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A Study on the Relationship Between Teaching Quality and Learning Satisfaction in University Taekwondo Courses

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Abstract

Purpose: This study examined the relationship between teaching quality and learning satisfaction in university Taekwondo courses.

Methods: A cross-sectional survey was administered to students enrolled in Taekwondo physical education at Lingnan Normal University (N = 367 valid responses). Teaching quality comprised five dimensions (tangibles, reliability, responsiveness, assurance, empathy) and learning satisfaction three facets (teacher instruction, facilities/equipment, instructional administration). Instruments were developed based om previous studies. Data were collected via anonymous paper-and-online questionnaires; reliability/validity were verified, and relationships tested using PLS-SEM.

Results: Factor loadings (0.604–0.842), CR (0.782–0.848), and AVE (0.445–0.691) supported acceptable measurement quality; Fornell–Larcker criteria indicated discriminant validity. All five quality dimensions positively predicted learning satisfaction; assurance (β = 0.205), tangibles (β = 0.181), and responsiveness (β = 0.188) were comparatively stronger, followed by empathy (β = 0.164) and reliability (β = 0.133). The model explained 45.7% of variance (R^2 = 0.457).

Conclusions: Enhancing safety-competent instruction, resource readiness, and timely feedback may improve satisfaction, persistence, and safer participation in university Taekwondo.

Keywords: Teaching quality; Learning satisfaction; Taekwondo; Physical education; PLS-SEM

1. Introduction

In recent years, physical education courses in higher education in mainland China have not only undertaken the task of promoting the physical and mental health of college students but have also been entrusted with the expectation of producing overall benefits in specialized skills, character cultivation, and lifelong exercise intentions. Since the successive release of the Healthy China 2030 Planning Outline and the Outline for Building a Leading Sports Nation, policies have clearly taken “health first” and “building a strong nation” as the main axes, promoting improvements in school sports conditions, curriculum quality enhancement, and the integration of physical education and teaching, and emphasizing the implementation of high-quality, diversified, and regularized physical education learning experiences in universities (WHO, 2016). Supporting documents such as the Opinions on Comprehensively Strengthening and Improving School Physical Education in the New Era further propose action plans and quantitative requirements for teacher allocation, facilities and equipment, teaching evaluation, and competition systems, thereby improving the accessibility and effectiveness of university physical education courses (Central Committee of the CPC & State Council, 2020; MOE, 2020). In addition, the National Guidelines for Physical Education Curriculum and Teaching in Regular

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Higher Education Institutions position physical education as a compulsory general course in universities, specify class hours and credits, and take "sports participation, motor skills, physical health, mental health, and social adaptation" as the core domain objectives for curriculum design and teaching evaluation (MOE, 2020). Under this policy context, Taekwondo, as an important elective option in university physical education, combines the characteristics of technical and tactical training, etiquette norms, and safety risk management, and therefore particularly requires coordinated enhancement in instructional design, teacher professionalism, course interaction, equipment and facilities, and post-class support to ensure learning effectiveness and positive experience quality (Wang, 2023; Gil, 2021).

The relationship between service (teaching) quality and learning satisfaction has long attracted attention in higher education quality management and physical education teaching research. The classical service quality model (SERVQUAL) indicates that quality can be measured through dimensions such as "tangibles, reliability, responsiveness, assurance, and empathy," and that improvements in service quality help increase satisfaction (Parasuraman et al., 1985). Recent empirical studies in higher education contexts have continued to confirm that students' perceptions of the service/teaching quality of schools (or courses) are significantly and positively related to their learning satisfaction and may further influence intentions to continue course enrollment and overall evaluations of learning experiences (Seitova, 2024; Onditi & Wechuli, 2017). In the context of schools and colleges of physical education and sport, quality assessment can serve as an important tool for the continuous improvement of teaching and management decisions and has indicative significance for the student experience (Yildiz, 2014).

With respect to Taekwondo courses themselves, research has indicated that making good use of data-based and technology-based instructional design, systematic training, and assessment helps to improve teaching efficiency and course quality (Wang, 2023). At the same time, learners' sense of enjoyment and engagement is also an important psychological mechanism affecting satisfaction and continued participation. The sport psychology literature regards "enjoyment" as a positive emotional response to exercise experiences, encompassing feelings such as "fun, liking, and pleasure," and closely related to motivation and sustained participation (Scanlan & Simons, 1992; see McCarthy et al., 2008; Joung et al., 2024). Therefore, in university Taekwondo courses, considering safety planning, instructional processes, feedback mechanisms, and peer interaction—to promote positive emotional experiences and self-efficacy—helps to enhance learning satisfaction and course achievement.

In sum, based on the continued requirements of educational policy regarding the quality of school physical education (Ministry of Education, 2013; Chen, 2024), the robust association between service/teaching quality and student satisfaction (Parasuraman et al., 1985; Seitova, 2024; Onditi & Wechuli, 2017; Yildiz, 2014), and the composite characteristics of Taekwondo courses that combine technical, safety, and affective aspects and are influenced by trends in technology-enhanced teaching, also the practical exploration of virtual training contexts for Taekwondo learners' satisfaction (Wang, 2023; Gil, 2021). This study aims to explore the relationship between teaching quality and learning satisfaction in university Taekwondo courses, with the goal of providing empirical evidence for curriculum design, teacher development, and facility management, as well as offering operational management indicators and improvement directions for quality assurance and the continuous enhancement of physical education courses.

2. Literature Review

2.1. Teaching Quality

In the context of physical education, "teaching quality" simultaneously encompasses the service dimension and the instructional dimension: the service dimension largely draws on theories of service quality in higher education (e.g., SERVQUAL/HEdPERF), emphasizing tangibles, reliability, responsiveness, assurance, empathy, and the allocation of unit processes and resources; the instructional dimension focuses on indicators of the "teaching–learning process," such as classroom interaction, structured instruction (alignment among objectives–activities–assessment), feedback quality, and the learning climate (Kruse et al., 2024). In recent years, "Quality Physical Education (QPE)" has been used as a higher-order framework, incorporating skill development, bodily awareness, norms and safety, teaching quality, and facilities and equipment into an overall logic of quality evaluation (Qin et al., 2025).

Students' perceptions of "teacher support/professional competence" are often used as a proxy indicator of teaching quality and, through psychological mechanisms such as learning motivation and self-efficacy, influence outcomes including intention to participate, learning performance, and (extended) satisfaction; the latest model using Chinese undergraduates as a sample confirms the pathway "teacher support → (chain mediation by motivation/self-efficacy) → physical activity participation," which has implications for improving the quality of course experiences (Su and Liu, 2025). In addition, recent observational studies have reinforced the evidence for the effects of "high-quality interaction"

on the learning process (Kohake et al., 2024), and the emergence of QPE instruments has provided a new measurement hub linking the three levels of "institution—classroom—learner" (Qin et al., 2025).

Accordingly, in terms of research and practical implications, the teaching quality of Taekwondo courses should be operationalized as a set of observable, quantifiable, and improvable indicators: for example, (1) the ratio of demonstration to feedback, feedback latency, and specificity; (2) safety compliance rates in sparring and skill training (correct use of protective gear, space density, number of rule violations); (3) technical performance and movement consistency (standardized movement scoring, video feedback); (4) learning climate (autonomy support, peer assistance, etiquette culture); and (5) learning outcomes (satisfaction, intention to continue participation, post-class self-practice). On this basis, conducting longitudinal or quasi-experimental designs can test the causal chain of "quality → motivation/satisfaction → continued participation," and provide clear priorities for instructional improvement and quality thresholds for university Taekwondo courses.

2.2. Learning Satisfaction

Learning satisfaction refers to students' positive evaluative tendency toward the overall course experience (content configuration, instructional interaction, learning resources and support). It is highly related to affective experiences (e.g., enjoyment/pleasure, boredom/fatigue) but is not an equivalent construct; most studies position it within the causal pathway of "instructional support/quality → (motivational and affective mechanisms) → satisfaction → intention to participate/sustained behavior" (Baños et al., 2020; McCarthy et al., 2008). In the context of physical education classes, satisfaction not only reflects subjective perceptions of course value and fairness, but is also connected to contextual characteristics such as risk perception, sense of safety, peer interaction, and accessibility of facilities and equipment (Kruse et al., 2024).

In the context of physical education instruction, recent research presents a consistent set of clues: First, teachers' autonomy support can enhance students' enjoyment and suppress boredom, and learning satisfaction often plays a mediating role between autonomy support and learning outcomes (e.g., performance, intention to participate) (Baños et al., 2020); second, the adoption of student-centered Sport Education Models (SEM) and structured instructional design often improves learning attitudes and experiences, thus elevating satisfaction either as an outcome or a mediator, although existing evidence is still primarily short-term, non-experimental, or quasi-experimental, with insufficient longitudinal research (Zhang et al., 2024); third, in online/blended physical education contexts, students' learning readiness and teacher support are positively correlated with satisfaction, whereas technological/environmental barriers are negatively correlated with satisfaction, indicating that structural supports such as course design and resource allocation are key to maintaining satisfaction (Wang et al., 2024); finally, although a positive association between service quality and satisfaction can be observed at the department/faculty level, the implementation of actionable improvements at the single-classroom level still requires the introduction of observable indicators of classroom interaction and instructional behaviors (e.g., quality of demonstration and feedback, risk and safety procedures) to link the "quality–satisfaction" mechanism between governance and classroom levels (Yildiz, 2014; Kohake et al., 2024).

Therefore, in university Taekwondo courses, learning satisfaction is not only the result of post-class feelings but also a key hub linking motivation, behavior, and effectiveness: higher satisfaction can strengthen intrinsic motivation and self-efficacy, increase intentions to re-enroll and self-practice outside of class, and promote the stable acquisition of key techniques (stance, footwork, kicking chain); at the same time, by enhancing the sense of safety and identification with norms, it can drive correct wearing of protective gear, adherence to sparring protocols, and maintenance of order in practice spaces, reducing injuries and rule violations and forming a positive cycle of "safety–satisfaction–sustainability"; in terms of character and etiquette, satisfactory learning experiences promote the internalization of respect, self-discipline, and peer support, optimizing class atmosphere and sports culture. In practice, it is recommended to jointly monitor satisfaction together with classroom observation indicators (quality of demonstration and feedback, safety procedures in sparring), objective performance (technical scores, rates of violations and injuries), as a basis for course governance and resource allocation (space density, number of protective gear sets, teaching assistants), thereby establishing a measurable and improvable quality assurance pathway of "instructional support/quality → (motivation and affect) → satisfaction → sustained participation/performance/safety."

3. Methods

3.1. Research Design

This study adopted a cross-sectional quantitative research design, targeting university students at Lingnan Normal University who were enrolled in Taekwondo physical education courses. A structural equation modeling (SEM) approach was used to examine the pathway "teaching quality → learning satisfaction." Teaching quality comprised five dimensions—tangibles, reliability, responsiveness, assurance, and empathy—while learning satisfaction comprised three dimensions: teacher instruction, facilities and equipment, and instructional administration. Data collection employed both online and paper-based formats and was conducted at staggered times to reduce common method bias. The analytical procedure included reliability–validity testing and structural model analysis. All data collection complied with research ethics and was carried out through anonymous surveys.

3.2. Data collection

Using purposive sampling, this study selected university students at Lingnan Normal University who were enrolled in Taekwondo physical education courses as the research participants. Data were collected during the course period through both paper-and-pencil and online questionnaires administered concurrently: paper questionnaires were distributed in class by the course instructor and collected on site; the online questionnaire link was posted by the instructor, and respondents completed it using personal mobile devices or computers. All responses were anonymous and non–personally identifiable. To ensure data quality, a research briefing and consent procedure were conducted in advance, and during data cleaning, questionnaires with duplicate submissions, abnormally short completion times, excessive item nonresponse, or failed logical checks were excluded. A total of 412 questionnaires were returned, of which 367 were valid and 45 were invalid; the effective response rate was 89.1%.

3.3. Instruments

3.3.1. Teaching Quality

This study's teaching quality scale was designed around five major dimensions in the context of physical education courses—"Tangibles" (7 items), "Reliability" (4 items), "Responsiveness" (4 items), "Assurance" (3 items), and "Empathy" (2 items). Drawing on extensions and revisions of service quality scales in higher education and schools/colleges of physical education (e.g., SERVQUAL, HEdPERF, PESPERF), an item pool was formed and then contextually revised according to the characteristics of Taekwondo courses (Parasuraman et al., 1988; Firdaus, 2006; Yildiz, 2014), yielding a total of 20 items. Responses were measured on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree); higher scores indicate better perceived "teaching quality of university Taekwondo courses."

3.3.2. Learning Satisfaction

The learning satisfaction scale referred to and revised the framework of commonly used satisfaction/course experience tools in higher education, adopting the core items from the Course Experience Questionnaire (CEQ) and the Student Satisfaction Inventory (SSI), for a total of six items, with item wording adjusted according to the technical/sparring and safety management needs of university Taekwondo courses (Ramsden, 1991; Wilson et al., 1997; Buntin, 2024). Responses were measured on a five-point Likert scale (1 = very dissatisfied to 5 = very satisfied); higher total scores indicate higher overall learning satisfaction with the Taekwondo course.

3.4. Data analysis

This study employed SmartPLS 3.0 to conduct PLS-SEM in order to examine the reliability and validity of teaching quality and learning satisfaction in Taekwondo courses, as well as the relationship between teaching quality and learning satisfaction.

4. Results

4.1. Demographic Information

Based on the data analysis (n = 367), 53.7% of samples were male (n = 197) and 46.3% were female (n = 170). By grade, first-year students accounted for 33.8% (n = 124), second-year 24.0% (n = 88), third-year 22.6% (n = 83), and fourth-year 19.6% (n = 72).

4.2. Reliability and Validity Analysis

The Table 1 presents the results of the reliability and validity analysis for the measurement scales. All factor loadings ranged from 0.604 to 0.842, exceeding the minimum acceptable level of 0.60, indicating satisfactory item reliability. The Cronbach's α coefficients for the constructs ranged between 0.553 and 0.791, demonstrating acceptable internal consistency for exploratory research in social science contexts. The construct reliability (CR) values ranged from 0.782 to 0.848, all surpassing the recommended threshold of 0.70, confirming adequate composite reliability across the constructs. The average variance extracted (AVE) values ranged from 0.445 to 0.691, suggesting that most constructs achieved acceptable convergent validity, with minor exceptions for Tangibles (AVE = 0.445) and Reliability (AVE = 0.473), which were slightly below the conventional 0.50 criterion yet still within the acceptable range given their CR values above 0.70. The results indicate that the measurement items demonstrated sufficient reliability and convergent validity, supporting the suitability of the scales for subsequent structural model analysis.

Table 1 Reliability and validity analysis of the scales

Variable	Item	Factor Loading	Cronbach's α	Construct Reliability	Average Variance Extracted (AVE)
Tangibles	T1	0.635	0.791	0.848	0.445
	T2	0.736			
	T3	0.635			
	T4	0.675			
	T5	0.604			
	T6	0.682			
	T7	0.692			
Reliability	Rel8	0.660	0.629	0.782	0.473
	Rel9	0.719			
	Rel10	0.706			
	Rel11	0.665			
Responsiveness	Res12	0.622	0.661	0.797	0.497
	Res13	0.739			
	Res14	0.723			
	Res15	0.729			
Assurance	A16	0.723	0.607	0.792	0.559
	A17	0.760			
	A18	0.761			
Empathy	E19	0.821	0.553	0.817	0.691
	E20	0.842			
Learning Satisfaction	LS1	0.655	0.774	0.817	0.691
	LS2	0.731			
	LS3	0.765			
	LS4	0.664			
	LS5	0.633			
	LS6	0.658			

The discriminant validity analysis of the constructs showed (table 2) that the square roots of the average variance extracted (AVE) for each construct, shown on the diagonal, were all higher than the corresponding inter-construct correlations, confirming adequate discriminant validity. Specifically, the square roots of AVE ranged from 0.667 (Tangibles) to 0.831 (Empathy), each exceeding their correlations with other constructs. The correlations among constructs ranged from 0.406 to 0.612, indicating moderate associations without excessive multicollinearity. These results suggest that each construct is empirically distinct and measures a unique aspect of the model, thereby supporting the discriminant validity of the measurement model.

Table 2 Discriminant validity analysis

	Assurance	**Empathy**	**Learning Satisfaction**	**Reliability**	**Responsiveness**	**Tangibles**
Assurance	0.748					
Empathy	0.446	0.831				
Learning Satisfaction	0.555	0.489	0.686			
Reliability	0.547	0.449	0.512	0.688		
Responsiveness	0.612	0.411	0.535	0.541	0.705	
Tangibles	0.567	0.406	0.531	0.526	0.552	0.667

4.3. Structural Model Analysis

The structural model indicated that all five dimensions—Tangibles, Reliability, Responsiveness, Assurance, and Empathy—exhibited positive effects on Learning Satisfaction. Among them, Assurance (β = 0.205) and Tangibles (β = 0.181) demonstrated relatively stronger predictive effects, followed by Responsiveness (β = 0.188), Empathy (β = 0.164), and Reliability (β = 0.133). The model explained 45.7 % of the variance (R^2 = 0.457) in Learning Satisfaction, indicating a moderate explanatory power. These findings suggest that higher perceptions of assurance, tangibility, and responsiveness are associated with greater student satisfaction with learning experiences. Overall, the results confirm that each service quality dimension contributes positively to learning satisfaction within the proposed model.

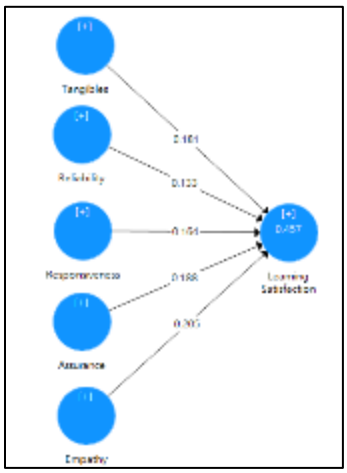

Figure 1 The structural model

5. Discussion

The structural model shows that all five service/teaching-quality dimensions—Tangibles, Reliability, Responsiveness, Assurance, and Empathy—are positively associated with Learning Satisfaction, jointly explaining a moderate proportion of variance (R^2 = 0.457). Within these effects, Assurance (β = 0.205) and Tangibles (β = 0.181) emerge as comparatively stronger predictors, followed closely by Responsiveness (β = 0.188), with Empathy (β = 0.164) and

Reliability (β = 0.133) exerting smaller yet positive effects. Taken together, the pattern supports the premise, widely discussed in higher education and physical education research, that perceived quality in both the service and instructional layers contributes to students' overall satisfaction with course experiences.

5.1. Theoretical implications

First, the results are consistent with SERVQUAL's core proposition that multi-dimensional quality perceptions relate to satisfaction, while extending this logic to a university Taekwondo context that blends technical–tactical training with safety, etiquette, and risk management. The relatively stronger role of Assurance underscores the salience of competence, trust, and perceived safety in contact/combative sport settings, where clarity of instruction, risk communication, and procedural safeguards are integral to a positive experience. The notable contribution of Tangibles reinforces the Quality Physical Education (QPE) view that environments and resources (e.g., facilities, equipment, protective gear, and their usability) are not merely background features but central quality signals that students translate into satisfaction judgments. Responsiveness—the timeliness and usefulness of help, corrections, and feedback—also shows a meaningful effect, aligning with instructional process theories that emphasize contingent guidance and feedback quality. Meanwhile, Empathy and Reliability contribute positively, suggesting that individualized consideration and dependable delivery (e.g., consistent class routines, adherence to course plans) matter, albeit to a lesser extent than assurance, tangibles, and responsiveness in this setting.

Collectively, these findings reinforce a dual-layered model of teaching quality in PE: (a) a service layer (tangibles, reliability, responsiveness) that shapes access, safety, and delivery; and (b) an instructional/relational layer (assurance, empathy) that shapes trust, perceived competence, and support. The convergence of both layers helps explain a substantial share of satisfaction, offering a parsimonious account of how students form global evaluations of their Taekwondo course experiences.

5.2. Practical implications

For course leaders and program administrators, the findings highlight three actionable priorities:

Assurance (instructional competence and safety culture):

- Emphasize clear demonstrations and risk-aware protocols (e.g., pre-sparring checklists, progressive contact rules, immediate correction of unsafe technique).
- Strengthen instructor credibility via visible expertise, transparent assessment rubrics, and consistent enforcement of safety norms.
- Tangibles (facilities, equipment, and usability):
- Ensure adequate protective gear quantity, correct sizing, and maintenance; optimize space density and floor safety.
- Streamline access (e.g., check-out systems for gear) and visibility (clear signage, organized storage) to reduce friction.
- Responsiveness (timely, specific feedback and support):
- Adopt structured feedback cycles (brief, frequent, task-specific) and rapid troubleshooting during drills/sparring.
- Utilize video-assisted feedback for key techniques (stance, footwork, kicking chains) to shorten error-correction loops.

At the class management level, pairing these priorities with monitorable indicators—e.g., protective-gear compliance rate, feedback density and latency, rule-violation and injury rates, space-use metrics—can tie resource allocation to student experience outcomes. Embedding these indicators into a routine quality dashboard would operationalize a continuous improvement pathway from "quality inputs/processes" to "satisfaction" and, ultimately, to persistence and performance.

5.3. Limitations

Several caveats warrant caution. The cross-sectional design limits causal inference; observed paths should be interpreted as associations. Data derive from a single institution and course context (university Taekwondo), which may constrain external validity to other PE modalities or institutional environments. Although the study staggered measurement modes to mitigate common method bias, self-report measures remain susceptible to shared-method variance and social desirability. Finally, the model focuses on direct effects and does not test theoretically plausible mediators (e.g., enjoyment, autonomy support, self-efficacy) or moderators (e.g., gender, prior experience, class level).

5.4. Future research

Longitudinal or quasi-experimental designs (e.g., phased improvements to assurance procedures or equipment pools) could more directly probe causality and dose–response relations. Incorporating mediational pathways (motivation, enjoyment, self-efficacy) can clarify the psychological mechanisms linking quality to satisfaction and subsequent engagement. Multi-group invariance tests could assess whether paths differ by prior martial arts experience, skill level, or class size. Finally, expanding outcomes to include behavioral indicators (retention, voluntary practice hours) and objective safety/performance metrics (injury incidence, standardized technical scores) would triangulate satisfaction with consequential endpoints.

6. Conclusion

The model indicates that students' satisfaction in university Taekwondo courses reflects a composite of service and instructional quality signals, with assurance, tangibles, and responsiveness playing comparatively prominent roles. Targeted enhancements in safety-competent instruction, resource readiness, and feedback responsiveness provide a pragmatic route to improving learning satisfaction—and, by extension, to fostering persistence, safer participation, and higher-quality learning experiences.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclsoed.

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