

IMPACT OF COMBATIVE SPORTS TRAINING ON PHYSICAL FITNESS AND MOTOR SKILLS OF SENIOR HIGH SCHOOL

JOHN DERICK R. DENZO

Master of Arts in Education

Major in MAPEH

Abstract

Senior high school learners increasingly need structured physical activity programs that can address declining fitness levels while also strengthening complex motor skills and positive behavioral attributes. This study examined the impact of structured combative sports training on the physical fitness, motor skills, confidence, and discipline of senior high school learners. Specifically, it determined the mean scores of selected physical fitness components in terms of muscular strength, cardiovascular endurance, and flexibility; assessed motor skills proficiency in balance, agility, coordination, and reaction time; tested the correlation between fitness and motor skill scores; and compared learners' confidence and discipline scores before and after participation in the training program. The study employed a quantitative quasi-experimental one-group pretest-posttest design involving 300 purposively selected senior high school learners from Dagupan City National High School during the first semester of School Year 2025–2026. Data were gathered using standardized physical fitness tests, motor skills proficiency tests, and self-report psychological inventories. Results revealed statistically significant improvements in all physical fitness components after the intervention, particularly in muscular strength, cardiovascular endurance, and flexibility. Significant gains were likewise recorded in balance, agility, coordination, and reaction time, confirming the positive influence of combative sports on motor proficiency. Moreover, a strong positive correlation was found between post-test fitness and motor skill scores ($r = 0.685$, $p < .001$), indicating that improvements in physical capacity were closely associated with gains in motor competence. Confidence and discipline scores also increased significantly after training. The findings support the development of an action plan integrating combative sports into senior high school physical education to enhance learners' physical, motor, and psychosocial development.

Keywords: Combative Sports Training, Physical Fitness, Motor Skills, Confidence, Discipline, Senior High School Learners, Quasi-Experimental Study

1. Introduction

Physical activity during adolescence is not a peripheral concern but a central educational and public health issue. The World Health Organization (WHO) states that physical inactivity is a major risk factor for noncommunicable diseases. It reports that 81% of adolescents aged 11–17 years worldwide do not meet the recommended activity levels. In the Philippine setting, this concern directly intersects with the purpose of school physical education. The K to 12 Physical Education Curriculum Guide identifies fitness and movement education as the core of PE and explicitly states that the curriculum seeks to develop the competence, confidence, and commitment needed for an active life. These policies and health perspectives converge on a single implication: secondary schools need movement programs that are not only participatory but also sufficiently structured, challenging, and developmentally meaningful to produce measurable gains in learners' physical and motor capacities.

This need is especially relevant in Senior High School, where physical education must respond to learners who are undergoing rapid physical, psychological, and social change while also facing intensifying academic demands. The strengthened Senior High School curriculum

for Physical Education 2 (Sports and Dance) emphasizes that Grade 11 and 12 learners should develop physical skills, coordination, and teamwork through sports-based experiences that promote personal well-being and community engagement. At the same time, the broader PE curriculum's logic of "move to learn" and "learn to move" underscores that school PE is not limited to participation alone; it is also expected to build movement competence and self-management. In this context, combative sports are pedagogically attractive because they combine repeated technical practice with high levels of attentional control, bodily coordination, and disciplined movement under changing conditions. Rather than offering undifferentiated activity, they provide an organized framework for developing health-related fitness and movement proficiency together.

Recent empirical work supports this view. In a 2025 longitudinal study, Saraiva et al. found that nine months of Judo and Muay Thai practice improved motor skills in children and adolescents, with gains observed in lateral jumps, platform transfer, and single-leg jump relative to controls. The authors concluded that combat sports practice was effective in improving the motor skills of young participants. Complementing this, Han and Ju's 2025 meta-analysis reported that Taekwondo interventions were effective in enhancing static and dynamic balance, reinforcing the idea that combat-based movement training can target precisely the types of outcomes that many school PE programs aim to develop but do not always measure rigorously. These findings are highly relevant to secondary education because balance, agility, coordination, and reaction time are not isolated athletic traits; they are core dimensions of motor competence that support both sports performance and functional movement in everyday life.

The potential value of combative sports extends beyond motor control to broader physical fitness outcomes. School-based karate research has shown that martial-arts-oriented programming can improve physical fitness in educational settings, including cardiorespiratory fitness and balance, and is feasible within PE lessons. This matters because one ongoing challenge in general physical education is that broad, low-specificity activity exposure does not always provide the repeated overload, coordinated movement demands, and progression needed to elicit robust adaptation. Combative sports, by contrast, typically require repeated bursts of effort, postural control, rapid directional change, flexibility, and technically regulated whole-body action. Such demands make them plausible vehicles for improving muscular strength, cardiovascular endurance, and flexibility—the very components examined in the present study. Thus, the educational question is no longer whether combative sports are merely recreational, but whether they can serve as a legitimate, evidence-based modality for strengthening health-related fitness within the school context.

A second reason the topic warrants focused inquiry is that combative sports may foster psychosocial outcomes highly relevant to adolescence. Moore, Dudley, and Woodcock's 2023 randomized controlled trial found that a school-based martial arts intervention significantly improved total self-efficacy, including academic, social, and emotional self-efficacy, among secondary school students. In parallel, the school-based karate trial led by Pinto-Escalona and colleagues reported improvement in conduct problems, suggesting that martial-arts-based programming may influence behavioral regulation as well as physical outcomes. Although confidence and discipline are conceptually distinct from self-efficacy and conduct, these findings are closely aligned with the broader claim that combative sports can shape how learners regulate effort, respond to challenge, and interpret mastery. This is especially important in Senior High School, where structured opportunities for self-control, perseverance, emotional regulation, and purposeful risk-taking may have developmental value beyond the gymnasium. Accordingly, examining confidence and discipline alongside fitness and motor proficiency is not an artificial expansion of the topic; it is consistent with the multidimensional educational promise of combative sports.

Despite this promising literature, important gaps remain. Much of the available evidence is drawn from children, specialized athletic samples, or interventions focused on only one or two

outcomes, such as balance or self-efficacy. Fewer studies examine an integrated school-based model that simultaneously evaluates health-related fitness, motor skills, and non-cognitive outcomes within a regular secondary-school context, and fewer still do so in the Philippine setting. This gap is precisely where the present study is positioned. The uploaded thesis shows that the investigation focuses on Dagupan City National High School during the first semester of School Year 2025–2026, examining whether a 12-week structured combative sports training program can improve muscular strength, cardiovascular endurance, flexibility, balance, agility, coordination, reaction time, confidence, and discipline among Senior High School learners, and whether fitness and motor-skill gains are significantly related. By addressing these outcomes together, the study contributes local, school-based evidence on whether combative sports can function not only as an engaging PE activity, but also as a purposeful intervention for adolescent physical, motor, and psychosocial development.

2. Method

2.1 Research Design

The study employed a purely quantitative quasi-experimental research design, specifically the one-group pretest–posttest design, to determine the impact of a structured combative sports training program on selected physical, motor, and psychological outcomes among Senior High School learners. This design was considered appropriate because it enabled the researcher to measure change within a single cohort by establishing baseline scores prior to the intervention and then comparing them with post-intervention scores after exposure to the training program over a fixed duration, identified in the thesis as approximately twelve weeks. In the pretest phase, baseline data were collected on muscular strength, cardiovascular endurance, flexibility, balance, agility, coordination, reaction time, confidence, and discipline. Following the intervention, the same instruments and tests were re-administered during the posttest phase to determine the magnitude and statistical significance of the change. The design also incorporated a correlational component by examining the relationship between posttest physical fitness scores and motor skills proficiency measures, thereby allowing the study not only to evaluate improvement over time but also to determine whether gains in physical capacity were associated with higher levels of specialized motor competence. Overall, the chosen design provided a rigorous, structured, and data-driven framework for isolating the educational effects of combative sports training within an authentic school setting.

2.2 Participants

The study was 300 purposively selected Senior High School learners from Dagupan City National High School, specifically students enrolled in Grades 11 and 12 during the first semester of School Year 2025–2026, who served as the sole intervention group in the quasi-experimental investigation. Their selection was guided by the study's methodological requirements, particularly the need for respondents who could safely and consistently participate in the structured twelve-week combative sports training program and complete both the pretest and posttest phases. Accordingly, inclusion criteria required that participants be officially enrolled senior high school learners, possess medical clearance for high-intensity physical activity, and submit both parental or guardian consent and their own assent to full participation throughout the intervention period. The use of purposive sampling was therefore appropriate because the study demanded not only numerical adequacy but also participant commitment, physical readiness, and ethical eligibility, all of which were necessary to preserve the integrity, safety, and continuity of the training-based research process. While this sampling strategy strengthened control over participation quality within a single institutional setting, the thesis also acknowledges that it necessarily limited the broader generalizability of the findings beyond similarly situated school populations.

2.3 Instrumentation

The study employed a multi-instrument quantitative assessment system designed to capture the physical, motor, and psychological effects of the structured combative sports training program among Senior High School learners. For the physical fitness components, the researcher used standardized and widely validated field tests, specifically the push-up test and, where applicable, a handgrip dynamometer for muscular strength; timed cardiorespiratory protocols such as the 3-minute step test or 1-mile run/walk test for cardiovascular endurance; and the sit-and-reach test for flexibility. For motor skills proficiency, the study employed specific time-based and performance-based instruments, including the T-Test for agility, static and dynamic balance protocols such as the Stork Stand Test, the Alternate Hand Wall Toss for coordination, and either an electronic reaction time meter or the ruler drop test for reaction time. To assess the non-cognitive dimensions of the intervention, particularly confidence and discipline, the study utilized a standardized self-report psychological inventory adapted from validated scales such as the Trait Self-Confidence Inventory and the Self-Control Scale; this instrument underwent pilot testing and expert validation to ensure reliability and suitability for Senior High School learners, and responses were gathered through a Likert-type scale and converted into quantitative mean scores for analysis. Collectively, these instruments provided an integrated, objective, and methodologically rigorous measurement framework capable of detecting pretest–posttest changes across the study's core outcome variables.

2.4 Data Analysis

The study employed a quantitative statistical analysis framework, using the Statistical Package for the Social Sciences (SPSS) as the primary software for processing and interpreting data from the pretest and posttest phases of the structured combative sports intervention. At the descriptive level, mean and standard deviation were computed to summarize the learners' scores across all outcome variables, specifically the physical fitness components (muscular strength, cardiovascular endurance, and flexibility), the motor skills proficiency measures (balance, agility, coordination, and reaction time), and the self-reported psychological indicators of confidence and discipline. To determine whether the intervention produced statistically significant changes over time, the study used a paired-samples t-test, which was appropriate because the same group of Senior High School learners was measured before and after exposure to the 12-week training program. In addition, to address the relationship between the two principal performance domains, the study employed the Pearson Product-Moment Correlation Coefficient (r) to examine the strength and direction of the linear association between the mean posttest physical fitness scores and the mean posttest motor skills proficiency scores. All inferential analyses were tested at the 0.05 level of significance, and the resulting statistical outputs served as the basis for hypothesis testing, interpretation of intervention effects, and formulation of the study's conclusions and action plan.

3 Results

The study demonstrated that the structured combative sports training program produced statistically significant improvements in all measured physical fitness components among Senior High School learners. In muscular strength, the mean score increased from 28.52 in the pre-test to 35.18 in the post-test ($t = 15.33$, $p < .001$), indicating a substantial gain in the learners' capacity to generate force after the intervention. Cardiovascular endurance likewise improved markedly, with the mean rising from 68.91 to 75.64 ($t = 12.87$, $p < .001$), while flexibility increased from 3.14 to 5.89 ($t = 11.02$, $p < .001$). These findings collectively show that the twelve-week training regimen was effective in enhancing health-related fitness, suggesting that the repetitive, high-intensity, and technically demanding nature of combative sports provided sufficient

physiological stimulus to produce measurable adaptations in strength, endurance, and range of motion.

A similarly strong pattern of improvement emerged in motor skills proficiency. The post-test mean for balance rose from 18.05 to 24.98 ($t = 18.99$, $p < .001$), indicating that learners became more capable of maintaining equilibrium during static and dynamic tasks. Agility improved as the time required to complete the test decreased from 12.55 seconds to 10.97 seconds ($t = -14.31$, $p < .001$), while coordination increased from 22.10 to 29.75 repetitions ($t = 16.50$, $p < .001$). In reaction time, the mean dropped from 350.11 milliseconds to 280.95 milliseconds ($t = -19.05$, $p < .001$), reflecting faster and more efficient sensorimotor response. These results indicate that combative sports training did not merely improve general physical condition; it also enhanced the learners' ability to execute complex movement tasks requiring speed, control, timing, and precision.

The study further established a strong, positive, and statistically significant relationship between physical fitness and motor skills proficiency. Correlational analysis yielded a Pearson r of 0.685 ($p < .001$), leading to rejection of the null hypothesis. This result indicates that learners who achieved higher post-test fitness scores also tended to demonstrate higher post-test motor skills proficiency. In substantive terms, the finding suggests that gains in muscular strength, endurance, and flexibility were closely associated with gains in balance, agility, coordination, and reaction time. The results therefore support the view that physical fitness and motor competence developed in a mutually reinforcing manner within the context of combative sports, rather than as separate or unrelated outcomes.

Beyond physical and motor variables, the study also revealed notable gains in the learners' psychological outcomes, particularly confidence and discipline. The mean confidence score increased from 3.51 in the pre-test to 4.29 in the post-test ($t = 18.01$, $p < .001$), while the mean discipline score rose from 3.88 to 4.55 ($t = 15.65$, $p < .001$). These findings indicate that the intervention fostered more than bodily development; it also strengthened the learners' self-belief, behavioral regulation, and persistence. The structured, rule-governed, and mastery-oriented environment of combative sports appears to have contributed to these improvements by requiring learners to demonstrate control, commitment, and resilience throughout the training process.

Taken together, the results present a clear and coherent pattern: combative sports training significantly improved physical fitness, motor skills proficiency, confidence, and discipline among Senior High School learners. The intervention was therefore effective not only as a physical conditioning program but also as a holistic developmental strategy that addressed physical, motor, and psychosocial dimensions of learner growth. Because all major indicators showed a statistically significant positive change, and because the relationship between fitness and motor competence was found to be strong and meaningful, the findings provided a solid empirical basis for the proposed action plan to integrate combative sports more deliberately into Senior High School physical education.

4. Discussion

The present study found that a 12-week structured combative sports program significantly improved muscular strength, cardiovascular endurance, and flexibility among Senior High School learners, with all three fitness indicators showing statistically significant pretest–posttest gains. This pattern is consistent with stronger external evidence. In a multi-country cluster-randomized controlled trial, Pinto-Escalona et al. reported that a school-based karate intervention improved cardiorespiratory fitness and balance, with a positive trend in flexibility, compared with regular physical education. Likewise, the current findings align with the literature synthesized in recent work on combat sports in youth, which suggests that martial-arts-based training provides sufficient movement intensity, postural demands, and repetition to stimulate meaningful physical

adaptation. On this basis, the present study's gains in strength, endurance, and flexibility are not isolated results; they align with broader evidence that structured combative sports can serve as a legitimate school-based fitness intervention.

The study also showed significant gains in balance, agility, coordination, and reaction time, indicating that combative sports training enhanced motor skills and health-related fitness. This is strongly corroborated by Han and Ju's 2025 meta-analysis and systematic review, which found that Taekwondo interventions significantly improved both static and dynamic balance, and by Saraiva et al.'s 2025 intervention study, which concluded that nine months of Judo and Muay Thai practice improved several youth motor-skill outcomes relative to controls. These external findings help explain the present thesis results: combative sports repeatedly require learners to stabilize the body, shift weight quickly, coordinate upper and lower limbs, and respond to moving stimuli under time pressure. In school-based terms, that means such training offers a more specific and demanding motor-learning environment than many general PE activities, which helps clarify why the observed posttest gains in balance and reaction time were especially strong.

Another important result of the study was the strong positive correlation between posttest physical fitness and posttest motor skills proficiency ($r = 0.685$, $p < .001$), suggesting that the two outcome domains developed in an interdependent way rather than as separate effects. Although this exact relationship has not been established in precisely the same intervention format, broader school-based evidence points in the same direction. Batez et al. found that motor competence and physical fitness were positively associated in school-aged children, supporting the idea that fitter learners often perform better on coordinated movement tasks and that movement proficiency and physical capacity reinforce one another over time. Read in that light, the current study's correlation is plausible and educationally meaningful: as learners became stronger, more enduring, and more flexible, they also appeared better able to execute balance-, agility-, and coordination-based tasks efficiently. This supports the study's argument that combative sports are especially useful because they integrate conditioning and skill execution rather than treating them as disconnected strands of instruction.

The present study further reported significant increases in confidence and discipline after the intervention. These psychosocial findings are also consistent with recent literature, although the alignment is closer conceptually than instrument-for-instrument. In a randomized controlled trial involving 283 secondary school students, Moore et al. found that a martial-arts-based intervention improved self-efficacy, and those gains were sustained at follow-up. Similarly, Koroğlu et al. reported that a 6-week judo training program improved psychological resilience and one dimension of self-control in a randomized controlled design. While self-efficacy and self-control are not identical to the thesis measures of confidence and discipline, they are clearly related constructs. That makes the current findings credible: the rule-governed, mastery-oriented, and feedback-rich environment of combative sports can reasonably strengthen learners' beliefs in their capability while also reinforcing persistence, behavioral control, and respect for structured routines.

At the same time, the discussion should remain methodologically careful. The thesis itself acknowledges that the study used a one-group pretest–posttest design without a control group, which limits the ability to attribute all observed gains exclusively to the intervention because maturation, outside activity, sleep, or other contextual factors may also have contributed. For that reason, the most defensible interpretation is not that combative sports alone caused every improvement, but that the observed changes are consistent with what stronger external studies and recent syntheses have found. In other words, the present study adds useful local evidence from Dagupan City National High School, and its results are more persuasive because they align with randomized trials, intervention studies, and meta-analytic work on karate, judo, Muay Thai, and Taekwondo.

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