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Kicking beyond the Mat: Development and Validation of Taekwondo Instructional Videos as a Supplemental Training Tool for SKSU Student-Athletes

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ABSTRACT

Taekwondo training must evolve to align with modern competition standards, yet many student-athletes at Sultan Kudarat State University (SKSU) struggle to adapt to new rule changes and techniques. This study developed and evaluated instructional videos as a supplemental training tool to enhance athletes' physical performance, particularly in speed, strength endurance, strategy, and technique execution. This study employed a one-group pre-test/post-test research design to assess the impact of instructional videos on SKSU Taekwondo student-athletes. A total of 48 athletes participated, undergoing a pre-test assessment before training with the instructional video. After a structured intervention period, a post-test was conducted to measure improvements in performance. The instructional videos were evaluated based on content, instructional quality, presentation, technical quality, appropriateness, and usability. Data analysis utilized descriptive and inferential statistics to determine the significance of performance differences. Findings revealed significantly improved athletes' speed, strength endurance, strategy, and technical execution after training with the instructional videos. The evaluation of the instructional videos indicated high ratings in content relevance, instructional quality, and usability, confirming their effectiveness as a supplementary training tool. Statistical analysis demonstrated a significant difference in pre-test and post-test scores, validating the impact of the intervention. The study concluded that instructional videos are an effective supplementary tool for enhancing Taekwondo training. Their integration into training programs can bridge gaps in skill development, providing athletes with structured guidance to improve performance in competitive settings. Further research is recommended to explore their long-term effects and application to other sports disciplines.

INTRODUCTION

Taekwondo, a Korean martial art and Olympic sport, emphasizes both physical and mental discipline. It consists of kyorugi (full-contact sparring) and poomsae (performance-based techniques). Staying updated with rule changes, which occur every four years, is crucial for athletes. However, many student-athletes and coaches struggle to adapt due to a lack of awareness, knowledge, and training resources.

According to Son *et al.* (2020), significant rule changes in Taekwondo competitions have left many athletes behind. Similarly, Cho *et al.* (2020) found that modern techniques favor quick, simple kicks, requiring updated training approaches. The transition from traditional to modern Taekwondo poses challenges, particularly in environments with limited instructor availability and training tools. In this regard, instructional videos can bridge this gap, supporting training both inside and outside formal settings (van der Meij, 2017).

In the Philippines, traditional Taekwondo training methods often leave athletes underprepared. A study conducted in Alaminos City (2022-2023) highlighted athletes' dissatisfaction with basic movements and sparring training, emphasizing the need for program revisions. Similarly, Bernal-Torres *et al.* (2020) found that instructional videos enhance technique execution and error correction, making them a valuable tool in skill development. Additionally, Bueza *et al.* (2023) demonstrated their effectiveness in improving footwork performance, further reinforcing the potential of video-based learning in sports training.

In Region XII, particularly in Sultan Kudarat, Sultan Kudarat State University (SKSU) has been one of the top-performing schools, excelling in Taekwondo at the annual Mindanao Association of State and Tertiary Schools (MASTS) competition in 2017 (Falle, 2017). The university consistently accumulated a high number of medals and represented Region XII in the State Colleges and Universities Athletic Association (SCUAA) (Ibot, 2017). However, in recent MASTS competitions, SKSU lost its competitive edge and has yet to recover (Usman, 2023). Notably, there are no existing studies on the use of instructional videos as a supplementary training tool to enhance and strengthen the physical performance of athletes at Sultan Kudarat State University.

Thus, this study aimed to develop an instructional video as a supplemental training tool for student-athletes at Sultan Kudarat State University. Specifically, it sought to train student-athletes to strengthen and enhance their physical and Taekwondo performance while supporting the university in achieving its goal of regaining its status as a leading institution in sports, particularly in Taekwondo.

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LITERATURE REVIEW

Quality and Effectiveness of Instructional Videos

Content Quality

Content quality in instructional materials must align with current practices and be structured to reinforce skill acquisition. According to Mayer and Fiorella (2020), content that is relevant and practical supports students in connecting theory to practice, enhancing the real-world applicability of their learning. High-quality instructional videos should present accurate, relevant, and well-structured content that aligns with learning objectives. Schooley *et al.* (2022) emphasize the importance of including clear learning objectives and reliable sources in instructional videos to enhance content quality. Navarrete *et al.* (2023) highlight that content should be aligned with learners' needs and instructional goals to ensure effectiveness. Min *et al.* (2024) discuss the significance of incorporating authentic assessment strategies in instructional videos, suggesting that content should be relevant and applicable to real-world scenarios. In the context of SKSU taekwondo videos, ensuring content that reflects modern scoring systems and techniques is critical for providing student-athletes with practical, up-to-date information.

Instructional Quality

Effective instructional videos employ sound educational design principles to facilitate learning. Schooley *et al.* (2022) developed the Instructional Video Quality Checklist (IVQC), which includes items related to educational design, such as the inclusion of learning objectives and adherence to multimedia principles, to enhance instructional quality. Navarrete *et al.* (2023) emphasize the importance of instructional design in video-based learning, highlighting that well-designed videos can significantly enhance learning outcomes. Min *et al.* (2024) suggest that incorporating perceptual video quality assessment can improve instructional quality by aligning teaching methods with real-world applications.

Presentation

Effective presentation is another crucial factor, as it helps reduce cognitive load and allows learners to focus on the material. Clark and Mayer (2020) suggest that multimedia learning should use clear visuals and well-paced audio to aid comprehension and retention. The presentation of instructional videos encompasses the organization and delivery of content, including visual and auditory elements. Schooley *et al.* (2022) highlight the importance of adhering to multimedia principles, such as coherence and signaling, to improve the presentation quality of instructional videos. Navarrete *et al.* (2023) found that visual and audio features play a crucial role in the effectiveness of video-based learning, emphasizing the need for clear and engaging presentation. Min *et al.* (2024) suggest that incorporating perceptual video quality assessment can enhance presentation by making the content more engaging and relevant to learners. This approach supports the design of taekwondo instructional videos by ensuring that demonstrations and explanations are clear and engaging, enabling SKSU student-athletes to better understand and practice techniques.

Technical Quality

Technical quality pertains to the production aspects of the video, including clarity of visuals and audio, editing, and overall professionalism. Schooley *et al.* (2022) include multimedia principle adherence in their IVQC, which encompasses technical quality aspects crucial for effective learning. Min *et al.* (2024) emphasize that high-quality video requires clear visuals and audio to be effective in improving learning outcomes. Navarrete *et al.* (2023) note that incorporating appropriate visual and audio features in instructional videos can enhance technical quality by providing realistic and relatable scenarios for learners.

Appropriateness

Appropriateness refers to how well the video content matches the learners' needs, considering factors like cultural relevance and alignment with learners' skill levels. Navarrete *et al.* (2023) emphasize the importance of developing instructional strategies that ensure the content is relevant and engaging for students. Min *et al.* (2024) highlight that tailored video content can address individual learner needs, enhancing the appropriateness of the instructional material. Schooley *et al.* (2022) suggest that including alternative language translations and accessibility features can improve the appropriateness of instructional videos for diverse learner populations. Consistency across instructional materials contributes to a coherent learning experience by reducing distractions and helping students internalize concepts more effectively. Zhang and Koehler (2021) found that maintaining consistent language, structure, and design in educational videos fosters a stable learning environment, promoting knowledge retention. This is particularly relevant for SKSU taekwondo videos, where consistency in terminology, demonstrations, and techniques will help student-athletes build a solid foundation in taekwondo practices. In instructional design, clearly defined objectives are essential for guiding learners effectively, as they help students understand what they are expected to achieve. Heinich *et al.* (2019) emphasize that instructional videos with specific objectives enable focused learning, helping students retain critical skills more effectively. These findings underscore the importance of integrating clearly defined objectives in SKSU's taekwondo instructional videos to ensure student-athletes can focus on specific skill development goals in each training module.

Usability

Usability, or the ease with which users can navigate and interact with instructional content, directly impacts learning effectiveness. Reeves and Oh (2018) assert that educational videos must be intuitive and accessible, as usability barriers can distract learners and reduce

engagement. Usability involves the ease with which learners can access and navigate the instructional videos. Schooley *et al.* (2022) found that usability is a critical component in the effectiveness of instructional videos, highlighting the need for materials that are easy to follow and understand. Navarrete *et al.* (2023) emphasize that user-friendly video interfaces can enhance learning outcomes in video-based training. Min *et al.* (2024) suggest that incorporating perceptual video quality assessment can improve usability by making the content more relatable and easier to apply in real-world scenarios. For SKSU's taekwondo videos, high usability will help student-athletes easily access and review material, supporting their ability to engage in independent learning and practice.

Physical Performance of Taekwondo Student-Athletes

There is a widespread belief that sleep is a component of the recovery process that occurs after training, and it is a vital component of the athlete's effort to retain control and monitoring of their ongoing training. Still in its infancy, the study that provides evidence in favor of the idea that sleep is connected to athletic performance is taking shape. Accordingly, Vargas and Jiménez (2020) conducted research in which they explored the connection between the quantity of sleep that athletes obtain and the level of physical performance that they exhibit for themselves. They were able to accomplish this by monitoring taekwondo players at universities while they were participating in a training macrocycle (Park *et al.,* 2022). The physical performance measures that were utilized included the kicking movement time, the kicking reaction time, the muscular strength, and the squat jump, the countermovement leap, the drop jump, and the arm countermovement jump. All dependent variables were evaluated before training, at the end of the first mesocycle, and twice a week throughout the period of tapering that lasted for three weeks. Applicably, accelerometry was employed to record the efficiency of sleep, and all dependent variables were evaluated. In addition, according to Charest *et al.* (2020), insufficient sleep duration and poor sleep quality are associated with declines in explosive power and reaction time in taekwondo athletes, emphasizing the need for sleep monitoring as part of high-performance training programs.

In agreement with Gaamouri *et al.* (2019), Da Silva Santos *et al.* (2020), and Ojeda-Aravena *et al.* (2021), taekwondo is a combat sport that is characterized as an activity that is of an intermittent nature, of high physiological intensity, and with motor actions that are accomplished at high speed, mostly using the lower limbs. Suitably, a group of scholars who had previously performed study on the topic came to the conclusion that this categorization should be used. In order to participate in taekwondo, athletes are needed to demonstrate a high level of proficiency in a number of different aspects of physical fitness. In addition to aerobic and anaerobic power, muscular strength and power, flexibility, speed, and agility are other traits that fall under this category.

Henceforth, the competition in taekwondo is defined by the fact that it is highly specialized and that it sets strict demands on both the physical and physiological components of the athlete. In addition, the competition is characterized by the fact that it is very competitive. Punching, precise unipedal standing and leaping kicks, and defensive moves with hands and feet (cuts, blocks) are some of the strong motions that fighters utilize in taekwondo to attack and counterattack their opponent's body and head. Taekwondo is a martial art that was developed in Korea. According to Menescardi *et al.* (2019), da Silva Santos *et al.* (2020), and Janowski *et al.* (2020) taekwondo provide a series of exercises that comprise fast displacement linked by a variety of dodges with change-of-direction (COD). These maneuvers are carried out across a 16 m^2 space.

According to the findings of a study that was conducted by Chaabene *et al.* (2020), participants in striking combat sports are required to exhibit a crucial physical characteristic known as COD speed. This speed refers to the power to change directions in a short period of time. It is necessary for taekwondo fighters to be able to accelerate, decelerate, and swiftly change direction in order to attack or repose all during the course of the battle. Additionally, they need to be able to place themselves in an advantageous circumstance with regard to their opponent in order to perform a variety of strikes (punches and kicks) with the appropriate speed and precision utilizing both sides of their body (Ojeda-Aravena *et al.,* 2020). This is necessary in order for them to be able to execute these blows. Based on Kwok and Cheung (2023), it is often accepted that taekwondo gained its reputation for the extensive variety of striking techniques that it has, and that this continues to be the case even in contemporary world.

The Use of Instructional Videos in Sports Training

Several publications and researchers have conducted a great number of studies to investigate the efficacy of instructional movies in a variety of sports settings. Research conducted by Elyakim *et al.* (2019) indicated that video-based training has the potential to increase performance and technical abilities in any sports discipline. These abilities are essential in every facet of life, including the job, and they are essential. Students may also benefit from partaking in physical exercise since it can assist them in developing their social skills and in making new acquaintances (Llego, 2022). In contrast, concerns have been raised and confusion has been prompted regarding the applications, effectiveness, expectations, experiences, and outcomes related to these distance-based materials and teaching (Dos Santos, 2019, 2020; Espino *et al.,* 2020). In view of the implementation of computer-aided teaching and learning approaches in the current education system (traditional-age students' classroom, vocational-based courses, and adult learning), it has caused these issues to arise. Among the challenges that are encountered, some of the concerns include the following: (1) students' inability to access the internet;

(2) a shortage of essential devices that are needed for online learning; and (3) instructors' inadequate technical capability to manage online classrooms (Tumbokon & Lantajo, 2024). Furthermore, the concerns and problems that were experienced in the e-learning platform were felt twice as strongly by both the students and the instructors who were registered for the Physical Education classes.

In addition, according to the research conducted by Apriyanto and Adi (2021), the epidemic has caused a shift in the routines that pupils follow among themselves. Students also show a significant amount of interest in the utilization of certain forms of internet media that are used by teachers. According to Bueza *et al.* (2023), learners are also interested in the strategy that is associated with the use of online learning techniques. The adoption of the audio-visual technique of teaching became the most convenient and suitable strategy employed by instructors in light of the scenario brought about by the pandemic. In particular, this is due to the fact that video lessons can be stopped, replayed, and played in slow motion (Athmika & Athmika, 2023).

Conferring to Yu and Jee (2021), learners have also claimed that the most effective way for studying physical education and sports is to follow instructional videos. The use of both demonstration and instructional materials in the process of instructing athletes in physical education is thus the most effective method for enhancing both teaching and learning (Alnajdi, 2019). The beginning of the COVID-19 epidemic has brought to light the relevance of video-based electronic learning, often known as e-learning, in the context of physical education lessons. As a result of the constraints imposed by the epidemic, physical education instructors have resorted to having their classes delivered via the use of instructional DVDs (Aguinaldo, 2021).

Meanwhile, it is abundantly clear that technology makes it feasible to teach dual sports via the use of e-learning videos (Go, 2020). The employment of technology has been shown to increase physical education and athletic performance, according to the findings of a study that was conducted by Muhammad (2023). Even if there are a number of drawbacks associated with e-learning, such as the high cost of technical infrastructure, the absence of human connection, and the doubtful efficacy of learning, it is still possible to utilize it to enhance learning (Diallo, 2022).However, despite the fact that there was evidence of successful utilization of video-based e-learning (i.e., the Sports Education and Training Program of the Philippine Sports Institute (PSI) created online video lectures to assist its learners), particularly in dual sports, there are still uncertainties regarding the effectiveness of its utilization Satumbaga-Villar (2021). Moreover, according to Tagimaucia *et al.* (2024), conventional physical education instructors are uncertain regarding the efficacy of using instructional films in the delivery of their lectures. Permitting to the instructors' own observations, the students were unable to complete their performance assignments in an accurate manner since they did not get timely feedback and were not given the option to have their children corrected. As a result, the teachers are concerned that they will not be able to assist students in achieving self-mastery, competence, and self-confidence in terms of developing and demonstrating skills in their respective fields of expertise. This is the primary objective of physical education, as stated in Republic Act No. 5708, Article XIV Section 19 of the Constitution of 1987, and CMO No. 18, section 2017.

In light of this, it is necessary to undertake study in order to investigate the efficiency of the video-based e-learning system that is used in the nation. According to Go (2020), there is a demand for research that would provide educators with information that would enlighten them about the construction of new standards and instructional practices that are adaptable to the changing times. According to Katzman and Stanton (2020), students in the lowest classes of the nation were feeling the pressure to entirely avoid attending online courses since they were having trouble catching up on lectures that they had missed via online classes. Every single one of the instructors' individual methods to teaching was suffocated by this new norm. Since the very first day of school, the majority of students have been forced to depend on a method of trial and error in order to construct effective methods and discover the most effective means of delivering their respective classes and physical activities (Perez *et al.,* 2022).

Online Taekwondo and Physical Education Teaching

Online taekwondo were mostly used by trainers and coaches during the pandemic, according to Mihaylov (2021), the COVID-19 pandemic significantly disrupted traditional taekwondo training and education, prompting the adoption of interactive online methods to maintain athlete engagement and skill development. His study revealed that while many taekwondo practitioners adapted to digital platforms, the number of active students declined, largely due to concerns about the virus and the challenges of remote training. According to Dos Santos (2022) the martial art of Taekwondo, which originates in Korea, may be divided into three distinct categories, each of which is determined by the rules of the game and the way it is that is why knowledge is necessary. When it comes to winning tournaments, taekwondo competitors must take into consideration a variety of criteria. The physiological, technical, tactical, and strength needs of taekwondo have been researched, and a number of studies have been gathered in order to train in an efficient manner (Uh *et al.,* 2024). Other studies have also been collected. In order to get optimal results from your workouts, it is essential to combine aerobic exercise with intermittent training and to reduce the amount of time spent resting. The flexibility of the hips and knees may be improved via the use of static stretches and proprioceptive neuromuscular facilitation stretches.

Additionally, visual training using red and blue lights is indicated for tactical components. Due to the fact that

taekwondo is a sport that needs competitive sparring that is both severe and full contact, mobile stances, agility, speed, flexibility, and endurance, it is very uncommon for players to have injuries while participating in the sport (Ji, 2019).According to the findings of Bores-García *et al.* (2024), the researchers conducted an investigation to see if the use of virtual reality-based badminton instruction in the field of physical education may potentially enhance the learning results at the teaching site. The findings demonstrated that teaching badminton in physical education through the use of virtual reality can be effective for learning aspects; nonetheless, it still needs to be improved in a variety of areas, including repeated practice and an understanding of the fundamentals, posture adjustment and mastery of the knack, support for teamwork, and learning prompting. Online taekwondo and physical education teaching is beneficial to everybody in enhancing their performance, the study of Lee *et al.* (2021) conducted a randomized controlled study examining the effectiveness of synchronous online physical education classes using Tabata training among adolescents during the COVID-19 pandemic. Their findings demonstrated that real-time online PE sessions significantly improved various aspects of physical fitness, including muscle mass, lower limb strength, and balance, indicating that well-structured virtual programs can support adolescent physical health even in remote learning settings.

On the other hand, the findings of the research conducted by Zheng *et al.* (2021) shown that students who participated in blended learning performed better than students who participated in single-type learning in every area. This demonstrates that the suggested strategy is both achievable and successful. A significant and complicated change in viewpoint has been created for educators all around the globe as a result of the incorporation of physical education into the landscape of online teaching. Conversely, the rapid closure of educational facilities and the need to preserve social distance forced that physical education instructors (PETs) immediately alter their instructional techniques (Bozkurt *et al.,* 2020). This was necessary because of the pandemic. The study of Dos Santos (2021) explored how the shift to online platforms during the COVID-19 pandemic affected taekwondo education, particularly from the perspective of parents. Using the Social Cognitive Career and Motivation Theory, the study found that parents were primarily motivated to enroll their children in online martial arts programs to support long-term educational and career goals, regardless of the students' personal motivation or the outcomes of the programs.

For this reason, teacher assessments have been conducted offline up until this point, despite the fact that they are an essential component of the learning process (Kánová & Pišútová, 2022; Tolgfors *et al.,* 2022). The educators, on the other hand, were looking for creative techniques that made use of technology in order to bridge the gap (Tan *et al.,* 2021). In a broader sense, it was found by Goad *et al.* (2020) that the use of virtual sessions, live-streamed exercises, and curated fitness applications had a significant impact in supporting the involvement of students in physical activities while they were restricted to their homes. Notwithstanding this, there are a few studies that have been conducted to investigate the efficacy of video-based teaching.

One such study is the one conducted by Ou *et al.* (2019), which found that there is a need to investigate and identify new design principles for effective video-based learning. Thus, this need arises as a result of the rapid advancement of technology and the growing number of students who are taking online courses and relying heavily on video lessons for their education (Campos *et al.,* 2022). Consequently, the purpose of their research is to determine whether or not E-Learning videos are useful for dual sports footwork exercise for students attending BPEd College. In a similar vein, Blegur *et al.* (2022) discovered that video analysis tools were advantageous for college athletes, as they assisted them in recognizing and rectifying technical flaws that occurred in the sports that they were training themselves for.

Technology-Enhanced Training in Taekwondo

From the start around the turn of the year 2020, several government agencies in South Korea and a great number of other nations and areas throughout the world mandated that their educational institutions, regardless of their status or the subject matter they teach, transition to online platforms. On the other hand, practical-based courses, such as martial arts training, may be subject to worries and uncertainty due to the fact that their instructions can only be delivered in-person and via performance-based education. Lassoued *et al.* (2020) suggested that as a result of the pandemic, classes had been moved online in order to avoid the hazards that were associated with attending classes in person. Additionally, Jelani *et al.* (2020), the use of virtual reality (VR) and motion capture technologies can significantly enhance self-directed taekwondo training by replicating trainer movements in three-dimensional formats.

In addition, Petrenko *et al.* (2020) argued that the applications of delivering vocational courses through online learning prompt problems regarding the tailor-made coursework curriculum, effective exchanges between teachers and students, useful interactions between students, and practical exercises with effective comments (Freer & Evans, 2019). These problems were discovered by Petrenko *et al.* (2020). In a similar manner, training in taekwondo enhanced the cardiovascular endurance, muscular endurance, and power of primary school pupils; however, it did not have a practical or less helpful effect on other aspects of physical fitness (Nam & Lim, 2019).

According to Kadri *et al.* (2019) also studied the practice of taekwondo that has the potential to enhance selective attention in adolescents. This technique, which does not include the use of pharmaceuticals, might be regarded an effective treatment option for combating or counteracting

the attention impairment that is associated with persons who have attention deficit hyperactivity disorder. In accordance with Hanski (2016), who is mentioned in Shi (2023), technology assists students in becoming physically active and fit by transforming their sedentary lifestyles into more active lifestyles.

Correspondingly, Williams *et al.* (2020) conducted research that revealed that high school students had a more favorable attitude about their online learning experience when compared to face-to-face programs. This finding was supported by the findings of those students. In accordance with Fernández-Batanero *et al.* (2019), in order to simplify the regulations and norms pertaining to physical education, it is necessary to have an understanding of the technological requirements that instructors of physical education have. In its essence, recognizing the needs of technology may assist instructors of physical education in keeping up with the latest technological advancements that can bring about improvements in their teaching. Weng *et al.* (2019) investigated the impact of multimedia-based teaching materials on junior high school students' attitudes toward learning Taekwondo Aerobic and their findings revealed that students with varying learning styles responded positively to multimedia instruction, indicating that such digital approaches can enhance student engagement and learning effectiveness in physical education contexts.

Additionally, this may assist educators in incorporating technology into their lessons and remaining up-to-date in a society that is increasingly driven by technology. In the words of Pangrazi and Beighle (2019), the core nature of physical education, which is strongly anchored in physical exercise, team sports, and interactive activities, posed an instant problem in an online learning environment. For this reason, it is essential that instructors be given priority in training programs in order for them to acquire the self-assurance and expertise necessary to instruct physical education utilizing technology (Zhou *et al.,* 2021). Considering traditional physical education (PE) instruction is often dull, both instructors and students often experience feelings of exhaustion. In addition to this, it does not provide a personalized training plan (Rapp, 2020).

As a result of the emergence of the new education model known as big data + artificial intelligence + education, the institution started utilizing the sports information service platform for the purpose of data collection and accumulation, thereby offering decision-making guidance for education management (Urquiza-Fuentes & Paredes-Velasco, 2017; Kuo *et al.,* 2019). When it comes to physical education, motion sensing control technology may be used in the actual training of students to achieve real-time identification of the sense organs and movements of students via the utilization of electronic apparatus. During the procedure, the motions of the user are sent back depending on the motion sensing mode that has been defined. This allows students to have a more intuitive experience with the training (Bolgova *et al.,* 2020). Consequently, the fast advancement of information technology has resulted in the realization and application of human-computer interaction in a variety of fields, including industry, medicine, the creation of smart cities, and physical exercise (Kim *et al.,* 2020).

Henceforth, human-computer intelligent contact is accomplished during physical activity by the identification of sports objectives using intelligent devices (Hou *et al.,* 2019). This interaction is realized through the use of intelligent equipment. Furthermore, the system will be able to thoroughly capture the final results of personal training, and via the analysis of large data, it will be able to provide more scientific exercise advice. Students' participation in sports is improved by the physical education programs that are based on somatosensory technology. Additionally, this technology allows for numerous individuals to study together and facilitates interactions both online and offline, which increases the amount of fun that can be found in physical education. The study of Ma *et al.* (2021) also support and proves that technology enhanced athletes' performance where they developed a flexible all-textile dual tactile-tension sensor capable of accurately monitoring athletic motion, including movements in Taekwondo. The E-textile demonstrated high durability, broad pressure and deformation sensitivity, and washability, making it highly suitable for real-time performance tracking and training feedback in martial arts. In addition, Shin *et al.* (2024) reviewed the application of artificial intelligence and other Fourth Industrial Revolution technologies in Taekwondo. The study emphasized how AI-based motion tracking systems and metaverse coaching platforms could revolutionize training, performance evaluation, and technique analysis in Taekwondo. It also highlighted the limitations of manual competition analysis and proposed AI solutions to enhance accuracy and efficiency.

Instructional Videos as a Supplemental Training Approach

It is possible for physical educators to make use of technology in order to enhance the skills of athletes and to bring more value to their education. According to Soltani and Morice (2020), computers are increasingly being used to simulate the dynamics of sporting activities in gaming settings. Wearable sensors have also garnered attention over the last few years owing to the fact that they have the potential to monitor the health and fitness of users as well as their surroundings while they are wearing them. The efficacy of various additional training methods in the realm of athletics has been the subject of much research. In their study on the effects of online and blended instruction in physical education on athletic performance, Killian *et al.* (2019) discovered that there were very few learning-related outcomes reported across all of the research. Furthermore, Ljubojevic *et al.* (2014) explored the effectiveness of using supplementary video clips in multimedia instruction and found that strategically placed educational videos significantly enhance students'

learning efficiency, motivation, and quality of experience. As noted by Asio *et al.* (2021), the usage of mobile devices has grown widespread among students as a result of its accessibility, ease, and affordability in comparison to other technical equipment. When students were exposed to recorded lectures or edited audio-visual snippets, as opposed to receiving instruction in person, participating in tutorials, or completing reading assignments, study found that students had substantial overall gains in their learning (Burt, 2021). In this aspect, there is a positive impact that the e-learning videos have on the students' comprehension of the fundamental footwork for dual sports competition. Furthermore, as evidenced by the significant increase in posttest scores of the participants who indicated having little to no knowledge regarding the fundamentals of playing sports such as badminton and table tennis (Ping & Liu, 2020), e-learning videos are an effective alternative learning material that can be used to teach the basic concepts of dual sport footwork.

In a similar manner, Cormier *et al.* (2020) investigated the advantages that video-assisted training has been applied to physical sports for student-athletes. They came to the conclusion that augmented reality-assisted instruction is more successful than video-assisted instruction. It is becoming more common for universities all around the globe to use online learning, often depending on videos (asynchronous multimedia). Concurrently, Noetel *et al.* (2021) discovered that substituting video for the techniques of instruction that were already in place resulted in marginal enhancements to the learning of the students. The use of video into learning was shown to result in significant learning improvements. According to Al-Samarraie (2019), the findings imply that videos are unlikely to be harmful to student learning and, in most cases, promote student learning. Based on the findings of these research, it seems that the use of supplementary training techniques may have a beneficial impact on athletic performance. For that reason, the use of hybrid units by teachers promotes an autonomy-supportive, inclusive, and equitable learning environment. This environment allows all students, regardless of their gender and/or the content focus of the unit, to have opportunities to increase their engagement, enjoyment, and social interactions within physical education lessons (Gil-Arias *et al.,* 2020). On the other hand, this is the case despite the fact that there are social stereotypes regarding physical activity despite the fact that the results may be susceptible to some experimental and publishing bias.

In secondary school physical education, Rekik *et al.* (2019) examined the effects of instructional media (video vs. photographs) showing tactical actions in basketball on learning outcomes (game understanding and game performance), cognitive load (mental effort invested and estimated difficulty), and attitudes. Moreover, video was more effective than photos for all indicators. These results suggest that video is best for teaching whole-body tactical maneuvers and have implications for instructional media design. In this thorough aspect, physical educators are finding video analysis useful for training and evaluation. As a result, slow-motion playback, magnification, and voice-over narration are incorporated into cheap mobile devices and apps that instructors may employ to promote student learning (Laughlin *et al.,* 2019). Also, Barnes and McCoy (2023) conducted an empirical study to evaluate the effectiveness of supplemental instructional videos (SIVs) in improving student performance in construction education. The study emphasizes the importance of carefully moderating expectations when implementing SIVs solely for performance improvement in construction-related courses.

In addition, Wang *et al.* (2024) conducted a comprehensive bibliometric review to analyze global trends in digital technology's influence on education reform and states that the expansion of the Internet and other associated technologies has brought about changes in education and society, which have resulted in the introduction of new requirements or expectations for educators. Given the inherent difficulties in conceptualizing the successful training and evaluation of physical exercise in an online context, the delivery of online physical education (OLPE) has been regarded with skepticism (Goad *et al.,* 2019). In a similar vein, videos that are created by instructors in order to satisfy certain learning goals are an element of the revolution in technology-enhanced learning that is now taking place in higher education. The majority of the study that has been conducted on teaching videos has been favorable. Additionally, the research has focused on the advantages that teaching videos provide for the students' experience, as well as the ways in which certain aspects of films might improve learning and achievement (Harrison, 2019).

Speed and Dolyo Chagi Kick Speed in Taekwondo

When it comes to competition, taekwondo is a combat sport that involves strong kicks and forceful motions along with continual contact between opponents and opposing aims (Akhmad *et al.,* 2021). Taekwondo athletes thus need the elements of leg muscle speed and explosive force. Acceleration (changing speed to attain maximum speed) and maintenance (maintaining speed throughout the remaining distance) are two crucial stages that make up speed, which is the least amount of time required for a person to go a certain distance (Aloui *et al.,* 2022). Meanwhile, muscles that function at their best in a brief amount of time are known as explosive power, or power (Cho *et al.,* 2020). One of the key elements in martial arts winning is speed (Podrigalo *et al.,* 2023).

In accordance with Sabatini, Nugraha, and Dewi (2019), there are two key components in the context of speed in taekwondo, and those components are the speed of the kick and the agility of the kick. The movement of the thigh and leg that is carried out fast and for a relatively short period of time against the target is a significant factor that determines the speed of taekwondo kicks. In order to be able to unleash a kick or strike at a preset target in the shortest amount of time feasible when

the stimulus arrives, a Taekwondo athlete has to have a high level of speed. According to Jeong *et al.* (2021), it seems that younger athletes have a harder time with kicking speed and agility. Increasing leg muscle strength and dolyo chagi kick speed in taekwondo players was the objective of Fajar *et al.* (2023), who wanted to examine the impact of offering three distinct workout techniques (Plyometric, SAQ, and Traning Circuit) to the athletes.

According to Nam and Lim (2019), taekwondo is a martial arts sport that has gained worldwide recognition as a sport that has participated in the Olympics since the year 2000. Taekwondo also originated as a result of mixing several kinds of martial arts that were practiced in Korea. In addition, the term taekwondo originates from the Korean words tae, which means kicking, kwon, which means punching, and do, which means method. Taekwondo may be seen as a kind of self-defense that incorporates the use of punching techniques, leaping kicks, blocks, as well as hand and foot movements. In addition, taekwondo is a kind of martial arts that emphasizes the use of the legs as the primary weapon (Wijayanti & Hartini, 2021). In addition, the Taekwondo sports are presently in a state of great development in Indonesia (Rasyono, 2021). As part of the sport of taekwondo, one of the kicking methods that is used is called dolyo chagi.

Moreover, an athlete with powerful and quick leg muscles is likely to be able to strike and outkick his opponent with a powerful kick. Young athletes may benefit from plyometric activities to assist increase their lower limbs' speed and explosive power (Fischetti *et al.,* 2019; Yuniana *et al.,* 2022; Nasrulloh *et al.,* 2021, 2022). It is also well recognized that plyometrics helps young taekwondo competitors perform better (Genç & Dağlıoğlu, 2021). Correspondingly, the training approach known as Speed, Agility, and Quickness (SAQ) has gained popularity because it helps athletes build fundamental abilities that enable them to become more proficient at quicker speeds and with more accuracy (Azmi & Kusnanik, 2019). Through neuromuscular growth, SAQ may also enhance the body's ability to regulate its movements (Surawan *et al.,* 2022).

Furthermore, through neuromuscular retraining, it aims to increase explosive strength and multidirectional motion ability by making movement more efficient. Additionally, circuit training is one of the more sophisticated training techniques, therefore it may be used to enhance general physical fitness, which encompasses fundamental biomotor skills (Ulfah & Walton, 2019). Circuit training is characterized by training with a distinct set of exercises at each post that are completed consecutively and in sequence throughout a single round (Patah *et al.,* 2021). The explosive power of the leg muscles may be greatly increased by circuit training, especially circuit training that incorporates strength and speed training movements (Yuliandra *et al.,* 2020). According to the previously given explanation, it is important to compare three well-liked training methods—plyometric, SAQ, and circuit training—in order to determine which is best for enhancing the leg power and kick speed of dolyo chagi taekwondo competitors.

In consequence, the development of the nevromes berler system is the goal of the SAQ (Speed, Agility, Quickness) training system, which aims to improve motor abilities and regulate body movements (Latip & Isyani, 2020). Accordingly, SAQ is a training approach designed to enhance athletes' strength and speed while also fostering the development of fundamental motor skills (Khaleel, 2022). Furthermore, it has been shown that six weeks of SAQ training enhance biomotor speed, agility, and power. It is also known that the SAQ training approach improves physical fitness levels (Subekti *et al.,* 2021). In this manner, a taekwondo athlete's leg strength and kick speed are crucial to their success (Sepriadi & Har, 2020). As follows, power is a mix of strength and speed that may be used to taekwondo kicks and other explosive actions (Fajrin *et al.,* 2018; Suharjana *et al.,* 2020). In the meanwhile, muscular strength determines kick speed (Moreira *et al.,* 2019). Therefore, in order to perform well while creating taekwondo kicks, leg strength and kick speed need to be increased.

Strength Endurance in Taekwondo

For Taekwondo competitors to maintain high-intensity moves for prolonged periods of time, strength endurance is crucial. According to Akbar & Pramono (2020) participating in sports is an essential physical activity that may improve human quality and lead to both physical and mental well-being. Additionally, Ouergui *et al.,* (2020) states that for the accomplishments of his sportsmen, a coach often overlooks factors that contribute to an athlete's performance because he only expects the best performance from them. Furthermore, Singh *et al.,* (2019) stated that taekwondo is an unarmed fighting style for self-defense that requires the application of skilled techniques like punching, jump kick, block, dodge, and parry action with hands and feet, an athlete must possess kick speed and agility when competing.

Moreover, people may be both physically and psychologically healthy by participating in sports, which is a physical activity that is very vital to increase human quality (Li *et al.,* 2023). With technology permeating every aspect of contemporary life, it is impossible to separate it from it. Technology is advancing quite quickly these days, as seen by the many inventions that have been produced, including sports technology (Putra & Rusdiana, 2019). Developed nations have used technology in the present to assist its athletes' accomplishments; examples of these nations are the United States, Germany, and other developed nations that have achieved success in sports with the usage of technology (Giartama *et al.,* 2020). The research by Swandana *et al.* (2021) titled The Development of Speed and Reaction Resistance Training Tools for Taekwondo Kick Speed Using Pyongyo is one of the pertinent studies that has been conducted. Conversely, the study's findings indicate that the developed tools can be used as speed and reaction resistance training tools for kick speed.

More importantly, exercises for core stability have been shown to improve sports performance and lower injury rates. The findings of some research were to look at how young male taekwondo athletes' balance and performance were affected by six weeks of core stability training (Ezadi & Hesar, 2021). On the other hand, one of the issues for athletes to practice response speed training is the absence of facilities to develop reaction strength endurance and punches in martial arts in Indonesia (Rarasti & Heri, 2019). Furthermore, both the anaerobic and aerobic metabolisms must work hard to support the unique intermittent activity of an official taekwondo bout. Research analyzing the energy systems' contributions during the fictitious match revealed that the oxidative system contributed between 62 and 74% (Apollaro *et al.,* 2023). Consequently, while broad tests are often used to evaluate players' endurance in taekwondo, research has concentrated on creating measures unique to the sport.

To put it simply, Taekwondo competitors' physical fitness has an impact on their performance. To execute challenging methods and intricate sequences of motions with a high degree of specificity, elite athletes need to be physically fit (Liu & Jia, 2023). According to Khazaei *et al.* (2023), a taekwondo athlete's ability to perform well depends on their biomotor skills. The purpose of this research was to examine the effects on the bio-motor capabilities of top female taekwondo competitors after eight weeks of functional training vs classical resistance. At the core of any martial arts training session is the development of physical strength, endurance, and resistance. This is so because fighting requires both resistance and strength (Jones, 2023). There is a ground fighting, grappling, striking, kicking, and throwing component in every martial art discipline.

Different Strategies in Taekwondo Sports

Taekwondo is well known for its extensive repertoire of striking techniques, which include kicks, punches, and knee strikes, among other body parts. For Taekwondo competitors to make wise judgments during competition, strategic thinking is fundamental. Combat success depends on the accuracy, force, and speed with which these strategies are used (Voysey, 2023). Meanwhile, Menescardi *et al.* (2019) used a Markov processes study to look at how Olympic taekwondo contestants moved in relation to their tactical choices. Markov chains aid in giving researchers and coaches pertinent data on how often certain acts occur during a genuine competition, including how frequently they occur and in what sequence. It is advised that while preparing for an actual competition, coaches and players concentrate on these patterns.

Similar to this, new research on taekwondo training indicates that practicing in an arena improves taekwondo players' aerobic capacity (Ouergui *et al.,* 2021). The effects of detraining brought on by canceling and suspending the training program may cause elite athletes significant stress, frustration, anxiety, and sadness, even though prior research on training cessation showed positive effects on psychological recovery and injury recovery (Parm *et al.,* 2021). (Toresdahl & Asif, 2020). Even after brief training breaks (no more than three weeks), athletes may retain adaptations particular to their training. Athletes who stop training for extended periods of time—six to eight weeks—show a decline in ideal body composition status and exercise performance adaptations (Gavanda *et al.,* 2020).

To see more of its essence, taekwondo may be interpreted as martial arts in martial arts books written in ancient times, but in the present day, it can be understood as kung fu or modern martial arts. Moreover, taekwondo is associated with the martial arts. An overwhelming number of techniques are proposed by the author in order to address the aforementioned issues, one of which is that the assessment system that is used in taekwondo instruction need to be enhanced (Lorås, 2020). Consequently, in the context of taekwondo and traditional sports, taekwondo possesses a certain fresh, which ought to be fully reflected in the process of sports training in text, give full play to various students teaching properties of diverse characteristics, and, more importantly, in the process of motion planning, not only to take into consideration the students' capacity to accept. In addition, the goals of instruction may be specified more precisely, and the depth of the information that is taught outside of class can be increased, which will allow Taekwondo to continue to develop and expand in a variety of domains (Hyvarinen *et al.,* 2019).

As a result, problems such as an imperfect market organization and operation system, an unreasonable competition system, and an imperfect management system of sports teams have been brought to light as a result of the rapid development of the Taekwondo League for middle school students (Liu & Jiang, 2024). These problems have an impact on the competition's ability to continue to develop in a sustainable manner. Herewith, according to Howland *et al.* (2020), the objective of schools is not just to teach a bunch of examination machines, but also to develop kids who are well-rounded and have great knowledge and theoretical skills in addition to having strong physical fitness. Accordingly, when it comes to taekwondo, there are not many studies that have been conducted in the past, and even if there are studies that are pertinent, they are based on theoretical study.

Kyurogi Techniques Applied in Taekwondo Performance

According to Sousa *et al.* (2024), the majority of effective techniques in taekwondo are strong kicks, which are delivered by striking the opponent's chest armor or the head. Taekwondo is a full contact combat sport for which the majority of methods are successful. Sparring, also known as Kyorugi, is one of the disciplines that make up Taekwondo. There are specific regulations that must be followed in order to prevent injuries and to guarantee that the competition is fair. It is a free-form battle

between two persons. According to SportsEdTV (2023), the competitors are required to wear body armor that includes a head and trunk protection. This body armor is equipped with electronic sensors that can detect punches and kicks if they are delivered with appropriate power. In addition, Sousa *et al.* (2024) noted that the roundhouse kick is the technique that has been researched the most in the sport of taekwondo. In Korean language, the roundhouse kick is referred to as bandal chagui or dollyo chagui and means kick to the chest gear or kick to the helmet gear.

Conferring to Liu *et al.* (2024), quantifying TKD kicks has been investigated extensively in a laboratory context, but it has been examined only seldom in a free-living environment. When it comes to this particular component, Hariadi *et al.* (2023) discovered that the Peta Chagi kicking and the punch method (Jireugi) are the most effective taekwondo kicking techniques that senior Kyourugi athletes, whether male and female, employ to attack during competition. In addition, compared to karate, taekwondo requires a greater amount of kicking, leaping, and spinning, and competitors must utilize their hands as a backup. Karate, on the other hand, prioritizes the use of hand assaults, with kicks serving as a backup strategy for athletes. As a result, the majority of their legs remain planted on the ground (Li, 2024). Based on Chang *et al.* (2022), the proposed reform on the physical education curriculum is a complicated and laborious program that is designed to be systematic. It is mostly comprised of a number of things. The first is the modification of the content of the curriculum. The second step is to improve the organization of the classroom program. In order for student-athletes in many schools to develop a decent ability structure, it is one of the basic conditions that the curriculum must be optimized.

Research in the taekwondo has generally concentrated on certain parts of athletes' total technical and tactical abilities, while disregarding other significant topics such as determining how successful athletes get points (Jeon & Lim, 2024). The scientific literature in this sport has mostly concentrated on the technical and tactical elements of all participants, while ignoring other significant topics such as determining the behavior of athletes who are skilled or successful. According to Maneiro *et al.* (2019), the conduct of a particular player has been analyzed in other sports, such as soccer, in order to determine how well that player performed in various situations. The data on the elements that determine the results of wins and losses is a special area of interest among the information that is generated in the sports industry. In addition to being employed for the purpose of athlete training and game strategies, this information is also utilized for the purpose of providing entertaining material for sports media and spectators (Kim *et al.,* 2021).

Taekwondo, on the other hand, is a sport that involves movements via kicks, fists, and steps. Taekwondo is distinguished by activities that range from extreme to moderate in terms of intensity. In the sport of taekwondo, research about winning and losing has been recorded (Kim *et al.,* 2021), and a significant amount of effort is being made to improve athlete performance (Da Silva Santos *et al.,* 2019). These findings have been reported by Apolloro, Moreira, and others with the year 2023. In addition, Kim and Jeon (2019) have revealed that time motion analysis and notation analysis of taekwondo athletes have been conducted. According to the findings of the research conducted by Oh *et al.* (2022), the implementation of a win-loss system that is based on rounds has resulted in major changes in the administration of scores and the operations of games. These changes are stated to have a direct association with the results of matches.

Problems of Taekwondo in Sports Training

To begin, taekwondo is often considered to be among the most significant athletic activities that humans participate in. In addition to being a component of human existence, it functions as a component of people's thinking, breathing, and actions. The cultivation of a healthy personality and the development of related self-defense methods is another protective behavior that is associated with it (Rebelo *et al.,* 2021). According to Kudinova *et al.* (2021), taekwondo may be characterized as a meaningful lifestyle and sport for some individuals who participate in it. Second, an additional kind of martial art is taekwondo. The majority of the time, martial arts are not merely a means of self-defense or everyday fighting that is one-sided; rather, they symbolize a spirit and sentiments. According to Rico-González *et al.*'s (2020) research from 2020, taekwondo is a kind of martial arts that can readily dismantle an assault from an adversary without the need of any weapons in the game. Being able to defend oneself is a skill that is essential and essential for both boys and girls in today's culture. Based on Al-Abdouh *et al.* (2020), Taekwondo is a system and technique that teaches individuals how to defend themselves against assaults from the opponent by training and engaging in high mental stimulation.

Many of the major problems in the analysis of the reasons for the non-acceptance of the various groups in the survey results lie in the fact that the reason why taekwondo is not accepted in schools is because they do not know what taekwondo is and what the role of this sport is. This is something that can be discerned from the findings of García-Hermoso *et al.* (2020). Nearly ten years have passed since China began to emphasize the importance of great education, and sports are no longer only for the purpose of displaying talent. According to Hurst *et al.* (2019), many various kinds of sports are emerging like a spring shower. This trend is expected to continue. As a result, Taekwondo is not an exception. Nevertheless, due to the fact that taekwondo is a new and new activity, there is a lack of professionalism in the instruction of taekwondo as a sport in countries, notably in China, and there is a situation of taekwondo instructors having several occupations (Giusti *et al.,* 2020).

As a result, even if the corresponding taekwondo

instruction is carried out in the society or in schools, students are unable to effectively strengthen their own training effect in the learning process. In addition, they do not have a specific reference, and they do not have a way to determine which level they actually reach (Gosselin *et al.,* 2020). This is because teachers have limited abilities. As a consequence of the fact that Taekwondo is meant to be an athletic course, many instructors focus only on the instruction of physical techniques in the classroom and disregard the significance of theoretical knowledge. According to Marcelo *et al.*'s research from 2020, it is very challenging for students to comprehend taekwondo in a practical sense without incorporating it with theory. This is on top of the fact that it is difficult for them to comprehend the history of taekwondo and the movement skills that match to it. Subsequently, the absence of theoretical information transfer in the process of teaching leads to a lack of love for taekwondo in the learning process. This lack of love for taekwondo is basically a lack of growth of the martial arts spirit, and as a result, the pupils go from having a passing fancy to having an avoidance mindset. According to Tibebu *et al.*'s research from 2020, students are left with nothing but bewilderment and anxiety for the rest of their life as a result of the difficulties of attempting to learn taekwondo, which is deeper than the sensation of achievement. As a result, there is a problem with boosting their desire. As shown in Chaabene *et al.* (2020), all of these issues are brought about by the fact that instructors do not provide students with an in-depth instruction of theoretical knowledge throughout the teaching and learning process.
According to Marcelo *et al.*'s research from 2020, it is very challenging for students to comprehend taekwondo. In the course of learning taekwondo, a lack of enthusiasm for the sport is a result of the absence of theoretical knowledge transmission that occurs throughout the training process. It is essentially a lack of development of the martial arts spirit that is causing this lack of passion for taekwondo, and the students move from having a passing fancy to having an avoidance attitude. The findings of a study that was conducted by Tibebu *et al.* (2020) indicate that pupils are left with nothing but confusion and worry for the rest of their lives as a consequence of the challenges that they face while trying to learn taekwondo. This is a more profound than the feeling of accomplishment that they experience. The consequence of this is that there is a difficulty with increasing their desire. As shown by Chaabene *et al.* (2020), all of these problems are brought about by the fact that teachers do not give students with an in-depth instruction of theoretical knowledge throughout the whole process of teaching and learning from beginning to end.

MATERIAL AND METHODS

Research Design

The effectiveness of the instructional video, alongside the physical and Taekwondo performance of Sultan Kudarat State University student-athletes, was assessed using a quantitative approach. This involved examining the quality of the developed instructional videos based on content, instructional quality presentation, technical quality, appropriateness, and usability. Also, key physical and Taekwondo performance indicators such as strategy and technique execution, speed, and strength endurance, which were analyzed using appropriate statistical methods. To systematically evaluate these aspects, the study employed a One-Group Pre-Test/Post-Test Design, where the dependent variable was measured before and after the intervention (Creswell, 2015). To collect data, the researcher focused on a single group, utilizing athletes' raw test scores from both a pre-test and post-test to measure performance improvements. The pre-test was administered before the athletes viewed the instructional video. During pre-test, the researcher assessed their physical performance and rated individually, then gave them enough time to watch it again for multiple times for them to replicate and digest the video and by these they will truly understand how new changes apply in this performance. Post-test followed the training period in which they used the video as a supplemental tool, they were assessed through combat to evaluate their Taekwondo performance which allowing for a direct comparison of performance levels.

Locale of the Study

The study was conducted at Sultan Kudarat State University (SKSU), ACCESS Campus, Isulan Campus and Tacurong Campus. The SKSU Taekwondo athletes were specifically chosen as respondents due to their historically low performance in the recent Mindanao Association of State and Tertiary Schools (MASTS) competition. This underperformance highlights the need for innovative training methods to improve their competitive edge. The researcher identified this gap, making these athletes ideal participants for the study, which seeks to enhance their skills through the development and validation of supplemental instructional videos.

Respondents of the Study

The respondents of this study comprised the entire population of sixteen (16) Taekwondo Kyorugi athletes from Sultan Kudarat State University (SKSU) from ACCESS, Isulan Campus and Tacurong Campus which total into 48 SKSU Taekwondo student-athletes. This study developed and evaluated instructional videos designed to enhance and strengthen the training effectiveness and level of physical and taekwondo performance of SKSU's Taekwondo athletes.
The decision to include all 48 athletes as respondents was carefully deliberated to ensure comprehensive participation and to capture a wide range of perspectives within the SKSU Taekwondo program and these campuses are one of the providers of qualified players to represent SKSU in higher competitions like Mindanao Association of State and Tertiary Schools (MASTS).

Sampling Technique

In this study, the researcher used total population sampling, also referred to as total enumeration sampling. Total population sampling is a type of purposive sampling that

involves searching the entire population for people who share a particular set of traits (Laerd, 2015). This sampling method is highly cost-effective and time-efficient as researchers select respondents specifically for the study. More information can be obtained by obtaining data from the entire population than by conducting a limited sample. Furthermore, this method is particularly useful in studies involving small and specialized populations where every member possesses critical traits necessary for the research objectives (Sharma & Bhattarai, 2024). Unlike random sampling, TPS ensures that all eligible participants are included, leading to a comprehensive understanding of the research subject.

One of the primary advantages of TPS is its ability to capture detailed and representative data, as it eliminates selection bias that may arise from sampling a subset of the population (Borromeo & Maligalig, 2022). Since the entire population is studied, findings can be more generalizable to that specific group. Additionally, TPS is a cost-effective and time-efficient approach, especially when the target population is small and easily accessible. Researchers can gain deeper insights by analyzing data from all individuals who meet the study's inclusion criteria, thereby strengthening the reliability and validity of the results.

Research Instrument

In this study, the researcher developed a comprehensive instructional video focusing on Taekwondo basic kicks, techniques and strategies and was evaluated based on content, instructional quality presentation, technical quality, appropriateness, and usability designed to function as a supplemental training tool for athletes. The video aimed to enhance the learning experience by incorporating structured lessons that covered both fundamental and advanced Taekwondo movements. Specifically, the content included essential taekwondo skills such as speed, strength endurance, strategy and techniques. Additionally, advanced training segments addressed high-performance techniques, tactical strategies, and methods to improve key athletic components such as speed, strength endurance, and adaptability in competition. The video also integrated insights on how to effectively utilize the latest advancements in competitive Taekwondo.

To ensure clarity and accuracy, the researcher—who possesses expertise in Taekwondo—personally demonstrated and performed each skill and technique featured in the video. After the video was produced, it underwent a rigorous validation process conducted by a panel of experts. This panel included physical education instructors with a Master of Arts in Teaching Physical Education, experienced Taekwondo trainers, certified instructors, black belt practitioners, and members of the Philippine Taekwondo Association (PTA). The researcher used an adopted and researcher made.

Data Gathering Procedure

In this study, the researcher conducted and undergo the following process in gathering the data. The procedure is shown in the flowchart (Figure 3).

The first step involves sending a formal letter of permission to the Graduate School, requesting approval for the study from the Dean. To ensure the developed instructional video was grounded in best practices and supported by expert insights, the researcher engage with Taekwondo head instructors and trainers. These experts evaluated the supplemental video, assess its alignment with current trends in new school training and competition, and provide recommendations for improvement.

After the supplemental video was evaluated and finalized, pilot test was conducted to know the quality of the developed instructional video as a supplemental training tool for SKSU student-athletes. Then a pre-test was conducted among the participating athletes.

With the pre-test complete and adjustments made based on expert feedback, the supplemental video was implemented. After the completion of the process, the post-test conducted to measure any improvements or changes in the athletes' skills and performance.

The final step involves analyzing the data collected from the pre- and post-tests. The researcher interprets the results to determine the effectiveness of the supplemental video. Statistical methods were used to identify any significant improvements in performance, and the findings were documented for future reference.

Statistical Treatment

In analyzing the data, the following statistical tools were utilized. In Problem 1, mean was used to measure the level the quality of the evaluated developed Taekwondo Instructional Videos as a Supplemental Training Approach. For problem 2 and 3, mean was also used to measure the level of physical performance in the Taekwondo Kyurogi. For problem 4, z-test was applied calculate the significant difference between the Pre-test and Post-test results in the physical performance of the respondents.

Ethical Consideration

The confidentiality of the participants was ensured, and full permission for participation was obtained. The sufficient and precise information was based on the details provided by the participants. Participants' willingness to take part in this study was taken into consideration without pressure, force, or constraint.

All data gathered during the process was kept confidential and used solely for the study. Security, confidentiality, and anonymity were ensured by properly gathering, archiving, and distributing research materials. Only relevant components gathered were included in the study. Evaluations were conducted objectively, avoiding biased information or misleading ideas. Research data, along with the privacy of participants, was protected to maintain an adequate level of confidentiality. The transparency of the evaluation ensured that respondents were informed about the topic, except for the specific data gathered. Additionally, participants were allowed to withdraw freely without negatively impacting the study.

Table 1: Level of quality of the evaluated developed Taekwondo instructional videos as a supplemental training tool for Sultan Kudarat State University student-athletes in terms of content

Indicator	M	SD	Interpretation
1. The contents comprehensively cover the intended topics and objectives.	4.40	0.55	Excellent
2. The contents are factual, precise, and clearly articulated.	4.80	0.45	Excellent
3. The topics are well – organized.	4.60	0.89	Excellent
4. The contents are appropriate to the ability or level of the intended learners.	4.80	0.45	Excellent
5. The contents promote hands-on and performance-based learning activities.	4.60	0.55	Excellent
Total	**4.64**	**0.57**	**Excellent**

Table 1 reveals that the overall mean was 4.64 with standard deviation of 0.57, which was described as excellent. In terms of indicator 1 it has a mean of 4.40 and a standard deviation of 0.55 and can be described as excellent. Likewise, indicator 2 has a mean of 4.80 and a standard deviation of 0.45, which can be determined as excellent. Also, indicator 3 has a mean of 4.60 with a standard deviation of 0.89, which was described as excellent. In indicator 4, it has a mean of 4.80 with a standard deviation of 0.45, which can be described as excellent. And for indicator 5, it has a mean of 4.60 with a standard deviation of 0.55 which is described as excellent. Among all the indicators, Indicator 2 and Indicator 4 recorded the highest mean score of 4.80, indicating a strong positive reception in these areas. On the other hand, Indicator 1 had the lowest mean score of 4.40, suggesting that while it was still rated as excellent, it may require slight improvements compared to the other indicators.

Content quality in instructional materials must align with current practices and be structured to reinforce skill acquisition. For instance, Mayer and Fiorella (2020) state that content that is relevant and practical supports students in connecting theory to practice, thereby enhancing the real-world applicability of their learning. Similarly, high-quality instructional videos should present accurate, relevant, and well-structured content that aligns with learning objectives. In line with this, Schooley *et al.* (2022) emphasize the importance of including clear learning objectives and reliable sources in instructional videos to enhanced content quality. Moreover, Navarrete *et al.* (2023) highlighted that content should be aligned with learners' needs and instructional goals so as to ensure effectiveness. Furthermore, Min *et al.* (2024) discussed the significance of incorporating authentic assessment strategies in instructional videos, suggesting that content should be relevant and applicable to real-world scenarios. Specifically, in the context of SKSU taekwondo videos, ensuring content that reflects modern scoring systems and techniques is critical for providing student-athletes with practical, up-to-date information.

In Table 2, it shows that the indicator 1 has a grand

Table 2: Level of quality of the evaluated developed Taekwondo instructional videos as a supplemental training tool for Sultan Kudarat State University student-athletes in terms of instructional quality

Indicator	M	SD	Interpretation
1.The material complements and enhances the existing curriculum.	4.40	0.55	Excellent
2. The material provides opportunities for collaborative activities and teamwork.	5.00	0.00	Excellent
3. The material supports self-paced and autonomous learning.	4.80	0.45	Excellent
4. The instructions are concise and easy to follow for learners.	4.80	0.45	Excellent
5. The material builds on learners' prior knowledge and experiences in basic exercises.	4.40	0.55	Excellent
Total	**4.68**	**0.48**	**Excellent**

mean of 4.68 and a standard deviation of 0.48 and can be described as excellent. Likewise, indicator 2 has a mean of 5.00 and a standard deviation of 0, which can be determined as excellent. Also, indicator 3 has a mean of 4.80 with a standard deviation of 0.45, which was described as excellent. In indicator 4, it has a mean of 4.80 with a standard deviation of 0.45, which can be described as excellent. And for indicator 5, it has a mean of 4.40 with a standard deviation of 0.55 which is described as excellent. Among all the indicators, Indicator 2 had the highest mean score of 5.00, indicating a perfect rating and strong agreement among respondents regarding its effectiveness. On the other hand, Indicator 5 had the lowest mean score of 4.40, suggesting that while still categorized as excellent, it may require further enhancements to match the higher-rated indicators.

Effective instructional quality videos employ sound educational design principles to facilitate learning. For example, Schooley *et al.* (2022) developed the Instructional Video Quality Checklist (IVQC), which includes items related to educational design, such as the inclusion of learning objectives and adherence to multimedia principles, in order to enhanced instructional quality. Similarly, Navarrete *et al.* (2023) emphasized the importance of instructional design in video-based learning, highlighting that well-designed videos can significantly enhance learning outcomes. In addition, Min *et al.* (2024) suggested that incorporating perceptual video quality assessment can improve instructional quality by ensuring that teaching methods aligned with real-world applications.

Table 3: Level of quality of the evaluated developed Taekwondo instructional videos as a supplemental training tool for Sultan Kudarat State University student-athletes in terms of presentation

Indicator	M	SD	Interpretation
1.The presentation was logically sequenced to facilitate understanding.	4.60	0.55	Excellent
2. The presenter delivered key points in a clear, engaging, and understandable manner.	4.80	0.45	Excellent
3. The presentation provided comprehensive and detailed coverage of the topic.	4.60	0.55	Excellent
4. The presentation offered practical knowledge or insights relevant to my work or studies.	4.40	0.55	Excellent
5.The presentation effectively conveyed its objectives and learning outcomes.	4.80	0.45	Excellent
Total	**4.64**	**0.49**	**Excellent**

In Table 3, it indicates that the overall mean was 4.64 with a standard deviation of 0.49, which was described as excellent. In terms of indicator 1, it has a mean of 4.60 and a standard deviation of 0.55 and can be described as excellent. Likewise, indicator 2 has a mean of 4.80 and a standard deviation of 0.45, which can be determined as excellent. Also, indicator 3 has a mean of 4.60 with a standard deviation of 0.55, which was described as excellent. In indicator 4, it has a mean of 4.40 with a standard deviation of 0.55, which can be described as excellent. And for indicator 5, it has a mean of 4.80 with a standard deviation of 0. 45, which is described as excellent. Among all the indicators, Indicator 2 and Indicator 5 had the highest mean scores of 4.80, suggesting that these aspects were highly rated by the respondents. On the other hand, Indicator 4 had the lowest mean score of 4.40, indicating that while still categorized as excellent, it may have slightly lower effectiveness or satisfaction compared to the other indicators.

Effective presentation is another crucial factor, as it not only helps reduce cognitive load but also allows learners to focus on the material. For instance, Schooley *et al.* (2022) highlighted the importance of adhering to multimedia principles, such as coherence and signaling, in order to improve the presentation quality of instructional videos. Likewise, Navarrete *et al.* (2023) found that visual and audio features play a crucial role in the effectiveness of video-based learning, emphasizing the need for clear and engaging presentation. Furthermore, Min *et al.* (2024) suggest that incorporating perceptual video quality assessment can enhance presentation by making the content more engaging and relevant to learners. In this context, this approach supports the design of taekwondo instructional videos by ensuring that demonstrations and explanations are clear and engaging, enabling SKSU student-athletes to better understand and practice techniques.

Table 4: Level of quality of the evaluated developed Taekwondo instructional videos as a supplemental training tool for Sultan Kudarat State University student-athletes in terms of technical quality

Indicator	M	SD	Interpretation
1. The instructional video features intuitive navigation for seamless use.	4.60	0.55	Excellent
2. The video operates smoothly, with minimal buffering or delays.	4.60	0.55	Excellent
3. The instructional video supports independent use through intuitive design.	4.40	0.55	Excellent
4. The video resolution enhances clarity and visual quality for users.	4.80	0.45	Excellent
5. The audio quality is clear and aids in comprehension.	4.80	0.45	Excellent
Total	**4.64**	**0.49**	**Excellent**

In Table 4, it reveals that the overall mean was 4.64 with a standard deviation of 0.49, which was described as excellent. In terms of indicator 1, it has a mean of 4.60 and a standard deviation of 0.55 and can be described as excellent. Likewise, indicator 2 has a mean of 4.60 and a standard deviation of 0.55, which can be described as excellent. Also, indicator 3 has a mean of 4.40 with a standard deviation of 0.55, which was described as excellent. In indicator 4, it has a mean of 4.80 with a standard deviation of 0.45, which can be described as excellent. And for the indicator 5, it has a mean of 4.80 with a standard deviation of 0.45, which is described as excellent. Among all the indicators, Indicators 4 and 5 had the highest mean scores of 4.80, indicating that these aspects were the most positively evaluated by the respondents. On the other hand, Indicator 3 had the lowest mean score of 4.40, suggesting that while still excellent, it may require slight improvements compared to the other indicators.

Technical quality pertains to the production aspects of the video, including clarity of visuals and audio, editing, and overall professionalism. For example, Schooley *et al.* (2022) include multimedia principle adherence in their IVQC, which encompasses technical quality aspects that are crucial for effective learning. Similarly, Min *et al.* (2024) emphasize that high-quality video requires clear visuals and audio so as to be effective in improving learning outcomes. Moreover, Navarrete *et al.* (2023) note that incorporating appropriate visual and audio features in instructional videos can enhance technical quality by providing realistic and relatable scenarios for learners.

Table 5: Level of quality of the evaluated developed Taekwondo instructional videos as a supplemental training tool for Sultan Kudarat State University student-athletes in terms of appropriateness

Indicator	M	SD	Interpretation
1. The presentation flow was engaging and suited to the learners' needs.	4.80	0.45	Excellent
2. The presenter explained concepts in a way that was easy to understand.	4.80	0.45	Excellent
3. The presentation deepened my understanding of the subject matter.	4.80	0.45	Excellent
4. The presentation pacing matched the learners' ability to follow along.	4.60	0.89	Excellent
5.The presentation achieved its objectives and addressed learner expectations.	4.60	0.55	Excellent
Total	**4.72**	**0.54**	**Excellent**

In Table 5, it indicates that the overall mean is 4.72 with a standard deviation of 0.54, which was described as excellent. In terms of indicator 1, it has a mean of 4.80 and a standard deviation of 0.45 and can be described as excellent. Likewise, indicator 2 has a mean of 4.80 and a standard deviation of 0.45, which can be determined as excellent. Also, indicator 3 has a mean of 4.80 and a standard deviation of 0.45, which was described as excellent. In indicator 4, it has a mean of 4.60 with a standard deviation of 0.89, which can be described as excellent. And for indicator 5, it has a mean of 4.60 with a standard deviation of 0.55, which is described as excellent.

Appropriateness refers to how well the video content matches the learners' needs, considering factors like cultural relevance and alignment with learners' skill levels. In this regard, Navarrete *et al.* (2023) emphasize the importance of developing instructional strategies that ensure the content is relevant and engaging for students. Likewise, Min *et al.* (2024) highlight that tailored video content can address individual learner needs, thereby enhancing the appropriateness of the instructional material. Additionally, Schooley *et al.* (2022) suggest that including alternative language translations and accessibility features can improve the appropriateness of instructional videos by making them more inclusive for diverse learner populations.

Table 6: Level of quality of the evaluated developed Taekwondo instructional videos as a supplemental training tool for Sultan Kudarat State University student-athletes in terms of usability

Indicator	M	SD	Interpretation
1. The video is intuitive and user-friendly for first-time users.	4.80	0.45	Excellent
2. The video provides clear guidance or prompts for navigation.	4.60	0.89	Excellent
3. The video layout and interface enhance the learning experience.	4.60	0.55	Excellent
4. The video is accessible on various devices (e.g., mobile, tablet, desktop).	4.60	0.55	Excellent
5. The video supports diverse learning styles and preferences.	4.40	0.89	Excellent
Total	**4.60**	**0.65**	**Excellent**

In Table 6, it reveals that the overall mean was 4.60 with a standard deviation of 0.65, which was described as excellent. In terms of indicator 1, it has a mean of 4.80 and a standard deviation of 0.45 and can be described as excellent. Likewise, indicator 2 has a mean of 4.60 and a standard deviation of 0.89, which can be determined as excellent. Also, indicator 3 has a mean 4.60 with a standard deviation of 0.55, which was described as excellent. In indicator 4, it has a mean of 4.60 with a standard deviation of 0.55, which can be described as excellent. And for indicator 5, it has a mean of 4.40 with a standard deviation of 0.89, which is described as excellent. Among all the indicators, Indicators 1, 2, and 3 had the highest mean scores of 4.80, indicating that these aspects were the most positively evaluated by the respondents. Meanwhile, Indicators 4 and 5 had the lowest mean scores of 4.60, suggesting that while still excellent, they may have slightly lower levels of agreement or satisfaction compared to the other indicators.

Usability, or the ease with which users can navigate and interact with instructional content, directly impacts learning effectiveness. For instance, Reeves and Oh (2018) asserted that educational videos must be intuitive and accessible, as usability barriers can distract learners and reduce engagement. In other words, usability involves the ease with which learners can access and navigate the instructional videos. Similarly, Schooley *et al.* (2022) found that usability is a critical component in the effectiveness of instructional videos, highlighting the need for materials that are easy to follow and understand. Moreover, Navarrete *et al.* (2023) emphasize that user-friendly video interfaces can enhance learning outcomes in video-based training. Furthermore, Min *et al.* (2024) suggested that incorporating perceptual video quality assessment can improve usability by making the content more relatable and easier to apply in real-world scenarios. In the case of SKSU's taekwondo videos, high usability will help student-athletes easily access and review material, thereby supporting their ability to engage in independent learning and practice.

Table 7: Summary of the level of quality of the evaluated developed Taekwondo instructional videos as a supplemental training tool for Sultan Kudarat State University student-athletes in terms of content, instructional quality, presentation, technical quality, appropriateness and usability

Variables	M	SD	Interpretation
1. Content	4.64	0.57	Excellent
2. Instructional Quality	4.68	0.48	Excellent
3. Presentation	4.64	0.49	Excellent
4. Technical Quality	4.64	0.49	Excellent
5. Appropriateness	4.72	0.54	Excellent
6. Usability	4.60	0.65	Excellent
Total	**4.65**	**0.53**	**Excellent**

Table 7 shows the level of quality of the developed taekwondo instructional video in terms of content, instructional quality, presentation, technical quality, appropriateness and usability. As you can observe from the level of quality of developed Taekwondo Instructional video, the content obtained a mean or average of 4.64 (SD=0.57), which meets 91-100% quality. While the level of quality of developed Taekwondo instructional video when it comes to instructional quality obtained a mean or average of 4.68 (SD=0.48), which meets 91-100% quality. The level of quality of developed Taekwondo instructional video when it comes to presentation and technical quality obtained a mean or average of 4.64 (SD=0.49), which meets 91-100% quality. The level of quality of developed Taekwondo instructional video when it comes to appropriateness obtained a mean or average of 4.72 (SD=0.54), which meets 91-100% quality. And the level of quality of developed Taekwondo instructional video when it comes to usability obtained a mean or average of 4.60 (SD=0.65), which meets 91-100% quality. Among these indicators, appropriateness had the highest mean score of 4.72, suggesting that the instructional video was highly relevant and suitable for its intended audience. On the other hand, usability had the lowest mean score of 4.60, indicating that while still within the excellent range, there may be minor areas for improvement in terms of user-friendliness or ease of application. The result reveals that the level of quality of developed Taekwondo instructional video in terms of content, instructional quality, presentation, technical quality, appropriateness and usability has a grand mean of 4.65 with a standard deviation of 0.53, which can be described as perfectly acceptable.

Min *et al.* (2024) suggest that incorporating perceptual video quality assessment can improve instructional quality by aligning teaching methods with real-world applications. Schooley *et al.* (2022) developed the Instructional Video Quality Checklist (IVQC), which includes items related to educational design, such as the inclusion of learning objectives and adherence to multimedia principles, in order to enhance instructional quality. It is possible for physical educators to make use of technology with in order to enhance the skills of athletes and to bring more value to their education. Additionally, Min *et al.* (2024) suggest that incorporating perceptual video quality assessment can improve usability by making the content more relatable and easier to apply in real-world scenarios. For SKSU's taekwondo videos, high usability will help student-athletes easily access and review material, supporting their ability to engage in independent learning and practice. According to Soltani and Morice (2020), computers are increasingly being used to simulate the dynamics of sporting activities in gaming settings. As noted by Asio *et al.* (2021), the usage of mobile devices has grown widespread among students as a result of its accessibility, ease, and affordability in comparison to other technical equipment. When students were exposed to recorded lectures or edited audio-visual snippets, as opposed to receiving instruction in person, participating in tutorials, or completing reading assignments. Also, study found that students had substantial overall gains in their learning (Burt, 2021).

Table 8: Level of physical performance of the Taekwondo student-athletes of Sultan Kudarat State University in terms of speed, muscular strength, strategy and techniques

Variables	M	SD	Interpretation
1. Speed	2.41	0.51	Fairly Skilled
2. Strength Endurance	2.44	0.53	Fairly Skilled
3. Strategy	2.37	0.51	Fairly Skilled
4. Techniques	2.39	0.51	Fairly Skilled
Total	**2.40**	**0.52**	**Fairly Skilled**

In Table 8, it shows that the grand mean was 2.40 with a standard deviation of 0.52, which was described as fairly skilled. In terms of speed, it has a mean of 2.41 and a standard deviation of 0.51 and can be described as fairly skilled. Likewise, strength endurance has a mean of 2.44

and a standard deviation of 0.53, which can be described as fairly skilled. It also demonstrates that the strategy has a mean of 2.37 with a standard deviation of 0.51, which was described as fairly skilled. In addition, the techniques have a mean of 2.39 with a standard deviation of 0.51, which can be described as fairly skilled. The results implied that the physical performance of the SKSU taekwondo student-athletes in terms of speed, strength endurance, strategy and techniques is fairly skilled.

Taekwondo skills are very important when competing sports like martial arts. When it comes to competition, taekwondo is a combat sport that involves strong speed kicks and forceful motions along with continual contact between opponents and opposing aims (Akhmad *et al.,* 2021) and for Taekwondo competitors to maintain high-intensity moves for prolonged periods of time, strength endurance is crucial. Additionally, participating in sports is an essential physical activity that may improve human quality and lead to both physical and mental well-being (Akbar & Pramono, 2020). Also, Taekwondo is well known for its extensive repertoire of striking techniques, which include kicks, punches, and knee strikes, among other body parts.

For Taekwondo competitors to make wise judgments during competition, strategic thinking is fundamental. Combat success depends on the accuracy, force, and speed with which these strategies are used (Voysey, 2023). Moreover, research in the taekwondo has generally concentrated on certain parts of athletes' total technical and tactical abilities, while disregarding other significant topics such as determining how successful athletes get points (Jeon & Lim, 2024).

Table 9: Level of Taekwondo performance of the Sultan Kudarat State University student-athletes in Taekwondo with Taekwondo instructional videos as a supplemental training tool before the intervention

Variables	M	SD	Interpretation
1. Speed	2.41	0.51	Fairly Skilled
2. Strength Endurance	2.44	0.53	Fairly Skilled
3. Strategy	2.37	0.51	Fairly Skilled
4. Techniques	2.39	0.51	Fairly Skilled

In Table 9, it shows that the overall mean was 2.40 with a standard deviation of 0.52, which was described as fairly skilled. In terms of speed, it has a mean of 2.41 and a standard deviation of 0.51 and can be described as fairly skilled. Likewise, strength endurance has a mean of 2.44 and a standard deviation of 0.53, which can be described as fairly skilled. It also demonstrates that the strategy has a mean of 2.37 with a standard deviation of 0.51, which was described as fairly skilled. In addition, the techniques have a mean of 2.39 with a standard deviation of 0.51, which can be described as fairly skilled. The results implied that the taekwondo performance of the SKSU taekwondo student-athletes before the intervention is fairly skilled. Among these indicators, strength endurance had the highest mean score of 2.44, suggesting that student-athletes demonstrated slightly better endurance capabilities compared to other aspects. On the other hand, strategy had the lowest mean score of 2.37, indicating that athletes may need additional training in tactical execution and decision-making during competition.

Research conducted by Elyakim *et al.* (2019) indicated that video-based training has the potential to increase performance and technical abilities in any sports discipline. These abilities are essential in every facet of life, including the job, and they are essential. They should be adaptable to the fast-changing transitions of sports competition, according to Go (2020), there is a demand for research that would provide educators with information that would enlighten them about the construction of new standards and instructional practices that are adaptable to the changing times. The employment of technology has been shown to increase physical education and athletic performance, according to the findings of a study that was conducted by Muhammad (2023).

Table 10: Level of Taekwondo performance of the Sultan Kudarat State University student-athletes in Taekwondo with Taekwondo instructional videos as a supplemental training tool after the intervention

Variables	M	SD	Interpretation
1. Speed	4.00	0.34	Skilled
2. Strength Endurance	4.01	0.52	Skilled
3. Strategy	4.03	0.57	Skilled
4. Techniques	4.10	0.49	Skilled
Total	**4.04**	**0.49**	**Skilled**

Table 10, reveals that the post-test was likely to be more effective, with a total overall mean of 4.04 and a standard deviation of 0.49, which was described as skilled. In terms of speed, it has a mean of 4.00 and a standard deviation of 0.34, which is described as skilled. Likewise, the strength endurance has a mean of 4.01 and a standard deviation of 0.52, which can be determined as skilled. It also demonstrates that the strategy has a mean of 4.03 and a standard deviation of 0.57, which was described as skilled. In addition, the techniques have

a mean of 4.10 with a standard deviation of 0.49, which can be described as skilled. The results implied that the taekwondo performance of the SKSU taekwondo student-athletes before the intervention is fairly skilled. Among the indicators, techniques had the highest mean score of 4.10, indicating that student-athletes exhibited the most improvement in executing Taekwondo techniques. Conversely, speed had the lowest mean score of 4.00, suggesting that while improvements were made, additional training may still be needed to enhance reaction time and movement efficiency.

Instructional videos are effective tool in assisting and improving their understanding and skills when in training and competition. According to the study of Cormier *et al.* (2020) investigated the advantages that video-assisted training has been applied to physical sports for student-athletes. They came to the conclusion that augmented reality-assisted instruction is more successful than video-assisted instructions. Also, we can apply instructional videos in training the students if there is less access to instructors and trainers since it is becoming more common for universities all around the globe to use online learning, often depending on videos (asynchronous multimedia). Concurrently, Noetel *et al.* (2021) discovered that substituting video for the techniques of instruction that were already in place resulted in marginal enhancements to the learning of the students. The use of video into learning was shown to result in significant learning improvements. According to Al-Samarraie (2019), the findings imply that videos are unlikely to be harmful to student learning and, in most cases, promote student learning.

Table 11: The significant difference between the physical performance of Sultan Kudarat State University student-athletes in Taekwondo with Taekwondo Instructional Videos as a supplemental training tool before and after the intervention

	N	M	SD	z-computed	p-value	Interpretation
Before	48	2.40	0.17			
				-50.00	0.001	significant
After	48	4.04	0.15			

The table 11, shows results of the Z-test that the post-test after using the developed instructional video as a supplemental training tool was likely to be more effective, with a total overall mean of 4.04 and a standard deviation of 0.15, compared to the pre-test, which had a total mean of 2.40 and a standard deviation of 0.17. This significant difference, as indicated by the z-computed value of -50.00 and a p-value of 0.001, confirms that the use of Taekwondo Instructional Videos as a supplemental training approach had a positive impact on the physical and taekwondo performance of Sultan Kudarat State University Taekwondo student-athletes.

Furthermore, this study examined the effectiveness of instructional videos in Taekwondo as an intervention to enhance the skill level and overall performance of student-athletes. A Z-test, a non-parametric statistical test, was employed to determine whether there was a significant difference between the pre-test and post-test results after the intervention. Since the results demonstrated a statistically significant improvement, it highlights the effectiveness of video-based learning in sports training in Taekwondo.

In this study, instructional videos in Taekwondo have proven to be an effective supplemental training tool for improving student-athletes' performance. By providing step-by-step guidance, instructions and visual demonstrations, students have learned new techniques and refined their existing skills application to new school competition and training. Videos that break down techniques into specific steps have helped athletes understand proper execution, leading to enhanced overall technique and performance. This supports the idea that video-based training is a valuable tool for skill development in sports education specially in Taekwondo.

CONCLUSION

Based on the findings, the following conclusion is hereby formulated: Our respondents have a total population of 48 SKSU student-athlete. According to the results from the developed instructional video rated by Physical Education instructors, Taekwondo Head Instructors and member of Philippine Taekwondo Association, the instructional video was having good content, which indicates that the instructional video as a supplemental training tool for SKSU stud`ent-athletes meets 91-100% of level of quality and can be used as a supplemental training tool for student athletes training. The quality of the developed instructional video has a descriptive rating of excellent in terms of its content, instructional quality, presentation, technical quality, appropriateness and usability. The results of the physical performance of the respondents in terms of speed, strength endurance, strategy and techniques have a descriptive rating of fairly skilled means that the student athletes have a lack of knowledge in new basic skills and training about the new school taekwondo. Likewise, the results of the Taekwondo performance of the respondents before the intervention was described as fairly skilled, also revealed that student athletes are at disadvantage when it comes to competition based on their performances. After showing the instructional video to the respondents, the results of the post - test can be described as skilled with a grand mean of 4.04. The highest improvement was observed in techniques (M = 4.10), while speed, though improved, had the lowest mean score (M = 4.00), suggesting a need for further training in movement efficiency and reaction time. The Z-test results further confirmed the effectiveness of instructional videos, showing a statistically significant difference between pre-test and

post-test scores (z-computed = -50.00, p-value = 0.001) thus, rejects the hypothesis that there is no significant difference between the physical performance of Sultan Kudarat State University student-athletes in Taekwondo with Taekwondo Instructional Videos as a supplemental training approach in their pre-test and post-test results. This indicates that video-based training played a crucial role in enhancing the student-athletes' skills and overall performance.

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