there have been made constant changes aiming to regulate the new style of electronic chest guards that cannot be caught at a rhythm and, therefore, training changes are frequent; now they have to train more skill than strength, since the main weapon is to make the chest guard regardless of the effectiveness of the kicks or the show, now there is a lack of kicks, before a combat with a large arsenal of combat techniques.

The taekwondo stakeholders, think that an electronic protector is a good tool to the referees in the moment of judging the fights of Taekwondo, sometimes, the human eye cannot see all the kicks that connect in the fights, for that reason electronic protector is a good idea to use in Taekwondo.

The problem is that the intention of electronic protectors is to replace the referees totally, the technology will never supplant the human resources, The referees are necessities in all the sports, especially in the sports of combat, it is needed more than one in the fights, and the new system wants to replace them totally, a gadget cannot substitute a human resource.

The electronic protector is a good tool for referees, but electronic protector not is a good substitute of them, why not use the electronic protector better as an extra gadget to sentence in a better way the Taekwondo? The way that people use the electronic protector is a wrong, is an extra, not is a

substitute.

Referees think that they could do a fair job if they be part of the combat sentence.

We should remember that the principles of Taekwondo talk about honesty

World Taekwondo could promote the training of referees continuously and they will do a better job in the moment of tournaments and championships.

5.2 Hypothesis' Analysis (Conclusion)

The research hypotheses were formulated on the basis of research questions that sought an answer as to whether one could determine whether Taekwondo practitioners have changed their Taekwondo perspective since the implementation of electronic chest guards. The taekwondo players of the competition, coaches and referees would think about their new way of appreciating Taekwondo, they specified what would be their role in this martial art.

The attraction of Taekwondo will be greater if you find a way to fight battles again as it was done before the entrance of the electronic chest guards.

The bad perception of electronic chest guards by taekwondo players is related to the athletes who perform tricks to score points, which are not part of the Taekwondo kicking arsenal and, therefore, the rules are not quite clear.

The inclusion of technology in taekwondo is associated with the update required by the International Olympic Committee every Olympic cycle, so that sports offer a better show and at the same time fairer results in their competitions.

The opinion of the taekwondo players about the combats with electronic chest guards is in its majority negative in the athletes, as coaches and referees.

More attractive Taekwondo bouts increase the public's audience, making it an even more popular sport than it is; Taekwondo as a martial art is the most popular, it can have an important growth if the way to make the most dynamic combats is looked for.

The fights of Taekwondo have become less dynamic since the human resources (referees) have been replaced by devices (electronic protectors).

This investigation leads it to believe that the way to sentence fights only with electronic protectors is the reason, the fights have to be sentenced by referees, supported by technological tools, because human resources cannot be supplied by gadgets, nor the ability human tends to perceive every detail of the fights, so the best way to judge the sport is using both factors.

5.3 Limitations

Of all the questions it was selected only 1, 2, 3, 4, 6, 8, 9, 10, 13, 15, 17, 18, 19, 20, 21, 22, because the rest of the questions are repetitive, and they refer to the same thing.

For incomplete information, it was annulled 10 answers.

The researcher did not have enough referees to do a balance study with their important opinion.

Limited amount of preexisting research in Mexico about this topic.

5.4 Implications

Since the criteria of the taekwondo players about the electronic protectors were published in their majority regarding the evolution in these moments and in this transition, there have been topics that have not been completely preferred by our Taekwondo practitioners

This is one of the first studies about the electronic protectors in Taekwondo done in Mexico.

This is the first step to do new research about new studies about electronic protectors in Taekwondo.

5.5 Conclusion

The study revealed that electronic protectors have been a factor that changes the way of fighting taekwondo, its rules, and spectacularity.

If Taekwondo returns to the fights with conventional chest guards, probably it would be more attractive again. Moreover, it could be used again as personal defense and, therefore, it would require stronger physical training and less use of tactics; it would be a sport that would improve the performance of its practitioners.

The present research has focused on Taekwondo as a martial art, which is an ancient philosophic practice. However, the results have revealed that even the groups of the new generations of athletes are more attracted to the fights with referees instead of devices, in other words, the traditional taekwondo.

The study helped to answer the research questions. Moreover, the study was useful to collect valuable ideas from taekwondo practitioners in order to make this sport again the same as before, a sport as complete as in its origin of "Martial Art".

The use of technology must be balanced in sports. Particularly in Taekwondo if some devices, like the electronic protectors, can become a factor that affects the essence of the sport itself.

In the case of taekwondo, the electronic protectors are doing almost all the work of the referees, taekwondo is a sport that cannot be guided for a system, it must be supervised every detail by experts in taekwondo, the electronic guard is a good idea to be more honest and mark points that the human eye cannot grasp, because Taekwondo is a speed sport, but it also has strength, it is a sport that has athletes and coaches, it also has referees, and this has always been the case. The referees have an important role in the fights, for this reason, they are 5 or 6 per area in each fight,

a system of electronic protectors cannot supply the work of 6 expert referees in Taekwondo, however, they can use a system as a tool to lean on this to do a better job, not use a system to do all their job.

The electronic protectors are making the athletes change the way they fight because now the way to mark the points only needs to put a sensor in the foot and a sensor in the protectors, now we do not see much speed or strong kicks than before the electronic protectors were implemented.

We have crossed the line of technology, before moving further, we need to stop and see where we are wrong, take some steps backward if it is necessary and then continue moving forward to make better taekwondo.

As said Burrhus Frederic Skinner in 1969 on his book Contingencies of Reinforcement: A Theoretical Analysis "The real question is not whether machines think but whether men do". (Skinner, 1969)

Taekwondo is more than a sport, it is a martial art, it is culture and history, and the history cannot be modified.

Appendix

1- What is your main modality in Taekwondo?

Kyorugui (Combat) = 1

Poomsae = 2

Kyokpa (Exhibition) = 3

2- What is your role in Taekwondo?

Athlete = 1

Coach = 2

Referee = 3

3- What is your country?

Mexico

4- Do you consider that the use of electronic protectors has changed the way of fighting in taekwondo?

5- Why?

6- Do you consider that the use of electronic protectors has changed the athletes' kicking technique to mark points in fights?

7- Why?

8- Do you consider that the use of electronic protectors has changed the athletes' strength of kicks to mark points in the fights?

9- Do you consider that the use of electronic protectors has changed the athletes' speed of kicks to mark points in the fights?

10- Do you agree that the use of electronic protectors has changed the athletes' technique of direct kick?

11- Do you agree that the use of electronic protectors has changed the athletes' technique of head kick?

12- Do you agree that the use of electronic protectors has changed the athletes' technique of spin kick?

13- Do you think that the use of electronic protectors has influenced the attractiveness of taekwondo?

14- How?

15- Do you consider that taekwondo fights would be more entertaining if the electronic protectors are removed?

16- Why?

17- Do you consider that the electronic protector is a good tool for referees to judge taekwondo combats?

18- Could referees do a fair job in fights if electronic protectors were removed of competition?

19- Has your perspective of taekwondo changed after electronic protectors' implementation? How?

20- Did you enjoy more taekwondo fights before electronic protectors' implementation?

21- Do you consider that electronic protector has deteriorated taekwondo as martial art?

22- Do you prefer taekwondo fights with electronic protectors?

Highly Agree = 1

Agree = 2

Neutral = 3

Disagree = 4

Highly Disagree = 5

References.

- About WTF - World Taekwondo. (2015). Retrieved February 27, 2018, from <http://www.worldtaekwondo.org/about-wt/about-wt/>
- Ahmed, J. (2017). How Technology is Affecting our Lives - Kashmir Reader. Retrieved August 23, 2018, from <https://kashmirreader.com/2017/08/21/how-technology-is-affecting-our-lives/>
- Ariens, C. (2016). Here Are the 11 Olympic Sports That Viewers Are Most Excited About Watching – Adweek. Retrieved November 5, 2018, from <https://www.adweek.com/tv-video/here-are-11-olympic-sports-viewers-are-most-excited-about-watching-172753/>
- BBC. (2009). Trajes de baño prohibidos - BBC News Mundo. Retrieved June 4, 2018, from http://www.bbc.com/mundo/ciencia_tecnologia/2009/05/090520_1327_trajes_prohibidos_1n
- Bryman, A. (2006). A L A N B R Y M A N University of Leicester. <https://doi.org/10.1177/1468794106058877>
- Caputo J., M. (2018). Instituto Superior de Taekwon-do – Maestro Marcelo J. Caputo (VIII DAN ITF). Retrieved August 10, 2018, from <http://taekwondo-ist.com.ar/wp/>
- Chova Blasco, G. (2007). Historia de las artes marciales. Retrieved November 21, 2018, from [http://marciales.astalaweb.net/general/Artes Marciales. Historia.asp](http://marciales.astalaweb.net/general/Artes_Marciales_Historia.asp)
- Cuántas personas juegan al fútbol en el mundo - Infobae. (2018). Retrieved March 2, 2018, from <https://www.infobae.com/2007/05/31/319469-cuantas-personas-juegan-al-futbol-el-mundo/>
- Durán, M. (2014). A.T. Kearney | Global Management Consulting Firm - A.T. Kearney.

Retrieved February 20, 2018, from <https://www.atkearney.com/>

Etikan, I. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1.

<https://doi.org/10.11648/j.ajtas.20160501.11>

Ford Rojas, J.-P. (2012). London 2012 is most watched sports tournament on record - Telegraph.

Retrieved August 19, 2018, from

<https://www.telegraph.co.uk/sport/olympics/news/9470518/London-2012-is-most-watched-sports-tournament-on-record.html>

Goldman, A. (2002). Choi Hong Hi, 83, Korean General Who Created Tae Kwon Do - The New York Times. Retrieved December 5, 2018, from

<https://www.nytimes.com/2002/06/29/sports/choi-hong-hi-83-korean-general-who-created-tae-kwon-do.html>

HAAKE, S. J. (2009). The impact of technology on sporting performance in Olympic sports.:

EBSCOhost. Retrieved from

<http://web.b.ebscohost.com.libproxy.snu.ac.kr/ehost/pdfviewer/pdfviewer?vid=1&sid=b65d5b70-d5b9-4f13-ba23-323d80fcf8c4%40sessionmgr101>

Intangible Heritage - Culture Sector - UNESCO. (n.d.). Retrieved October 25, 2018, from

<https://ich.unesco.org/en/RL/taekkyeon-a-traditional-korean-martial-art-00452>

Katz, C. (1997). Discusiones marxistas sobre tecnología. Retrieved from

<http://www.razonyrevolucion.org/textos/revryr/prodetrab/ryr3Katztecnolo.pdf>

Kim, H.-Y. (2014). Analysis of variance (ANOVA) comparing means of more than two groups.

Restorative Dentistry & Endodontics, 39(1), 74–77.

<https://doi.org/10.5395/rde.2014.39.1.74>

Moenig, U. (2016). *TAEKWONDO : from a martial art to a martial sport*. (First). Abingdon, Oxon: ROUTLEDGE. Retrieved from <https://www.routledge.com/Taekwondo-From-a-Martial-Art-to-a-Martial-Sport/Moenig/p/book/9781138701458>

Molina, G. (2014). Interview: Gerardo Molina, Euromerics Sport Marketing Founder & CEO - Agencia de Marketing Deportivo - Euromerics Sport Marketing. Retrieved February 20, 2018, from <http://www.euromerics.com/interview-gerardo-molina-euromerics-sport-marketing-founder-ceo/>

Philosophy of Taekwondo. (n.d.). Retrieved November 21, 2018, from <https://www.puntofape.com/evolucion-del-taekwondo-deporte-olimpico-26907/>

Plato. (n.d.). Plato's Concept of the Body and Soul. Retrieved November 21, 2018, from <https://www.bartleby.com/essay/Platos-Concept-of-the-Body-and-Soul-PKPMBZYTC>

Rocio. (2001). MARCIAL. Retrieved November 21, 2018, from <http://etimologias.dechile.net/?marcial>

Sánchez, C. (2016). 80 millones de almas practican Taekwondo en el mundo - mastkd.com. Retrieved March 1, 2018, from http://mastkd.com/2016/10/80-millones-de-almas-practican-taekwondo-en-el-mundo/?subscribe=success#blog_subscription-2

Schaefer, J. (2012). El deporte, los artículos deportivos y la industria del deporte. Retrieved February 15, 2018, from http://www.wipo.int/wipo_magazine/es/2012/05/article_0005.html

Seitz, F. C., Olson, G. D., Locke, B., & Quam, R. (1990). *O Perceptual and Motor Skills*

- 1990 Address correspondence to F. C. Seitz. *Perceptual and Motor Skills* (Vol. 70). North Willson. Retrieved from <http://journals.sagepub.com/doi/pdf/10.2466/pms.1990.70.2.459>
- Skinner, B. F. (1969). *Contingencies of Reinforcement: A Theoretical Analysis* - B. F. Skinner - Google Libros. Retrieved from <https://books.google.co.kr/books?hl=es&lr=&id=yLn6AwAAQBAJ&oi=fnd&pg=PT25&dq=contingencies+of+reinforcement+a+theoretical+analysis&ots=qT-JKPVdY0&sig=kJwKZdaOYKl6LSzhcCQFbtPBZVE#v=onepage&q=contingencies of reinforcement a theoretical analysis&>
- Soong, K. (2016). With introduction of sensors, taekwondo moves away from tradition - The Washington Post. Retrieved December 5, 2018, from https://www.washingtonpost.com/olympics/2016/live-updates/rio-games/scores-and-latest-news/with-introduction-of-sensors-taekwondo-moves-away-from-tradition/?utm_term=.052cdc333157
- Soto, A. (2016). El dobok: significado - Solo Artes Marciales. Retrieved August 28, 2018, from <https://soloartemarciales.com/blogs/news/el-dobok-significado>
- Southwick, R. (1998). Taekwondo History. Retrieved December 5, 2018, from <https://msu.edu/~spock/history.html>
- Taekwondo Museum. (2013). Muju. Retrieved from <https://www.tkdwon.kr>
- Terre Blanche, M. J. (Martin J. ., Durrheim, K., & Painter, D. (n.d.). *Research in practice : applied methods for the social sciences*.
- Torres Lira, A. G. (2017) *Metodología del Entrenamiento de Taekwondo y Objeto Digital de*

Aprendizaje del Poomsae y los Básicos del Taekwondo

What is art? (n.d.). Retrieved October 25, 2018, from <https://concepto.de/arte/>

초록

과학기술이 태권도에 미치는 영향: 전자호구를 통한 태권도 기술적 측면의 변화 검토

Arturo Rolando Alvarez Cardenas

글로벌 스포츠 매니지먼트

체육교육과

대학원

서울대학교

본 연구는 태권도의 전자호구에 대한 인식을 알아보고자 태권도와 연관이 있는 196 명을 대상으로 연구를 진행했다. 태권도가 전자호구의 장착을 위해 새로운 방식의 태권도를 즐기는지, 그리고 이러한 전자호구로 인해 태권도의 규칙의 변화를 가져왔기 때문에 심판들에게는 어떠한 영향을 미쳤는지 알아보고자 하였다.

전자 보호 장치는 세계 태권도 협회에서 2009 년 덴마크 코펜하겐에서 개최한 세계 선수권 대회에서 공식적으로 사용하기 시작한 신기술이다. 이를 통해 태권도의 새로운 장이 열리게 되었다. 선수들은 창의력을 발휘하여 태권도 규정에 포함되지 않은 새로운 발 차기를 만들고, 기술 없는 태권도 발차기도 생겨났으며 겨루기 방식의 변화가 나타났다. 또한 수동적으로 태권도를 하면서 점수를 내기 위한 태권도로 발전을 하여 실제적인 겨루기 기술에는 영향력이 적었다.

설문지를 통해 자료를 수집했다. 본 연구는 양적 연구방법을 통해 수집된 자료를 분석하였다. 기술통계와 빈도를 측정했으며 설문 문항에 따라 양적 연구방법을 통해 분석했을 했다. 따라서, 본 연구는 새로운 태권도 훈련 방식과 관련된 전자호구 장치로 태권도와 싸우는 새로운 방법과 관련한 의견을 얻었다. 그러나 본 연구는 세계 태권도가 표본으로부터 수집 된 자료를 사용하여 분석 될 때까지 관심과 중요성을 두지 않은 의견과 상황을 발견했다. 또한, 태권도 겨루기, 품세 그리고 격파를 하는 집단과 운동선수, 코치, 그리고 심판으로 나누어 연구 집단을 분리하여 의견과 설문을 받았다.

키워드: 태권도, 과학기술, 전자호구, 스포츠에서의 과학기술, 격투, 투기종목

학생번호: 2017-24079

