

How Course Experience Shapes Satisfaction in University Aerobics Classes: The Mediating Role of Learning Self-efficacy in an Explanatory Sequential Mixed-methods Study

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Abstract

This study examined whether learning self-efficacy mediates the association between course experience and course satisfaction in university aerobics classes. An explanatory sequential mixed-methods design was used. In the quantitative phase, 500 undergraduates completed paired surveys, with course experience measured at Time 1 and self-efficacy and satisfaction measured 7-14 days later at time 2. Descriptive statistics, reliability analysis, correlations, regression, bootstrap mediation analysis, and supplementary construct-distinctiveness analyses were conducted. In the qualitative phase, 21 students participated in semi-structured interviews to explain the quantitative pathway. Course experience positively predicted self-efficacy and course satisfaction, and self-efficacy partially mediated the association between course experience and satisfaction (indirect effect = 0.199, 95% confidence interval (CI) [0.140, 0.262]). Although raw correlations among the focal variables were very high, covariate-adjusted residual correlations were substantially lower, suggesting that between-group differences partly inflated the zero-order overlap. Interview findings indicated that teacher feedback, peer support, progressive mastery, emotional safety, and challenge-skill fit helped explain how positive experiences were translated into stronger efficacy beliefs and higher satisfaction. Overall, the findings suggest that students were more satisfied when supportive course experiences were converted into a credible sense of capability, but the mediation results should be interpreted as a cautious observed-score explanatory pattern rather than as definitive causal or latent-variable evidence.

Keywords

Aerobics, Course experience, Self-efficacy, Course satisfaction, Mixed methods, Physical education

Introduction

Student satisfaction has become one of the most closely watched indicators of teaching quality in higher education. In physical education, satisfaction is not merely an evaluative afterthought or a consumer-like response to services received. It is closely intertwined with students' engagement, persistence, willingness to enroll in later courses, and broader attitudes toward physical activity. When students feel satisfied with a course, they are more likely to interpret the learning environment as supportive, to remain invested in practice, and to transfer positive experiences beyond the classroom. When they are dissatisfied, even a technically well-designed curriculum can fail to sustain motivation, especially in courses that require repeated public performance, bodily expression, and visible skill

development. For these reasons, course satisfaction in university physical education deserves to be treated as a theoretically meaningful educational outcome rather than as a simple end-of-semester rating.

Aerobics is a particularly instructive setting in which to study the formation of course satisfaction. University aerobics classes typically combine rhythmic coordination, movement precision, musical timing, expressive performance, memory for movement sequences, and varying degrees of public display. Unlike many general fitness classes, aerobics often requires students to learn combinations that are executed in synchrony with music and observed by peers and instructors in real time. In such contexts, students are not evaluating only whether the teacher is organized or

enthusiastic. They are also evaluating whether the class enables them to keep up, to improve, to feel physically competent, and to present themselves without embarrassment. Consequently, aerobics satisfaction is shaped by both instructional conditions and students' evolving beliefs about what they can do within those conditions.

Self-efficacy theory offers a particularly strong framework for understanding this process. Bandura defined self-efficacy as individuals' judgments of their capabilities to organize and execute actions required to attain designated performances [1]. The core proposition is that people do not respond only to objective task demands; they also respond to what they believe they can do in relation to those demands. Self-efficacy affects task choice, persistence under difficulty, emotional reactions, and the interpretation of performance successes and failures. In educational settings, students with stronger self-efficacy tend to set higher goals, sustain effort longer, and recover more effectively from setbacks [2,3]. In physical activity and physical education contexts, self-efficacy has been repeatedly associated with effort, enjoyment, persistence, and adaptive motivation [4].

As outlined in recent educational scholarship, self-efficacy theory distinguishes four foundational formative sources originally proposed by Bandura: mastery experiences, vicarious experiences, social persuasion, and cognitive interpretation of physiological and affective states (as cited in Lawrent, 2022) [5]. Each of these four efficacy-building mechanisms translates directly to aerobics classroom instruction. Step-by-step progressive mastery emerges when students gradually master unified movement sequences and shift from insufficient ability to confident execution. Vicarious learning occurs when learners observe peers of equivalent proficiency successfully perform movement combinations, they previously found demanding. Social persuasion takes shape through personalised teacher feedback, targeted corrective coaching, and supportive peer dialogue. Affective interpretation becomes relevant when students read fatigue, nervousness, embarrassment, or enjoyment as evidence either of inadequacy or of meaningful challenge. If aerobics classes are organized in ways that help students interpret these experiences constructively, then course experience should foster self-efficacy, and self-efficacy should, in turn, increase

satisfaction.

A second useful lens comes from motivational research in physical education. Self-determination theory argues that motivation becomes more adaptive when learning environments support competence, autonomy, and relatedness [6]. Studies in physical education have shown that teacher support, meaningful feedback, a mastery-oriented climate, and positive peer relations are associated with more adaptive motivational patterns and more favorable affective outcomes [7-10]. Although self-determination theory and self-efficacy theory are not identical, they converge on an important point: students interpret instructional contexts through psychologically meaningful appraisals of competence and support. In aerobics, where students may feel exposed, clumsy, or self-conscious, competence beliefs are likely to be especially consequential.

The literature on student satisfaction also suggests that students' judgments about educational quality are shaped by both expectations and actual course experiences. Research in higher education has shown that satisfaction is affected by instructional effectiveness, perceived support, campus climate, and the extent to which educational experiences match or exceed prior expectations [11,12]. However, this literature is often broader than the physical education setting and does not fully explain how satisfaction emerges in skill-based courses that place the body, not just cognition, at the center of evaluation. This gap is important. A student may acknowledge that an aerobics teacher is well prepared, yet remain dissatisfied if the course repeatedly produces the experience of "I still cannot do this". Conversely, a student may overlook minor curricular imperfections if the class fosters a growing sense of "I can actually learn this". That difference points directly to the mediating role of self-efficacy.

Despite the relevance of these theories, the existing literature leaves at least three gaps. First, much of the research on motivation and physical education has focused on broad school physical education (PE) settings rather than on a single course type with distinct expressive, rhythmic, and performative demands. Aerobics has features that differ from ball games, endurance activities, or strength-based training: Students must coordinate body movement with external rhythm, remember sequences, and often negotiate gendered

expectations about how a movement-based activity should look. Second, the route from course experience to course satisfaction is often assumed rather than tested. Studies frequently report that supportive teaching relates to higher motivation or enjoyment, but fewer studies isolate the psychological mechanism through which supportive experiences become satisfaction judgments. Third, quantitative associations alone do not reveal how students themselves narrate the emergence of confidence and satisfaction. Without qualitative explanation, the pathway from classroom experience to self-efficacy can remain statistically convincing but pedagogically under-specified.

The present study addresses these gaps by combining time-lagged survey data with qualitative interviews in an explanatory sequential mixed-methods design. The quantitative phase tests whether course experience predicts satisfaction directly and indirectly through learning self-efficacy. The qualitative phase then explores how students describe this process in their own words and under what conditions the mechanism appears to strengthen or weaken. This design is appropriate because the research question is not only whether mediation exists, but also how it operates in a real university aerobics course context. The logic of the design is sequential and explanatory: Numerical trends are established first, and interviews are used to interpret the mechanism and its boundary conditions [13,14].

Based on self-efficacy theory, motivational research in physical education, and the specific demands of aerobics instruction, three hypotheses were advanced. Hypothesis 1: Course experience will positively predict course satisfaction. Hypothesis 2: Course experience will positively predict aerobics learning self-efficacy. Hypothesis 3: Self-efficacy will mediate the association between course experience and course satisfaction. In addition, the qualitative strand was expected to identify the concrete classroom experiences through which course experience becomes self-efficacy and ultimately, course satisfaction.

A further reason to focus on aerobics lies in the way evaluation is distributed across the course. In many university settings, aerobics is assessed through attendance, sequence completion, technique quality, expressive coherence, or public demonstration. These assessment features mean that students receive ongoing

evidence about their performance status well before any final examination. Such a structure may intensify the influence of self-efficacy because students are continuously forming judgments about whether they can meet visible standards. A course that supplies abundant opportunities for practice but insufficient opportunities for successful interpretation may still leave students feeling incapable. Conversely, even demanding instruction can be experienced positively when evaluation is organized as a progression of attainable challenges.

The present study also responds to a practical challenge faced by many university physical education programs in China and elsewhere: How to teach a highly heterogeneous class without reducing pedagogical quality to the lowest common denominator. Within the same aerobics course, teachers may face students who selected the class out of curiosity, students who enrolled merely for credits, students with prior dance or cheerleading experience, and students from sports backgrounds that emphasize very different movement cultures. The question is not simply whether the same syllabus can be delivered to them all, but whether the course can produce confidence across that diversity. By examining student category differences while retaining a common mediation model, this study offers evidence that the underlying psychological mechanism may be stable even when baseline levels differ considerably.

Recent evidence makes the same case in contemporary higher-education and physical education contexts. Among Chinese college students, exercise motivation predicts self-efficacy both directly and indirectly through positive leisure experiences and mental toughness [15]. Related work indicates that exercise self-efficacy is positively associated with better emotion-management capacities in college populations, while research with physical education students shows that self-efficacy is closely tied to subjective well-being and future-oriented development outcomes [16,17]. Collectively, these studies suggest that efficacy beliefs are not peripheral correlates of activity participation. They are central psychological resources that shape how students interpret effort, emotions, and educational values.

Recent physical education research has further highlighted the instructional origins of these appraisals. Transformational teacher leadership in physical

education has been associated with students' self-esteem, motor self-efficacy, enjoyment, and intention to remain active [18]. Among college students, perceived teacher support predicts sport participation through learning motivation and self-efficacy, and longitudinal evidence indicates that physical education teacher support promotes exercise adherence over time [19,20]. Parallel research shows that autonomy-supportive climates sustain emotional engagement in college physical education, whereas exercising self-efficacy predicts physical education learning engagement partly through flow experience [21,22].

Together, these studies strengthen the rationale for

examining not only whether aerobics students are satisfied, but whether their satisfaction is formed through a chain linking classroom experience to efficacy judgments. As shown in Figure 1, the quantitative phase was organized around a simple mediation model in which course experience served as the antecedent variable, learning self-efficacy served as the mediator, and course satisfaction served as the outcome. This model operationalized the study's central assumption that favorable classroom experiences should increase satisfaction partly because they strengthen students' confidence that they can successfully learn, perform, and present the required aerobics tasks.

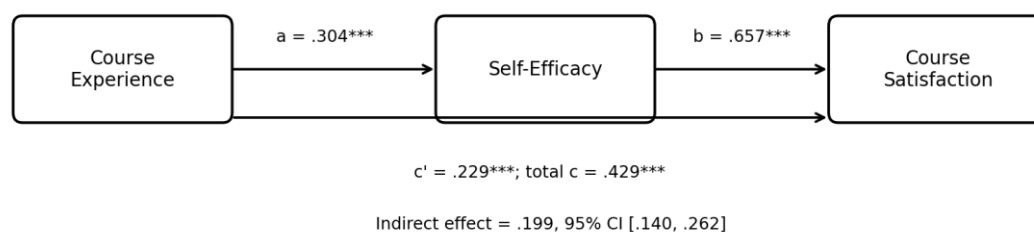


Figure 1. Hypothesized mediation model tested in the quantitative phase.

Materials and methods

Study design

This study used an explanatory sequential mixed-methods design. The quantitative component provided the principal test of the hypothesized mediation model, whereas the qualitative component was used to explain why and under what conditions the observed statistical pathway emerged. The two strands were therefore connected at the stages of sampling, interpretation, and meta-inference rather than treated as independent projects. The design is stronger than a simple cross-sectional survey because the predictor (course experience) was measured earlier than the mediator and outcome variables, thereby reducing, though not eliminating, concerns about same-moment inflation of relationships.

Participants and procedure

As shown in Table 1, 500 university students enrolled in aerobics courses. The sample represented three student categories: public physical education students (n=240, 48.0%), PE or teacher-education students (n=128, 25.6%), and specialized sport-training students (n=132,

26.4%). The sample included 118 males (23.6%) and 382 females (76.4%). In terms of year level, 169 were first-year students (33.8%), 197 were second-year students (39.4%), 88 were third-year students (17.6%), and 46 were fourth-year students or above (9.2%). Experience with aerobics or cheerleading before the current course varied from none to more than two semesters. The distribution of perceived athletic ability and weekly moderate-to-vigorous physical activity also indicated substantial heterogeneity in learning backgrounds, which strengthened the suitability of the sample for examining individual differences in self-efficacy formation.

Data collection followed a paired, time-lagged procedure. At time 1, during the middle-to-late phase of the semester, students completed the Course Experience Questionnaire. At time 2, 7 to 14 days later, they completed the Aerobics Learning Self-Efficacy and Course Satisfaction Questionnaire using the same anonymous matching code. The questionnaires were administered for research purposes only, and the instructions explicitly stated that responses would not affect course grades or teacher evaluation. A data-quality item was included in the time

2 instrument; all 500 cases passed this check and were retained for analysis. Although the study remained non-experimental, the time separation between the measures improved the plausibility of the proposed ordering of variables.

To improve transparency, the interview sampling strategy was linked directly to the survey findings. Students were identified from high-, medium-, and low-scoring profiles on course experience and self-efficacy, and the final interview pool included public PE students,

teacher-education students, and specialized sport-training students. This connection between the quantitative and qualitative strands was important because the interview phase was designed not as a separate narrative exercise but as an interpretive extension of the mediation analysis. In other words, the interviews were used to explain the statistically observed pathway, to identify concrete classroom events corresponding to that pathway, and to illuminate why some students deviated from the dominant pattern.

Table 1. Sample characteristics (n=500).

Dimension	Category	n	%
Gender	Male	118	23.6
	Female	382	76.4
Year level	First-year	169	33.8
	Second-year	197	39.4
	Third-year	88	17.6
	Fourth-year or above	46	9.2
Student category	Public PE	240	48.0
	PE/Teacher education	128	25.6
	Specialized sport-training	132	26.4
Prior aerobics/cheerleading experience	None	117	23.4
	<1 semester	188	37.6
	1-2 semesters	118	23.6
	>2 semesters	77	15.4
Weekly moderate-to-vigorous activity	0-1 times/week	101	20.2
	2-3 times/week	177	35.4
	4-5 times/week	156	31.2
	≥6 times/week	66	13.2
Self-rated athletic ability	Low	115	23.0
	Average	146	29.2
	High	128	25.6
	Very high	111	22.2

Measures

Course experience was measured with 20 items rated on a five-point Likert scale (1= strongly disagree, 5= strongly agree). The instrument was organized around five four-item dimensions: content and organization (e.g., “the course difficulty matches my current level”), teacher support (e.g., “the teacher provides timely and specific correction”), peer atmosphere and interaction (e.g., “cooperation with classmates helps me complete learning tasks”), mastery and achievement (e.g., “I can clearly feel my progress from not being able to perform to being able to perform”), and emotion and well-being (e.g., “after aerobics class, I usually feel relaxed and energized”). The total mean score was used as the primary predictor, while the five dimensions were examined descriptively to identify relative strengths in students’ experience profiles.

Aerobics learning self-efficacy was measured with eight items on the same five-point scale. The items assessed students’ confidence in learning combinations, keeping up with class pace, completing performance tasks, responding to teacher feedback, and reaching expected course goals. This instrument was intentionally task-focused rather than framed as a general sports-confidence scale, because the theoretical interest of the study lay in efficacy beliefs situated within the aerobics classroom.

Course satisfaction was measured with eight items reflecting global evaluations of teaching content, instructional organization, class atmosphere, skill gains, emotional and physical experience, and willingness to choose the course again. A quality-checking item was included but not scored as part of the construct. For

substantive analyses, the number of the eight satisfaction items served as the outcome variable. Because all three scales shared the same response metric, mean scores were easy to interpret and comparable across constructs. To strengthen conceptual separation among the focal constructs, course experience was defined as students' perceptions of instructional organization, teacher support, peer climate, mastery opportunities, and emotional tone in the learning environment. Self-efficacy was defined as students' task-specific confidence that they could learn and perform the required aerobics content. Course satisfaction was defined as a broader evaluative judgment formed after course participation. Thus, the three measures were theoretically linked but not intended to capture the same psychological content.

The internal consistency of the three main scales was satisfactory to excellent. Cronbach's alpha was 0.891 for course experience, 0.899 for self-efficacy, and 0.904 for course satisfaction. The alphas for the five four-item course experience subdimensions ranged from 0.598 to 0.647. These subscale reliabilities were modest and did not support strong standalone interpretation. Accordingly, the five subdimensions were retained only for descriptive profiling, whereas all hypothesis tests relied on the total course experience score as the principal explanatory variable.

Qualitative strand

The qualitative phase drew on 21 semi-structured interviews. Participants were purposively selected after the survey phase to ensure variation by course-experience score level (high, middle, and low), student category, gender, and year level. The interview guide focused on four domains: perceived course experience, the emergence or erosion of self-efficacy, judgments of course satisfaction, and explicit reflections on whether learning confidence mediated the relationship between experience and satisfaction. Interviews typically lasted 20 to 35 minutes. Students were informed that participation was voluntary, that they could stop at any time, and that the interview would not influence academic evaluation. Transcripts were anonymized using participant codes.

Interview analysis was informed by grounded theory procedures, but the study did not aim to generate a completely *de novo* theory detached from prior constructs. Instead, the coding process was abductive:

The interview material was examined openly for emergent meanings while also being interpreted in relation to the predefined analytical backbone of course experience, self-efficacy, and satisfaction. Open coding was first used to identify meaning units, axial coding to connect recurring categories, and selective coding to integrate categories into an explanatory storyline. During interpretation, attention was also paid to discrepant and negative cases so that the qualitative strand would not merely reproduce the dominant positive pattern. Representative quotes were translated into English for reporting while preserving their substantive meaning.

Data analysis

The quantitative analyses were conducted in Python. This paper computed descriptive statistics, reliability coefficients, Pearson correlations, and ordinary least squares regressions. To test the mediation hypothesis, we estimated three regression equations: course experience predicting self-efficacy; course experience predicting satisfaction; and course experience together with self-efficacy predicting satisfaction. Demographic and learning-background covariates (gender, year level, student category, prior aerobics experience, weekly physical activity frequency, and self-rated athletic ability) were included in the regression models reported in the main text, because these factors were plausibly related to both efficacy and satisfaction. The indirect effect was estimated by nonparametric bootstrap resampling with 5,000 draws and 95% confidence intervals. Group differences across student categories were examined to contextualize the findings rather than to redefine the central model. Because the focal constructs were theoretically adjacent and assessed through self-report, the results were interpreted conservatively, with explicit attention to possible common-method inflation and the non-causal nature of observational mediation.

Supplementary construct-distinctiveness analyses were performed using the item-level questionnaire dataset. First, Fisher's *z* transformations were adopted to estimate 95% confidence intervals for the zero-order correlations among course experience, learning self-efficacy, and course satisfaction. Second, given the distinct student subgroups and varied learning backgrounds in the sample, the three composite scores were residualized against the same demographic and learning-background covariates employed in the mediation models to compute covariate-

adjusted residual correlations. Third, within-category correlations were examined to explore whether the extremely high zero-order correlations were partially driven by between-group mean differences. These analyses functioned as observed-score sensitivity checks and cannot replace comprehensive latent-variable validation.

Results

Descriptive statistics and reliability

Table 2 presents the sample characteristics. The overall mean score for course experience was 3.806 (SD=0.447), indicating that students viewed the aerobics classes positively on average. Self-efficacy (M=3.664, SD=0.650) and course satisfaction (M=3.724, SD=0.579) were also above the scale midpoint. Among the five experience dimensions, peer atmosphere and interaction

(M=3.819) and mastery and achievement (M=3.818) were slightly higher than content and organization (M=3.794), teacher support (M=3.804), and emotion and well-being (M=3.792), although the differences were not large. Thus, the data did not suggest a class climate dominated by either emotional enjoyment alone or instructional support alone; instead, students' responses pointed to a generally balanced experience profile.

Table 2 shows that the three principal scales demonstrated satisfactory to excellent internal consistency, with Cronbach's α values above 0.890. By contrast, the five four-item course experience dimensions yielded only modest reliability coefficients. For this reason, these subdimensions were interpreted descriptively and cautiously, rather than as robust standalone scales for inferential testing.

Table 2. Descriptive statistics and internal consistency of the study variables.

Variable	Items	M	SD	Cronbach's α
Course experience (total)	20	3.806	0.447	0.891
Content and organization	4	3.794	0.542	0.632
Teacher support	4	3.804	0.538	0.623
Peer atmosphere and interaction	4	3.819	0.520	0.598
Mastery and achievement	4	3.818	0.525	0.602
Emotion and well-being	4	3.792	0.551	0.647
Self-efficacy	8	3.664	0.650	0.899
Course satisfaction	8	3.724	0.579	0.904

Figure 2 shows the five course experience dimensions cluster closely; peer atmosphere and interaction and mastery and achievement scored slightly higher than the

other three. This confirms students' positive course evaluations span instruction, social climate, progress and emotional experience instead of one single domain.

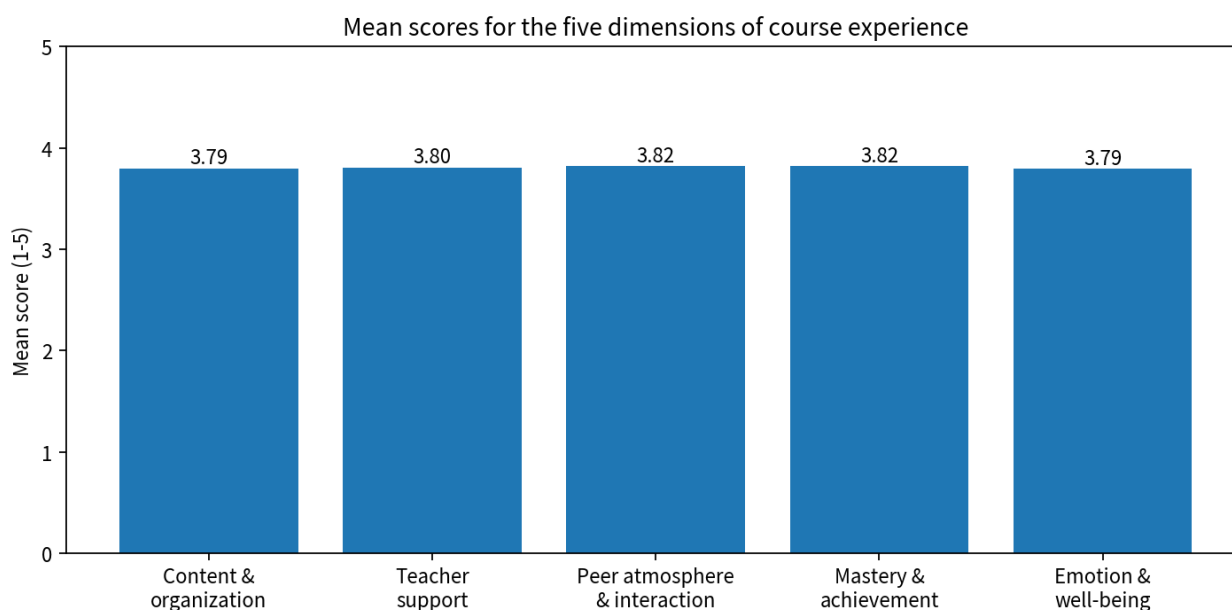


Figure 2. Mean scores for the five dimensions of course experience.

Correlation analysis

As reported in Table 3, all correlations among the core

variables were positive and statistically significant. Most importantly, course experience showed strong positive

associations with both self-efficacy and course satisfaction, which provided the empirical basis for proceeding to the covariate-adjusted mediation analyses. The correlation matrix showed strong positive associations among all core variables. Course experience was strongly related to self-efficacy ($r=0.920$, $p<0.001$) and course satisfaction ($r=0.911$, $p<0.001$). Self-efficacy was also strongly associated with satisfaction ($r=0.945$, $p<0.001$). The five course-experience dimensions were positively interrelated ($r=0.601$ to 0.642 , all $p<0.001$) and each was strongly associated with both self-efficacy and satisfaction. These results were fully consistent with the hypothesized direction of the mediation model and

justified the subsequent regression analyses.

At the same time, the magnitude of these correlations warranted additional construct-validity scrutiny. Course experience refers to students' appraisals of the learning environment, self-efficacy refers to perceived capability to meet course demands, and satisfaction refers to a broader retrospective evaluation of the course. These constructs are theoretically distinguishable, but their shared positive valence, common self-report format, and strong between-group differences may have increased their empirical overlap. Therefore, supplementary construct-distinctiveness analyses were conducted before the mediation results were interpreted.

Table 3. Correlations among the core variables.

Variable	CO	TS	PAI	MA	EWB	CE	SE	CS
CO	/	/	/	/	/	/	/	/
TS	0.617	/	/	/	/	/	/	/
PAI	0.612	0.617	/	/	/	/	/	/
MA	0.640	0.601	0.603	/	/	/	/	/
EWB	0.617	0.634	0.622	0.642	/	/	/	/
CE	0.837	0.832	0.825	0.834	0.845	/	/	/
SE	0.771	0.758	0.772	0.775	0.766	0.920	/	/
CS	0.776	0.746	0.754	0.766	0.761	0.911	0.945	/

Note: CO=content and organization; TS=teacher support; PAI=peer atmosphere and interaction; MA=mastery and achievement; EWB=emotion and well-being; CE=course experience; SE=learning self-efficacy; CS=course satisfaction. All coefficients below the diagonal are significant at $p<0.001$.

Construct-distinctiveness analysis

Given the extremely high correlations among the three core variables, supplementary construct-distinctiveness analyses were performed before the mediation model was interpreted. As shown in Table 4, the zero-order correlations were indeed very high ($r=0.911$ to 0.945), and the confidence intervals confirmed substantial overlap.

However, after controlling for the same demographic and learning-background variables used in the mediation models, the residual correlations dropped markedly:

course experience - self-efficacy $r=0.315$, course experience - course satisfaction $r=0.371$, and self-efficacy - course satisfaction $r=0.612$. Within-category correlations showed a similar pattern and were considerably lower than the pooled zero-order coefficients. These results indicate high raw correlations were partly inflated by gaps between public PE, PE education and specialized-training students. The constructs were not treated as redundant in adjusted analyses, yet the robust self-efficacy-satisfaction link was interpreted prudently.

Table 4. Zero-order, covariate-adjusted, and within-category construct-distinctiveness checks.

Construct pair	Zero-order r (95% CI)	Covariate-adjusted residual r (95% CI)	Within-category r range	Interpretation
Course experience - self-efficacy	0.920 [0.906, 0.933]	0.315 [0.233, 0.393]	0.300-.347	Raw overlap high; adjusted relation moderate
Course experience - course satisfaction	0.911 [0.895, 0.925]	0.371 [0.292, 0.446]	0.263-0.445	Raw overlap high; adjusted relation moderate
Self-efficacy - course satisfaction	0.945 [0.935,	0.612 [0.553, 0.664]	0.562-0.703	Adjusted overlap remains strongest; interpreted

Construct pair	Zero-order r (95% CI)	Covariate-adjusted residual r (95% CI)	Within-category r range	Interpretation
	0.954]			cautiously

Note: Zero-order confidence intervals were estimated using Fisher z transformations with $n=500$. Covariate-adjusted residual correlations were calculated after residualizing the three composite scores on gender, year level, student category, prior experience, weekly activity frequency, and self-rated athletic ability. Within-category ranges summarize separate correlations for public PE, PE/teacher-education, and specialized-training students.

Mediation analysis

Consistent with the construct-distinctiveness results, the mediation analysis was retained but interpreted as an observed-score explanatory model among closely related appraisals. The regression results supported model 1 and model 2. After the demographic and learning-background covariates were entered, course experience significantly predicted self-efficacy ($\beta=0.304$, $SE=0.042$, $t=7.29$, $p<0.001$). In the total-effect model, course experience also significantly predicted course satisfaction ($\beta=0.429$, $SE=0.049$, $t=8.79$, $p<0.001$). These findings indicate that students who perceived the course as better organized, more supportive, more encouraging, and more developmentally meaningful also reported greater confidence in learning aerobics and higher overall satisfaction with the course.

Table 5 summarizes the covariate-adjusted regression models and shows that the mediation pattern remained stable after demographic and learning-background factors were controlled. The attenuation of the course-experience coefficient after self-efficacy entered the model, together with the continued significance of the direct path, provides the statistical basis for interpreting the result as partial rather than full mediation.

All β values reported in Table 5 are standardized regression coefficients. Because full model fit statistics and measurement-model tests were not the focus of the present observed-score report, the inferential emphasis was placed on effect direction, statistical significance, and the bootstrapped indirect effect.

Model 3 was likewise supported. When both course experience and self-efficacy were entered into the satisfaction equation, self-efficacy remained a strong positive predictor of course satisfaction ($\beta=0.657$, $SE=0.044$, $t=14.89$, $p<0.001$), while the direct effect of course experience remained statistically significant but decreased in magnitude ($\beta=0.229$, $SE=0.043$, $t=5.38$, $p<0.001$). The bootstrap analysis yielded an indirect effect of 0.199, with a 95% confidence interval from 0.140 to 0.262, excluding zero. Taken together, these results indicate significant partial mediation. In substantive terms, course experience exerted both a direct influence on how students evaluated the class and an indirect influence through students' evolving belief that they could learn and perform the course requirements.

The distinction between partial and full mediation is important here. The findings do not imply that satisfaction in aerobics is reducible to self-efficacy alone. Rather, self-efficacy explained a major portion of the link between course experience and satisfaction while leaving a meaningful direct effect in place. This residual direct effect likely reflects aspects of course evaluation that are not exhausted by perceived capability, such as enjoyment of the class atmosphere, appreciation of instructional style, and value judgments about the relevance of the course content. Nevertheless, the magnitude of the self-efficacy path demonstrates that a large part of the student satisfaction process is rooted in the question: Can I actually do this?

Table 5. Standardized regression coefficients for the mediation model controlling for demographic and learning-background covariates.

Path	β	SE	t	p/95% CI
Model 1: Course experience $\rightarrow$ self-efficacy	0.304	0.042	7.29	<0.001
Model 2: Course experience $\rightarrow$ course satisfaction (total effect)	0.429	0.049	8.79	<0.001
Model 3: Course experience $\rightarrow$ course satisfaction (direct effect)	0.229	0.043	5.38	<0.001
Model 3: Self-efficacy $\rightarrow$ course satisfaction	0.657	0.044	14.89	<0.001
Bootstrapped indirect effect	0.199	/	/	95% CI [0.140, 0.262]

Group differences by student category

Additional analyses revealed clear differences across student categories. Specialized sport-training students reported the highest levels of course experience ($M=4.40$), self-efficacy ($M=4.55$), and satisfaction ($M=4.48$), followed by physical education or teacher-education students (course experience $M=3.95$, self-efficacy $M=3.83$, satisfaction $M=3.89$). Students in general public physical education reported the lowest scores across all three constructs (course experience $M=3.40$, self-efficacy $M=3.09$, satisfaction $M=3.22$). One-way analysis of variance (ANOVA) showed that all category differences were statistically significant (all $p<0.001$), and Tukey tests confirmed a stepwise pattern in which each group differed significantly from the other two. These subgroup results did not alter the main mediation model, but they underscored that students enter and interpret aerobics classes from markedly different curricular positions and competence backgrounds.

Qualitative findings

The qualitative findings deepened the interpretation of the mediation pathway. Five axial categories emerged as recurrent self-efficacy-building mechanisms. The first was teacher feedback and corrective guidance. High-scoring participants repeatedly emphasized that specific, actionable teacher comments transformed uncertainty into controllable action. One participant described how a teacher's brief cue about a support point during a difficult movement immediately changed hesitation into confidence. The second category was peer support and collective efficacy. Particularly among general public physical education students, small-group creation, shared practice, and a low-pressure climate reduced embarrassment and made difficult tasks feel collectively manageable rather than individually threatening.

Table 6 condenses the qualitative coding results by linking each mechanism theme to representative interview evidence. The table makes clear that students

did not attribute satisfaction to a single isolated factor. Instead, they repeatedly connected confidence formation to teacher feedback, supportive peer interaction, progressive mastery, emotional safety, and an appropriate match between challenge and skill.

The third category was progressive mastery experience. Several students reported that their confidence did not emerge from a single breakthrough performance but from the accumulation of "micro-successes": Remembering one more sequence, staying on beat for slightly longer, or completing a small in-class demonstration. A first-year female participant who began the course with strong fear described the process as moving from "not understanding the rhythm at all" to being able to complete an entire sequence independently, which made her re-evaluate her own athletic ability. The fourth category was positive affect and emotional safety. In a number of interviews, enjoyment, relief, and the absence of ridicule allowed students to keep participating even when their movements were imperfect. In this sense, positive affect did not replace competence; rather, it buffered the anxiety that often prevents competence from developing.

The fifth category was challenge-skill fit. This mechanism worked in both positive and negative directions. When the level of difficulty was too high, students described feeling that the class moved faster than they could process, resulting in frustration, withdrawal, or anticipatory helplessness. One low-scoring student stated that when complex combinations appeared, she immediately felt that she would fail and wanted to avoid the task altogether. By contrast, some specialized students became dissatisfied when the course failed to challenge them enough. One participant explicitly reported high confidence but low satisfaction because the semester's material felt like repetitive review rather than growth. This pattern is theoretically important: high self-efficacy does not automatically guarantee high satisfaction if the course lacks developmental stretch.

Table 6. Core qualitative mechanism themes and representative evidence.

Axial theme	Core meaning	Representative quotation	Mechanistic implication
Teacher feedback and corrective guidance	Specific correction and encouraging cues transformed uncertainty into controllable action.	"When the teacher told me exactly where the support point should be, I suddenly felt stable." (T-H-07)	Experience strengthened self-efficacy through informational support.
Peer support and collective	Group practice, cooperation, and a low-pressure climate	"From laughing at our mistakes to completing the routine together,	Experience strengthened self-efficacy through

Axial theme	Core meaning	Representative quotation	Mechanistic implication
efficacy	reduced embarrassment and normalized errors.	we gradually believed we could do it.” (P-M-17)	social belonging and shared capability.
Progressive mastery experiences	Confidence accumulated through small but visible improvements rather than through one dramatic success.	“From not understanding the rhythm at all to finishing a whole sequence on my own, I started to think I really could learn it.” (P-H-10)	Experience strengthened self-efficacy through repeated mastery evidence.
Positive affect and emotional safety	Enjoyment, relaxation, and the absence of ridicule buffered anxiety and kept students engaged.	“Even when I made mistakes, the atmosphere made me willing to keep trying.” (P-M-09)	Experience protected self-efficacy by lowering emotional threat.
Challenge-skill fit	Overload undermined confidence; insufficient challenge undermined growth-based satisfaction.	“I was confident, but the class was too easy, so I still was not satisfied.” (S-L-18)	Experience influenced satisfaction through the calibration of challenge to skill.

Beyond these five mechanisms, the interviews also revealed three boundary conditions that shaped whether positive course experience translated smoothly into self-efficacy. The first was gender identity. Several male students reported discomfort with movements they perceived as overly “feminine” or misaligned with their habitual sense of bodily expression. In these cases, even reasonably organized instruction could fail to enhance confidence until the teacher reframed movement quality in terms of power, control, or expressive variety rather than stereotyped softness. The second boundary condition was initial expectation. Students who chose the course expecting a low-effort credit option were more likely to experience dissatisfaction when confronted with rhythm, expression, and sustained practice demands. The third was pace adaptation. Students with weak rhythmic sense or lower baseline coordination were especially vulnerable to confidence loss when class tempo moved too quickly and opportunities for repeated practice were limited.

Integration of quantitative and qualitative findings

Integrating the quantitative and qualitative results yielded a coherent explanatory account. The survey data

showed that course experience was strongly associated with both self-efficacy and satisfaction, and that self-efficacy partially explained the link between the two. The interviews then clarified what “course experience” actually meant in a pedagogically actionable sense. Students became more satisfied when the course created conditions in which they could credibly infer: “I can learn this sequence”, “I can correct my movement”, “I can keep up with the pace” or “I can present myself in front of others”. The qualitative strand also explained why the same formal teaching structure did not produce the same psychological outcome for all students. Depending on prior expectations, gendered perceptions, and adaptation to pace, the identical class activity could be read either as an empowering challenge or as a threatening exposure.

Table 7 serves as a joint display for mixed-methods integration. Its analytical value lies in showing how the statistically observed mediation pathway can be translated into concrete pedagogical processes and in identifying the boundary conditions that explain why the same formal course arrangement was not experienced uniformly across students.

Table 7. Joint display of quantitative and qualitative integration.

Quantitative result	Qualitative explanation	Meta-inference
Course experience significantly predicted self-efficacy.	Students described confidence gains after specific teacher correction, peer help, and visible micro-successes.	The predictive path was carried by concrete, instructional, and social experiences rather than by abstract positivity alone.
Self-efficacy significantly predicted satisfaction.	Students often judged the course favorably once they believed they could learn, keep up, and present themselves.	Satisfaction was strongly tied to believable competence, not just to liking the teacher or class atmosphere.
A significant direct effect of course experience on	Students also valued enjoyment, respect, and class atmosphere even when skill	Part of satisfaction reflected general course appraisal beyond efficacy alone.

Quantitative result	Qualitative explanation	Meta-inference
satisfaction remained.	gains were modest.	
Student category differences were large.	Novices emphasized emotional safety and support; advanced students emphasized challenge and developmental progression.	The same mechanism operated across groups, but the threshold conditions for satisfaction differed.

Figure 3 synthesizes the mixed-methods findings into a single explanatory framework.

It shows that positive course experiences enhance satisfaction most effectively when they are translated

into credible efficacy judgments, while gender identity, initial course expectations, and pace adaptation operate as boundary conditions that strengthen, weaken, or redirect this process.

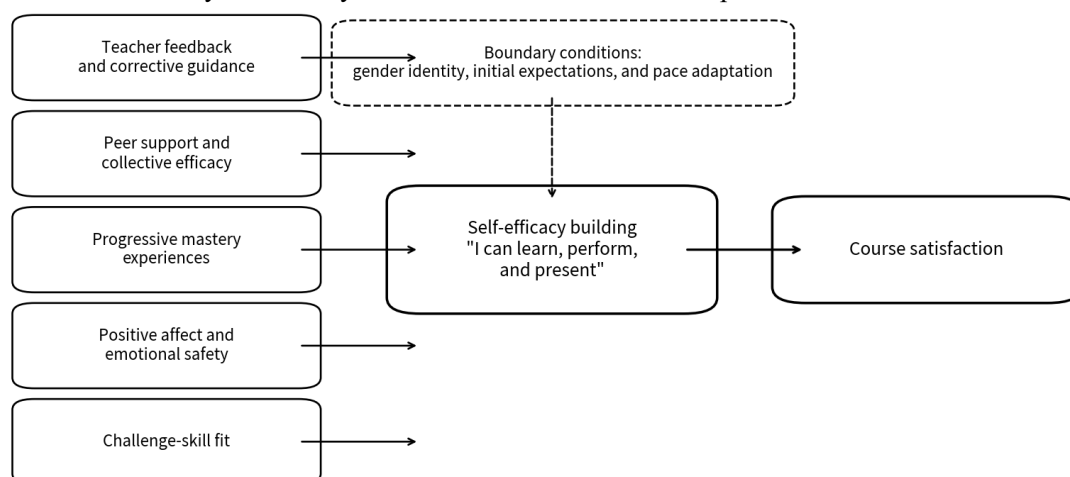


Figure 3. Integrated explanatory framework derived from the mixed-methods findings.

Discussion

The central contribution of this study is to show that satisfaction in university aerobics classes was closely associated with course experience and that this association was partly carried by learning self-efficacy. Because the design was time-lagged but observational, the findings are best interpreted as supporting a theoretically consistent explanatory pathway rather than a definitive causal chain. Even so, the results suggest that students did not respond only to the formal features of teaching; they also evaluated the course considering whether they believed they could meet its demands.

The quantitative evidence remains broadly consistent with Bandura's theoretical argument that efficacy judgments shape emotional reactions and evaluative outcomes. The added construct-distinctiveness analyses provide a more nuanced response to the concern that the three variables may be statistically redundant. The zero-order correlations were very high, but they decreased substantially when demographic and learning-background covariates were controlled and when correlations were inspected within student categories. This pattern suggests that pooled correlations were partly driven by known-group differences rather than by

complete construct duplication. Nevertheless, the constructs should still be regarded as closely connected appraisals rather than sharply separated psychological entities, especially because self-efficacy and satisfaction remained moderately to strongly associated after adjustment.

The interview evidence clarifies why teacher feedback was so prominent. In aerobics, students often know that they are "not getting it right" but they may not know whether the problem lies in timing, limb position, force production, or coordination sequence. Generic encouragement can sustain mood, yet it does not necessarily solve uncertainty. The interviewees who reported the strongest confidence gains emphasized feedback that was concrete, immediate, and technically interpretable. This observation resonates with previous research showing that perceived positive and informational feedback supports competence and intrinsic motivation in physical education. The implication is straightforward: Teacher feedback matters not only because it is supportive in an emotional sense, but because it converts ambiguity into controllable action. The role of peer support adds a second layer to the mechanism. Students in general public physical

education, especially those without prior aerobics experience, often framed confidence as socially negotiated rather than individually produced. Group practice reduced the emotional cost of error, enabled observational learning, and generated what may be described as collective efficacy at the micro-group level. When classmates struggled together and eventually completed a sequence together, the task ceased to be evidence of isolated inadequacy. This is important because aerobics, unlike some individual fitness tasks, unfolds in a visibly shared space. Peer climate therefore does not merely decorate the course; it shapes whether students experience public performance as exposure or as belonging.

The findings regarding progressive mastery experience also deserve emphasis. The students' accounts suggest that self-efficacy in aerobics is rarely built through one dramatic success. More often, it emerges through repeated low-stakes confirmations that one is improving. Small demonstrations, manageable sequence chunks, and visible progress over time functioned as mastery evidence. This pattern mirrors Bandura's argument that mastery experience is the most influential source of self-efficacy, especially when learners interpret improvement as evidence of controllable growth.

An especially valuable aspect of the present study is the identification of challenge-skill fit as a double-edged mechanism. Much educational practice assumes that increasing support will uniformly enhance confidence and satisfaction. The interviews complicate that assumption. For low-confidence students, an overly rapid pace or overly complex sequence can trigger helplessness before mastery has any chance to form. For high-level specialized students, however, insufficient challenge can undermine satisfaction even when confidence is already strong. Thus, the relationship between experience, self-efficacy, and satisfaction is not linear in a simplistic sense. Students need an environment that is supportive enough to scaffold competence but demanding enough to preserve growth. This conclusion parallels broader motivational theories emphasizing optimal challenge, competence satisfaction, and developmental fit.

The boundary condition of gender identity is equally noteworthy and should be interpreted within the cultural context of Chinese university physical education. In

many local settings, aerobics is still socially coded as a more feminine activity, and some male students may enter class with concerns about gender display, peer evaluation, or mismatch with prior sport socialization. In this sense, several male participants did not initially resist the course because of objective difficulty alone; rather, they struggled with a mismatch between the expressive qualities of the movement and their own gendered expectations about appropriate bodily performance. Once teachers reframed movement quality in terms such as force control, explosiveness, or stylistic variation, some of these students began to reconstruct the activity as compatible with their self-concept, and self-efficacy improved. This finding should not be misread as confirming stereotyped pedagogies. On the contrary, it suggests that inclusive aerobics teaching may require broader representational language so that diverse students can locate themselves within the activity without shame or ridicule.

Another important insight concerns initial course expectations. Students who enrolled expecting an easy credit-bearing option were often poorly prepared for the cognitive and physical demands of rhythm, sequence memory, and expressive presentation. When the actual course did not match this expectation, dissatisfaction emerged even before stable self-efficacy judgments had formed. This observation is consistent with expectation-disconfirmation perspectives on satisfaction. For instructors and departments, the implication is practical: course introductions, syllabi, and early instructional framing should communicate both the demands and the rewards of aerobics more realistically, so that confidence can be built on informed engagement rather than on mistaken assumptions.

From a methodological perspective, the study demonstrates the value of combining time-lagged quantitative analysis with qualitative explanation. Pure questionnaire-based research may yield statistically significant mediation results yet fails to clarify the specific experiential pathways driving such effects, including teacher feedback, peer collaboration, minor academic successes, emotional safety, and calibrated task challenge. Conversely, a purely qualitative study could have generated rich descriptions but might have been less persuasive about the centrality of self-efficacy as a cross-case explanatory link. The sequential mixed-methods

design allowed the strengths of each approach to compensate for the limitations of the other. This is particularly important in physical education research, where instructional processes are embodied, contextual, and often difficult to reduce to single-moment self-report indicators.

The findings also have direct pedagogical implications. First, aerobics instructors should design progression visibly and deliberately. Students need to see how the course moves from basic rhythm and posture control to combination learning and expressive presentation. Second, teacher feedback should be specific, timely, and behaviorally actionable. Statements such as “good job” are less effective than cues identifying where force, timing, or alignment should change. Third, small-group collaborative tasks can be used strategically to turn peer presence into a resource rather than a threat. Fourth, staged mini-presentations may provide low-risk mastery evidence before high-stakes final assessments. Fifth, differentiated difficulty options should be embedded so that novices are not overwhelmed and advanced students are not underchallenged. Finally, departments should be attentive to the language surrounding course introduction and promotion, because expectation management appears to matter for later satisfaction.

At the theoretical level, the study contributes to the intersection of self-efficacy theory and higher-education physical education research in three ways. It specifies course experience as a psychologically meaningful antecedent rather than a mere descriptive background condition. It demonstrates that satisfaction in a skill-based physical education course is partly an efficacy-based judgment of one’s own capability in relation to course demands. And it shows that efficacy is not built only through direct skill success, but also through social interpretation, emotional climate, and identity negotiation. This broader view is useful because it prevents self-efficacy from being treated as an isolated internal trait. In the aerobics classroom, efficacy is socially produced, instructionally shaped, and affectively colored.

These practical implications are not limited to aerobics. A wide range of university movement-based courses, including dance, cheerleading, foundational gymnastics, and selected racket sport and martial arts modules, require students to integrate motor execution with

perceptual visibility, temporal coordination, real-time adjustment, and social comparison. In all such courses, a positive classroom climate may be necessary but insufficient. Students need to accumulate believable evidence that they can improve. Thus, teachers should think not only in terms of content coverage but also in terms of efficacy architecture: What sequence of experiences will allow students to infer competence without trivializing the course? This question may be especially relevant in contemporary higher education, where students often enter physical education with highly uneven movement histories and varying levels of confidence in public physical performance.

Two additional pedagogical recommendations follow from the qualitative material. First, instructors should make room for visible but low-stakes reflection on progress. Short moments in which students compare current performance with their own earlier attempts may help them anchor efficacy in personal improvement rather than peer ranking alone. Second, teachers should diversify the expressive framing of the course. Some students respond positively to language about rhythm, elegance, and fluency, whereas others connect more readily to cues emphasizing control, explosiveness, precision, or performance presence. Broadening the descriptive vocabulary of movement can enlarge identification with the activity without diluting technical standards.

The study further suggests that satisfaction in physical education should be conceptualized as an achievement-related appraisal rather than a purely service-related response. Traditional higher-education satisfaction models tend to emphasize instructional clarity, service quality, infrastructure, and expectation fulfillment. Those factors remain important, but in embodied learning settings students also evaluate whether the course enables a changed relationship to their own bodies and performance capacities. Aerobics students do not merely ask whether the class was well delivered; they ask whether participation changed what they believe they can do. This makes self-efficacy especially suitable as a bridge construct connecting classroom process to evaluative outcome.

The present findings also resonate with newer physical education studies on leadership, support, and downstream behavioral persistence. Recent evidence

suggests that perceived transformational leadership among physical education teachers influences college students' exercise adherence through serial pathways involving physical self-efficacy and exercise motivation [23]. Other work shows that self-efficacy can also condition the strength of the association between transformational leadership and enjoyment in physical education settings [24]. Although the outcome in the present study was course satisfaction rather than exercise adherence, the implication is comparable: supportive teaching matters partly because it changes how capable, involved, and emotionally receptive students feel during participation.

Affective and satisfaction-oriented evidence from recent physical education research further reinforces this interpretation. Chen and Xiang found that teacher care was associated with physical education class learning satisfaction through exercise enjoyment and exercise self-efficacy, a pattern strikingly close to the mechanism identified in the present study [25]. Adjacent educational research has likewise shown that physical exercise can enhance academic satisfaction through social and emotional pathways, while current university-based evidence indicates that physical fitness is closely tied to enjoyment of physical activity [26,27]. Read together with the present interviews, these studies suggest that aerobics satisfaction is not a superficial end-of-course opinion; it reflects an instructional-emotional process in which support, enjoyment, challenge, and capability beliefs accumulate over time.

There is also an institutional implication. Universities often assess physical education courses with a small number of end-of-semester satisfaction items that provide little insight into why students responded as they did. The present findings indicate that such evaluations would be more informative if they were complemented by measures of perceived competence growth, teacher feedback usefulness, peer climate, and challenge-skill fit. Doing so would allow departments to distinguish between dissatisfaction rooted in poor instructional design and dissatisfaction rooted in unaddressed confidence barriers. This distinction matters for course reform, because the solutions are not identical.

Finally, the mixed-methods approach highlighted that negative cases are as informative as positive ones. Not all dissatisfied students were simply low-performing, and

not all highly confident students were satisfied. Some students were discouraged because the course moved too quickly and repeatedly exposed their perceived inability; others were under-stimulated because the course failed to offer developmental progression. These negative cases sharpen the interpretation of the mediation model by showing what it does not mean. The model does not imply that greater confidence is the sole goal of teaching, nor that satisfaction should be increased by making all tasks easier. Rather, effective instruction calibrates support and challenge so that confidence remains evidence-based and growth-oriented.

Several limitations should be acknowledged. First, although the use of time-lagged paired data strengthens causal plausibility, the design remains observational and does not warrant strong causal claims. Second, all quantitative measures were self-reported. Common-method bias was mitigated procedurally by temporal separation and anonymous matching, but it cannot be ruled out completely, especially given the high zero-order correlations among the core constructs. Third, although the added residual and within-category analyses indicated that the constructs were not fully redundant after adjustment, they did not establish strong latent-variable discriminant validity. Future studies should use larger item pools, confirmatory factor analysis, confidence-interval tests of latent factor correlations, average variance extracted, and heterotrait-monotrait ratio evidence to test construct separation more rigorously. Fourth, the study focused on university aerobics classes in one educational context, and generalization to other forms of dance-based or rhythm-based physical education should be made with caution. Fifth, the subgroup differences by student category were large, suggesting that future work should examine moderation more explicitly rather than treating category only as a control or contextual variable. Sixth, the subscale reliabilities for the four-item experience dimensions were modest; refinement of the dimensional measurement model would strengthen future studies.

Future research could build on the present study in several directions. Longitudinal designs covering an entire semester could examine how efficacy trajectories develop session by session and whether early mastery experiences disproportionately influence later satisfaction. Intervention studies could test whether

process-oriented feedback, staged performance tasks, or differentiated progression structures produce measurable gains in self-efficacy and satisfaction. Researchers could also investigate whether collective efficacy within practice groups mediates peer effects above and beyond individual self-efficacy. Finally, more explicit attention should be paid to gendered interpretations of movement-based courses, not in order to reinforce stereotypes, but in order to understand how students negotiate identity within embodied curricular contexts.

Conclusion

In summary, the present study shows that positive course experience increases satisfaction with university aerobics classes partly because it builds students' confidence that they can learn, perform, and display the required movements. Teacher feedback, peer support, progressive mastery, emotional safety, and appropriately calibrated challenge emerged as the main mechanism pathways, while gender identity, initial expectations, and pace adaptation shaped the conditions under which these pathways became effective. For higher-education aerobics teaching, the message is clear: Students are more satisfied not simply when a class is enjoyable, but when enjoyment is organized in ways that make competence believable. The practical task of aerobics pedagogy is therefore to design learning environments in which students can repeatedly experience the transition from uncertainty to capability.

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Conflicts of Interest

The author declares no conflict of interest.

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