

Research Article

Perceived improvisational and reflection-oriented teaching among choreography undergraduates in Chinese comprehensive universities: Indirect associations through perceived teacher support

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Choreography students must generate movement, work with ambiguity, and revise unfinished material under observation, yet quantitative research rarely distinguishes the instructional practices that support generation from those that support reflection and revision. This study examined whether perceived improvisational teaching and perceived reflection-oriented teaching were associated with creative self-efficacy in choreography, including indirect associations through perceived teacher support. The study used cross-sectional survey data from 368 adult choreography undergraduates in 12 comprehensive universities across eastern, central, and western China. Covariance-based structural equation modelling was used to estimate the proposed associations. Both perceived teaching practices were positively associated with perceived teacher support and creative self-efficacy, and perceived teacher support was positively associated with creative self-efficacy. The findings were also consistent with indirect associations through perceived teacher support. The results support a distinction between generation-oriented improvisational practice and regulation-oriented reflective activity and clarify how perceived instructional practice and relational support are jointly associated with creative confidence. Because the variables were measured concurrently through student self-reports, the pattern should be interpreted as associational rather than causal.

Keywords: Choreography education; Creative self-efficacy; Improvisational teaching; Indirect associations; Reflection-oriented teaching; Teacher support

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1. Introduction

Chinese university dance education has expanded its technological and curricular repertoire, yet choreographic training still has to negotiate a basic tension between movement reproduction and artistic authorship (Huang et al., 2025). Demonstration, imitation, correction, and technical accuracy remain indispensable. Choreography, however, asks students to work without a fixed model: they must generate movement, organise it into a defensible structure, explain their choices, respond to critique, and revise a work for which no single correct answer exists. Research on choreographer preparation similarly emphasises the need to connect technical development with

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creative agency, reflective judgement, and professional independence (Androshchuk et al., 2023). Research on international tertiary dance education during COVID-19 also documented how changing teaching conditions reshaped the organisation and experience of dance learning (Heyang & Martin, 2021). The issue is whether students receive enough experience of making and revising decisions under uncertainty.

The problem becomes visible when a teacher asks students to create movement that has not existed before. Without a sequence to reproduce or a predetermined route to success, students must turn sensation, imagery, rhythm, space, and intention into material while others witness incomplete decisions. This exposure can narrow participation when uncertainty is interpreted as limited talent. Creative self-efficacy in choreography (CSEC) matters because it concerns confidence in generating ideas, solving compositional problems, using feedback, and persisting with revision. It is not a proxy for independently judged artistic quality, but a task-specific belief that can influence whether students enter difficult creative work and remain engaged long enough to develop it (Bandura, 1997; Tierney & Farmer, 2002).

Two teaching methods address different phases of choreographic work. Improvisational teaching structures real-time movement generation through embodied prompts, constraints, and variation. Reflection-oriented teaching makes experience available for examination through documentation, dialogue, review, feedback, and revision. The former produces and varies possibilities; the latter supports their interpretation, evaluation, and development. Recent research indicates that creative dance can support ideational behaviour and tolerance of ambiguity when exploration is deliberately organised, while reflection in higher arts education is most useful when connected to artistic action (Richard et al., 2024; Treacy & Gaunt, 2021). In this study, reflection-oriented teaching denotes students' participation in these regulation-oriented activities, rather than teachers' reflection on their own professional practice.

The presence of either method does not guarantee that students experience it as supportive. An improvisational prompt can feel like exposure rather than freedom if its purpose and boundaries are unclear. Reflection can become defensive compliance when critique is vague, humiliating, or impossible to use. Students' interpretation of the surrounding relationship may therefore matter alongside the activity itself. Perceived teacher support (PTS) refers to their judgement that practical help, respect, guidance, and appraisal are available and usable (Wu et al., 2024). The word perceived is essential: a teacher's intention to support learning is not equivalent to a student's experience of receiving support. This distinction is particularly important in choreography, where the teacher is simultaneously an expert, evaluator, and witness to unfinished work.

The study examines whether perceived improvisational teaching (PIT) and perceived reflection-oriented teaching (PROT) are associated with creative self-efficacy in choreography (CSEC), directly and indirectly through perceived teacher support (PTS). Drawing on self-efficacy theory, the model distinguishes perceived instructional activity from perceived relational support and estimates how each is associated with students' confidence in undertaking choreographic problems. This distinction matters because creative tasks may provide opportunities for mastery while the surrounding relational context shapes how uncertainty, feedback, and revision are interpreted. The study therefore tests an integrated account of practice, support, and efficacy without treating them as interchangeable features of a generally positive classroom. Because all variables were measured concurrently, the proposed indirect associations are interpreted as a theory-guided pattern rather than a temporal sequence.

2. Literature Review, Conceptual Background, and Hypotheses

2.1. Self-Efficacy Theory and Choreography

Self-efficacy refers to beliefs about one's capability to organise and execute actions required for a particular outcome (Bandura, 1997). It is task- and domain-specific. A student can feel highly capable when reproducing a memorised phrase yet uncertain when asked to invent, structure, and defend original movement. Creative self-efficacy applies the same principle to creative demands

(Tierney & Farmer, 2002). In choreography, CSEC includes confidence in generating material, solving compositional problems, and persisting through revision.

Bandura (1997) identifies mastery experience, vicarious experience, social persuasion, and physiological or affective states as sources of efficacy information. These sources matter through interpretation rather than through exposure alone. A successful attempt strengthens efficacy when students attribute progress to developing capability or usable strategies; the same attempt may contribute little when it is dismissed as luck. Similarly, feedback can strengthen efficacy when it is credible and actionable but weaken it when it communicates fixed incapacity. Choreography is a useful domain for studying these interpretations because its criteria are partly negotiated, several solutions may be defensible, and early versions are necessarily incomplete.

CSEC should not be treated as a substitute for independently judged creative quality. Confidence can be inaccurate, and an original idea can be poorly developed. Nevertheless, efficacy beliefs influence whether students enter difficult tasks, seek feedback, test alternatives, and remain engaged after failure. Meta-analytic evidence links creative self-efficacy with several measures of creativity (Haase et al., 2018). Recent creative-dance and imagery research also indicates that embodied and metacognitive practice can contribute to creative potential and ideational behaviour (May et al., 2020; Richard et al., 2024), while the six-item creative self-efficacy scale used here has shown acceptable measurement properties in prior work (Karwowski et al., 2018; Shaw et al., 2021). In an adjacent teacher-education context, a small single-group mixed-method study reported pre-post gains in creative self-efficacy following structured creative drama (Eyüp, 2023). This result supports the relevance of active creative practice to efficacy beliefs, although the design and disciplinary context limit direct generalisation to university choreography.

2.2. Improvisational Teaching as a Pedagogical Method

Improvisational teaching uses structured, real-time movement exploration to generate material for choreographic inquiry. Its defining feature is not spontaneity for its own sake, and it should not be confused with unrestricted movement or a general request to 'be creative.' The teacher constructs a problem space through somatic or imagery-based prompts, rhythmic conditions, spatial pathways, effort qualities, partner relationships, or restrictions on available actions. A well-judged constraint focuses attention and makes an initial response possible without prescribing a single acceptable solution. Improvisational teaching is therefore generation-oriented: it supports the production, variation, and discovery of movement material before decisions are made about what a composition should retain.

In practice, the teacher first frames a choreographic problem and explains what the chosen constraint is intended to make noticeable. Students answer through movement, repeat and vary what emerges, observe other possible solutions, and identify material worth developing. Cues concerning space, effort, direction, level, time, or bodily sensation can interrupt habitual patterns and give students a vocabulary for reorganising them. The work thus progresses from a prompt to embodied response, variation, selection, and compositional development, although movement between these phases need not be linear. This bridge is crucial. Improvised material becomes educationally useful when students learn to describe, analyse, interpret, evaluate, and develop what has emerged (Lavender, 2009; Lavender & Predock-Linnell, 2001). Studies of agency and creative-dance pedagogy further show that openness is not directionlessness: dancers learn to handle contingency, attend to expressive movement qualities, and practise non-predetermined action within a framed task (Larsson et al., 2025; Ravn, 2020). Higher-education research likewise treats applied improvisation as a structured and progressively scaffolded pedagogy rather than an unplanned activity (Jouin et al., 2026).

This account also marks the boundary between improvisational teaching and neighbouring practices. Technique demonstration provides a model for reproduction, whereas free exploration may offer choice without a planned instructional progression. Improvisational teaching deliberately arranges conditions in which students produce several embodied responses and learn

how to develop them. Prompts, constraints, repetition, and feedback can be scheduled and adjusted, making the method suitable for a designed course intervention. That possibility must be distinguished from what was measured here. Perceived improvisational teaching (PIT), the first independent variable, records students' reported exposure to five practices: somatic prompts, explicit constraints, analytic movement cues, try-adjust-retry cycles, and disruption of habitual patterns. It is evidence of perceived instructional experience, not confirmation that teachers delivered a uniform intervention protocol.

PIT may be associated with CSEC through efficacy-relevant experiences. Responding to a prompt, discovering an unexpected action, repeating it, and turning it into usable material provide bounded mastery experiences. Observing peers produce different solutions can offer vicarious evidence that no single ideal answer is required. Yet real-time generation also increases social-evaluative exposure. Without clear boundaries and respectful feedback, openness may be interpreted as a test of innate spontaneity rather than as a learnable process. PIT is consequently expected to relate to CSEC directly through repeated movement generation and indirectly through PTS, which captures how students interpret the teacher's availability, guidance, respect, and appraisal around that uncertainty.

H1a: Perceived improvisational teaching (PIT) is positively associated with creative self-efficacy in choreography (CSEC).

2.3. Reflection-Oriented Teaching as a Pedagogical Method

Reflection-oriented teaching begins from a different difficulty: choreographic experience is fleeting, whereas revision requires something that can be recalled, examined, and questioned. The method makes experience available as evidence through process notes, video or work review, dialogue, self-assessment, teacher feedback, explanation of choices, and repeated modification. Reflection here means more than thinking after class, keeping a diary, receiving a grade, or listening passively to critique. It is regulation-oriented because students are asked to compare intention with what occurred, interpret the discrepancy, and choose a revision strategy that can be tested in subsequent work.

A reflective sequence commonly moves from experience and documentation to analysis, conceptualisation, revision, and renewed experience. Notes, video, sketches, or discussion first preserve aspects of the creative process that would otherwise disappear. Students can then describe before evaluating, compare intention with observable effect, consider alternative interpretations, formulate an actionable principle, and test a revision. Schön's (1983) distinction between reflection in action and reflection on action accounts for inquiry during and after practice; Kolb's (1984) cycle connects experience with reflection, conceptualisation, and further experimentation. Within dance and higher arts education, dialogic review, multiple perspectives, future-oriented planning, and collaborative reflection provide practical means of enacting these processes (Leijen et al., 2009; Schwender et al., 2025; Treacy & Gaunt, 2021). Such cycles also accord with self-regulated learning accounts in which reflection informs subsequent strategy selection (Zimmerman, 2002).

Feedback, assessment, and documentation may contribute to reflection-oriented teaching, but none is sufficient by itself. Feedback supplies information that the learner must interpret and use; assessment judges performance, whereas reflection connects evidence to a subsequent decision; documentation becomes reflective when it informs analysis and revision. Perceived reflection-oriented teaching (PROT) captures students' reported participation in process documentation, work or video review, teacher-guided analysis, explanation of choreographic choices, and iterative revision. It therefore represents a coherent pattern of regulation-oriented learning activity rather than a general evaluation of teaching quality.

A positive association between PROT and CSEC may arise partly because structured reflection can make revision feel more controllable. The undifferentiated judgement that a piece 'does not work' offers little direction, whereas identifying a repetitive spatial pattern, an unclear transition,

or a mismatch between intention and effect creates a bounded problem that can be revised. Feedback contributes when its design, context, and uptake enable students to translate information into further action (Kerman et al., 2024). Repeated cycles of diagnosis, strategy selection, testing, and revision can therefore show students that improvement depends on learnable actions rather than on an opaque creative gift. Because reflection often involves critique and disclosure of uncertainty, its relationship with CSEC may also depend on PTS.

H1b: Perceived reflection-oriented teaching (PROT) is positively associated with creative self-efficacy in choreography (CSEC).

2.4. Perceived Teacher Support and the Proposed Indirect Associations

Perceived teacher support (PTS) is the student's judgement that a teacher is available and helpful in ways relevant to learning and development. The word perceived is central to the construct: the questionnaire records students' interpretations of support rather than an objective count of teacher actions, resources, or intentions. Two students may encounter similar behaviour yet differ in whether they regard it as timely, respectful, credible, and usable. The Perceived Teacher Support Scale distinguishes instrumental, emotional, informational, and appraisal support (Wu et al., 2024). These functions capture access to practical conditions, emotional respect, usable guidance, and feedback about performance and improvement.

These functions are especially relevant to choreography because the teacher is simultaneously an expert, evaluator, and witness to unfinished work. A student may need studio time and opportunities to collaborate, permission to experiment, information about compositional options, and appraisal that identifies what to retain or revise. PTS is therefore not synonymous with praise, leniency, or the absence of standards. A teacher may demand another iteration or challenge a weak decision while still being perceived as supportive when the demand is fair, the reasoning is understandable, and a credible route forward is available.

2.4.1. Perceived teaching practices and perceived teacher support

PIT and PROT are instructional constructs rather than dimensions of support, but their enactment can convey support-relevant information. In improvisational teaching, clear constraints, staged challenge, opportunities for repeated trials, and non-humiliating responses can signal that exploration is expected and that help is available. In reflection-oriented teaching, attentive dialogue, interpretable criteria, and feedback that can be converted into revision can communicate informational and appraisal support. Students who report greater exposure to these practices may therefore also judge their teachers as more available, responsive, and helpful.

H2a: Perceived improvisational teaching (PIT) is positively associated with perceived teacher support (PTS).

H2b: Perceived reflection-oriented teaching (PROT) is positively associated with perceived teacher support (PTS).

2.4.2. Perceived teacher support and creative self-efficacy

Recent syntheses link perceived teacher support with engagement and achievement across educational settings (Tao et al., 2022; Vargas-Madriz et al., 2024). Autonomy-supportive teaching can also be learned and can improve motivation and classroom functioning (Reeve & Cheon, 2021; Ryan & Deci, 2020). More directly, Liu et al. (2021) found that perceived teacher support was related to Chinese students' creative self-efficacy through motivational and emotional variables. Recent Chinese studies also associate teacher support with creative thinking (Shi et al., 2025) and, among art-major undergraduates, with art self-efficacy and art creativity (Cui & Fan, 2026). These studies do not establish the proposed choreography model, but they support the premise that students' interpretations of instructional relationships are associated with creative beliefs.

Self-efficacy theory provides a rationale for why PTS may be associated with CSEC. Emotional and appraisal support can operate as social persuasion, while informational and instrumental

support can create and structure mastery opportunities. Qualitative evidence from higher-education improvisation likewise suggests that psychological safety can coexist with productive discomfort and can support experimentation and perceived self-efficacy (MacGlone, 2023). When students perceive guidance and evaluation as credible and usable, creative difficulty is more likely to be interpreted as a manageable learning problem than as evidence of fixed incapacity.

H3: Perceived teacher support (PTS) is positively associated with creative self-efficacy in choreography (CSEC).

2.4.3. Proposed indirect associations

The preceding arguments imply a linked pattern of associations. PIT may accompany generative mastery experiences, whereas PROT may accompany more controllable revision processes. Each practice may also covary with students' perceptions of teacher support, which may in turn covary with the practical resources, guidance, appraisal, and social persuasion associated with efficacy beliefs.

With cross-sectional data, however, temporal direction among these perceptions remains unresolved. The proposed model therefore tests whether the theoretically specified relationships occur together without assuming that PTS transmits a causal effect.

H4a: Perceived improvisational teaching (PIT) has a positive indirect association with creative self-efficacy in choreography (CSEC) through perceived teacher support (PTS).

H4b: Perceived reflection-oriented teaching (PROT) has a positive indirect association with creative self-efficacy in choreography (CSEC) through perceived teacher support (PTS).

2.5. Synthesis and Research Gap

Taken together, the literature explains why improvisation may expand movement possibilities, why reflection can organise interpretation and revision, and why students' readings of teacher support matter for difficult creative work. It does not, however, offer a sufficiently differentiated account of how these elements are related in choreography education. Generation-oriented and regulation-oriented practices are frequently subsumed under broad descriptions such as creative, innovative, or student-centred teaching. Such grouping obscures whether perceived exposure to each method has a distinct relationship with students' confidence in undertaking choreographic problems.

The available evidence also leaves the relational association structure under-specified. Recent studies have renewed attention to creative dance, embodied agency, reflective arts practice, and the preparation of choreographers (Androshchuk et al., 2023; Larsson et al., 2025; Ravn, 2020; Treacy & Gaunt, 2021), but much of this scholarship remains conceptual, qualitative, or practice-based. Quantitative studies rarely test an explicit set of direct and indirect relationships. Teacher support is often treated as a desirable background condition or inferred from teachers' conduct, even though support is consequential partly through how students interpret it. Research beyond dance connects creativity-fostering teaching and perceived teacher support with creative self-efficacy through related belief and emotion associations (Liang et al., 2026; Liu et al., 2021). Comparable evidence that separates PIT from PROT and examines PTS within Chinese university choreography courses remains scarce.

This study responds by modelling PIT and PROT as separate perception-based independent variables, PTS as the variable through which indirect associations are estimated, and CSEC as the dependent variable. The distinction matters substantively: instructional methods, students' perceptions of the relational environment, and efficacy beliefs occupy different positions in the argument and should not be treated as interchangeable indicators of a generally positive classroom. The analysis estimates the direct association of each perceived method with CSEC and its indirect association through PTS. Given the cross-sectional, student-reported design, this contribution is deliberately associational. It does not show that either method, if implemented as an intervention, would change support or creative self-efficacy.

2.6. Research Questions and Conceptual Model

Figure 1 presents the model for three research questions:

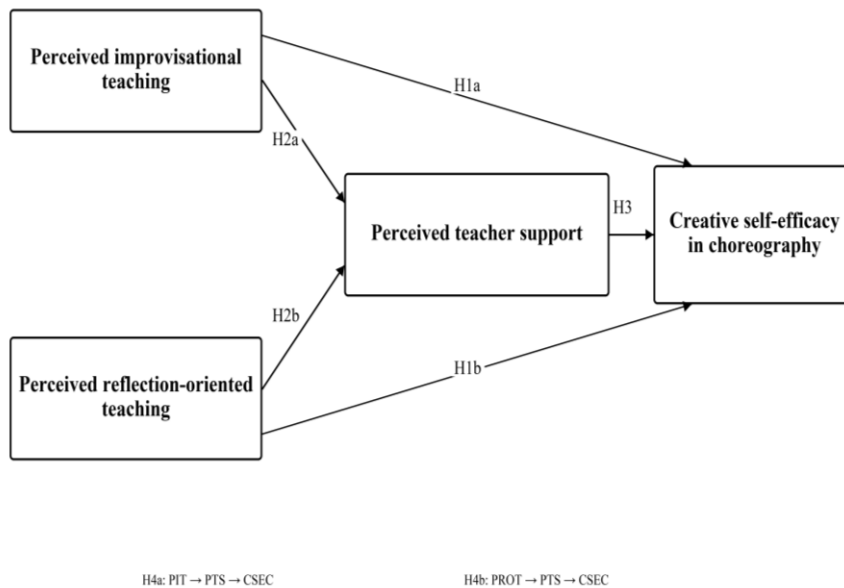
RQ 1) How are perceived improvisational teaching and perceived reflection-oriented teaching associated with creative self-efficacy in choreography?

RQ 2) How are the two perceived teaching practices associated with perceived teacher support, and how is perceived teacher support associated with creative self-efficacy in choreography?

RQ 3) Are there significant indirect associations from each perceived teaching practice to creative self-efficacy in choreography through perceived teacher support?

Figure 1

Conceptual Model and Hypothesised Associations



Note. Arrows represent the hypothesised associations.

3. Method

3.1. Research Design

The study used a quantitative, cross-sectional, correlational design. PIT and PROT were specified as exogenous latent variables, PTS as the variable through which indirect associations were estimated, and CSEC as the focal outcome. The questionnaire measured students' perceptions of practices and support encountered in their choreography learning rather than assigning or standardising an intervention. This design permitted estimation of the proposed direct and indirect latent-variable associations at one point in time; temporal ordering was not assumed (Maxwell & Cole, 2007; Maxwell et al., 2011).

Covariance-based structural equation modelling (CB-SEM) was used because the study tested a prespecified reflective measurement model and a theory-defined association structure. PTS was represented as a reflective second-order factor indicated by four correlated first-order support dimensions. At the first level, items were treated as manifestations of their respective perceived-practice or perceived-support dimensions; at the second level, the four support dimensions were treated as related manifestations of an overarching perception that support was available. This specification does not imply that the support functions are interchangeable, and alternative structural placements of PTS were examined as robustness checks. The first- and second-order measurement components and the structural paths were estimated simultaneously in a single-stage CB-SEM model.

3.2. Participants and Sampling

The population of interest comprised adult undergraduates majoring in choreography in Chinese comprehensive universities who had studied choreography-related courses. Non-probability purposive recruitment was used so that respondents had direct experience of generating, reviewing, and revising movement material, consistent with the use of purposive sampling to recruit information-rich cases for a defined research purpose (Campbell et al., 2020). Students were recruited across eastern, central, and western China. Twelve comprehensive universities participated and are reported anonymously to preserve institutional confidentiality. Exact age, course type, course duration, and the numbers of courses, classes, and instructors were not recorded; relevant experience referred to choreography learning or creative-practice experience.

Data were collected from 10 to 24 March 2026. A total of 392 questionnaires were returned: 327 online and 65 on paper. Eleven online questionnaires completed in less than two minutes, seven online questionnaires showing invariant or patterned responding, and six paper questionnaires showing patterned responding were excluded. The final sample comprised 309 online and 59 paper responses ($N = 368$), representing 93.9% of returned questionnaires (see Table 1). All items were required, so the retained dataset contained no item-level missing values. The online mini-program prevented a completed account from submitting the questionnaire again.

Table 2

Respondent Demographic Profile (N = 368)

<i>Characteristic</i>	<i>n</i>	<i>%</i>
Gender		
Women	245	66.58
Men	123	33.42
Region		
Eastern China	147	39.95
Central China	128	34.78
Western China	93	25.27
Year level		
Year 1	51	13.86
Year 2	84	22.83
Year 3	132	35.87
Year 4	101	27.45
Relevant experience		
Less than 1 year	18	4.89
1-2 years	229	62.23
3-4 years	99	26.90
5 years or above	22	5.98

3.3. Instruments

Data were collected with a self-administered Chinese-language questionnaire. All construct items used a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). The scale modules followed the conceptual-variable order, while item order within each module was randomised. Participants answered with reference to their choreography learning experience. The English items supplied with the manuscript are reporting translations of the administered Chinese instrument.

Perceived improvisational teaching (PIT) was measured with five researcher-developed items covering bodily or sensory prompts, imagery and metaphor, explicit improvisational constraints, variation in effort, rhythm, and spatial level, and repeated try-adjust-retry practice. The item domain was informed by choreography pedagogy that links improvisation with critical development and dialogical learning (Lavender, 2009; Lavender & Predock-Linnell, 2001) and by research on embodied creativity and imagery (May et al., 2020; Richard et al., 2024). An initial 11-item pool underwent domain specification, expert review, pilot preparation, and psychometric

assessment in line with recommended scale-development procedures (Boateng et al., 2018). The administered Chinese items and aligned English translations are provided in Supplementary Table S4 (see the Supplementary Document).

Perceived reflection-oriented teaching (PROT) was measured with five researcher-developed items covering process documentation, work or video review, teacher-guided analysis, explanation of choreographic choices and revision strategies, and a complete reflection cycle. Item development drew on reflective practice, experiential learning, self-regulation, and dance-specific reflection research (Kolb, 1984; Leijen et al., 2009; Schön, 1983; Schwender et al., 2025; Treacy & Gaunt, 2021). An initial 12-item pool underwent the same review and pilot preparation as PIT. The administered bilingual items are reported in Supplementary Table S5. A separate pilot (N = 120), independent of the article sample, yielded Cronbach's α values of .909 and .882, KMO values of .889 and .868, and preliminary one-component solutions for PIT and PROT, respectively. These results were treated as instrument-readiness evidence rather than confirmatory validation; full diagnostics are reported in Supplementary Table S3.

Perceived teacher support (PTS) was measured with 25 context-adapted items from the Perceived Teacher Support Scale (Wu et al., 2024): instrumental support (seven items), emotional support (six), informational support (seven), and appraisal support (five). Although the original instrument was developed with Chinese secondary students, its multidimensional social-support structure was relevant to university choreography learning. The adaptation retained the four support dimensions while locating the items in students' choreography learning experience. Linguistic and contextual review preceded administration. The verified Chinese wording and aligned English translations are provided in Supplementary Table S6. The scale author was contacted by email, informed of the contextual adaptation, and supported its use in this study.

Creative self-efficacy in choreography (CSEC) was measured with six published creative self-efficacy items contextually adapted to choreography (Karwowski et al., 2018; Shaw et al., 2021). The items assess confidence in solving difficult creative problems, trusting one's creative capability, coping with demanding situations, and producing original solutions. The publicly available source items were adapted only by adding the choreography context; their core self-efficacy meaning was retained. Subsequent psychometric research has supported the six-item scale's unidimensionality and measurement precision (Shaw et al., 2021). Supplementary Table S7 provides the administered items and source-pool mapping. Table 2 summarises the constructs, dimensions, item counts, and sources used in the article.

Table 2
Measurement Constructs, Dimensions, Item Counts, and Sources

<i>Construct and Code / dimension</i>	<i>Items</i>	<i>Primary sources</i>
Perceived improvisational teaching		
PIT	5	Lavender & Predock-Linnell (2001); Lavender (2009); Ravn (2020); Larsson et al. (2025)
Perceived reflection-oriented teaching		
PROT	5	Schön (1983); Kolb (1984); Leijen et al. (2009); Schwender et al. (2025); Treacy & Gaunt (2021)
Perceived teacher support		
INS	7	Wu et al. (2024)
ES	6	Wu et al. (2024)
INF	7	Wu et al. (2024)
AS	5	Wu et al. (2024)
Creative self-efficacy in choreography		
CSEC	6	Karwowski et al. (2018); Shaw et al. (2021)

Note. INS = instrumental support; ES = emotional support; INF = informational support; AS = appraisal support.

The questionnaire therefore comprised 41 construct items: ten instructional-practice items, 25 teacher-support items, and six creative-self-efficacy items.

3.4. Data Collection

Questionnaires were administered anonymously online or on paper. Online respondents completed the survey independently. Paper questionnaires were organised and collected by the researcher; course instructors were present but did not provide response guidance or inspect individual answers. Participants were told that participation was voluntary, that there were no correct answers, and that responses would not affect grades.

3.5. Data Analysis

Following data screening, descriptive statistics and Pearson correlations were calculated. Covariance-based structural equation modelling was estimated in IBM SPSS Amos version 31 using maximum likelihood estimation. Model fit was evaluated with the chi-square statistic (χ^2), comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA). Standardised direct, indirect, and total associations were evaluated from 5,000 case-resampled bootstrap estimates. All bootstrap models converged, and percentile 95% confidence intervals were obtained from the empirical distributions.

Measurement assessment included standardised loadings, Cronbach's alpha, composite reliability (CR), average variance extracted (AVE), and heterotrait-monotrait ratios (HTMT). Values of .70 or above were used as a general guideline for internal consistency, and AVE values of .50 or above indicated adequate convergence (Fornell & Larcker, 1981). HTMT confidence intervals were obtained from 5,000 bootstrap resamples (Henseler et al., 2015). A one-factor instructional-practice model was compared with the proposed two-factor PIT-PROT model to evaluate whether the two practices were empirically distinguishable. Structural assessment reported standardised coefficients, percentile bootstrap intervals, and R^2 .

Robustness was examined in three ways. First, a behaviour-only latent model omitted PIT5, PROT4, and PROT5 because these items referred most directly to perceived outcomes, revision strategies, or complete process cycles. Second, a covariate model included gender, region, year level, and prior choreography experience to examine whether the focal coefficients were sensitive to measured student characteristics. Third, alternative models treated PTS as a parallel predictor or antecedent and placed CSEC in the reverse structural position. These analyses assessed whether the primary pattern depended on item content, measured covariates, or structural placement. Detailed estimates are reported in Supplementary Tables S10 and S11. Because institution, course, class, and instructor identifiers were not retained, empirical cluster-robust or multilevel estimates could not be reconstructed.

3.6. Validity

The two researcher-developed teaching scales were defined and reviewed before the present main-sample analysis. Five experts, comprising two choreography specialists and three education specialists, rated relevance and reviewed clarity, observability, redundancy, and construct boundaries. PIT began with 11 candidate items and PROT with 12; five items were retained for each. The scale-level content validity index (CVI) averages were .93 and .95, respectively. The adapted PTS and CSEC items underwent linguistic and contextual review but were not assigned CVI values. Anonymised expert qualifications and aggregate content-validity evidence are provided in Supplementary Tables S1 and S2; the final bilingual measures appear in Tables S4–S7.

Candidate and adapted items were reviewed in Chinese, the language used for formal administration. English versions were prepared for academic reporting and checked against the Chinese meanings. Review focused on conceptual rather than literal equivalence, particularly for terms related to support, reflection, improvisation, appraisal, and creative problem solving, following established guidance for cross-cultural instrument adaptation (Sousa & Rojjanasrirat, 2011). The bilingual items and their construct alignment are documented in the supplementary material.

A separate pilot involved 120 choreography students who were not included in the $N = 368$ main sample. The pilot examined item clarity, response burden, scoring direction, questionnaire operation, and whether students could distinguish generation-oriented improvisational activity from reflection-oriented documentation, analysis, and revision. Participant feedback informed minor revisions to lengthy expressions, choreography-specific terminology, questionnaire instructions, and response flow. No final article item was removed at this stage, and the underlying construct definitions and seven-point response format remained unchanged. The pilot served as a pre-administration check rather than an independent confirmatory sample, consistent with the role of pilot feedback in scale preparation (Boateng et al., 2018).

Construct validity was evaluated with the CB-SEM measurement model. Standardised loadings were examined for indicator coherence, and CR and AVE were used to assess internal consistency and convergence. Discriminant validity was evaluated using HTMT with 5,000 bootstrap resamples and by comparing one- and two-factor instructional-practice models. The higher-order PTS construct was evaluated from the loadings of its four first-order dimensions. These analyses assessed whether the observed responses were consistent with the proposed measurement structure before the structural associations were interpreted.

3.7. Reliability

Internal consistency was assessed with Cronbach's alpha and CR. Values at or above .70 were treated as acceptable, while the coefficients were interpreted together with item loadings, AVE, and discriminant-validity evidence rather than as stand-alone evidence of measurement quality. Estimates for the seven first-order constructs and the second-order PTS factor are reported in Table 4.

4. Results

4.1. Descriptive Results

Table 3 reports the means, standard deviations, and zero-order correlations for the four focal constructs. These descriptive associations are provided to characterise the sample and are not used as hypothesis tests.

Table 3
Descriptive Statistics and Zero-Order Correlations (N = 368)

Construct	M	SD	1	2	3	4
1. PIT	4.765	1.053	—			
2. PROT	4.639	1.085	.456	—		
3. PTS	5.015	.845	.497	.446	—	
4. CSEC	4.659	1.079	.402	.433	.437	—

Note. PIT = perceived improvisational teaching; PROT = perceived reflection-oriented teaching; PTS = perceived teacher support; CSEC = creative self-efficacy in choreography. Correlations are zero-order Pearson correlations; all off-diagonal correlations are significant at $p < .001$.

4.2. Measurement Model

The primary measurement model fitted the data well, $\chi^2(769) = 1098.355$, CFI = .962, TLI = .959, RMSEA = .034. First-order standardised loadings ranged from .640 to .855; alpha ranged from .868 to .910, CR from .871 to .915, and AVE from .528 to .641. The second-order PTS loadings were .699–.776, with CR = .840 and AVE = .568. Table 4 summarises the measurement results.

All higher-order HTMT estimates were below .60, and all 5,000-bootstrap upper confidence limits were below .71 (Supplementary Table S9). The proposed two-factor instructional model also fitted much better than a one-factor model: $\chi^2(34) = 63.349$, CFI = .986, TLI = .982, RMSEA = .048, compared with $\chi^2(35) = 690.534$, CFI = .689, TLI = .600, RMSEA = .226. Table 5 presents the confirmatory comparison. Together, these results support the empirical distinction between PIT and PROT in this sample.

Table 4
Reliability and Convergent Validity Summary

Construct	k	Loading range	α	CR	AVE
PIT	5	.761–.815	.885	.890	.619
PROT	5	.779–.830	.893	.899	.639
INS	7	.640–.774	.884	.886	.528
ES	6	.685–.778	.868	.871	.531
INF	7	.709–.796	.893	.894	.546
AS	5	.748–.774	.872	.877	.587
CSEC	6	.772–.855	.910	.915	.641
PTS second order	4	.699–.776	—	.840	.568

Note. PIT = perceived improvisational teaching; PROT = perceived reflection-oriented teaching; PTS = perceived teacher support; CSEC = creative self-efficacy in choreography; INS = instrumental support; ES = emotional support; INF = informational support; AS = appraisal support; k = number of indicators.

As Table 4 indicates, all first-order constructs met the prespecified internal-consistency and convergent-validity guidelines; the second-order teacher-support factor also met these guidelines.

Table 5
Confirmatory Comparison of Instructional Practice Measurement Models

Model	χ^2	df	CFI	TLI	RMSEA
One-factor instructional practice	690.534	35	.689	.600	.226
Two-factor PIT-PROT	63.349	34	.986	.982	.048

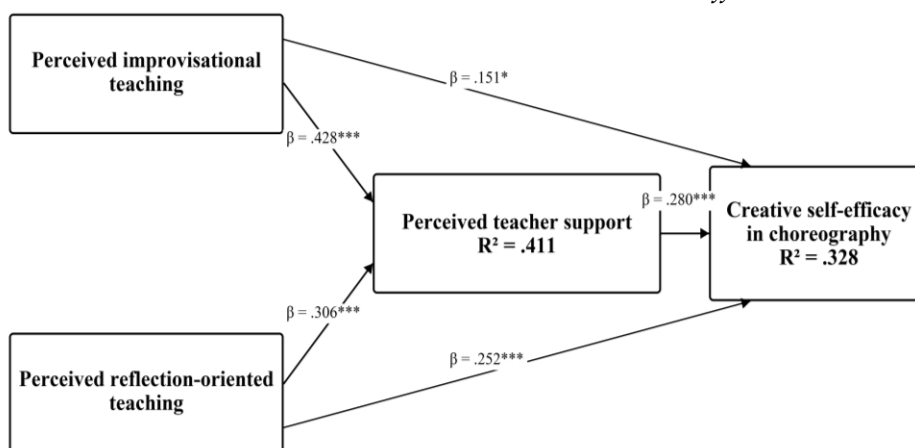
Note. The two models were estimated with the same ten teaching-practice indicators using maximum likelihood estimation.

The comparison in Table 5 indicates that students differentiated generation-oriented improvisational activity from reflection-oriented activity rather than responding to both as one undifferentiated teaching-practice factor.

4.3. Structural and Indirect Associations

Figure 2 displays the standardised associations, and Table 6 consolidates the hypothesis decisions using empirical percentile bootstrap intervals.

Figure 2
Structural Model Results with Standardised Association Coefficients



Bootstrap indirect associations through perceived teacher support

Improvisational teaching: $\beta = .120$, 95% CI [.050, .207]

Reflection-oriented teaching: $\beta = .086$, 95% CI [.032, .152]

* $p < .05$; *** $p < .001$

Note. Arrows show standardised associations from the primary CB-SEM model.

The structural model fitted the data well, $\chi^2(769) = 1098.355$, CFI = .962, TLI = .959, RMSEA = .034. PIT and PROT were positively associated with PTS ($\beta = .428$ and $.306$, respectively) and with CSEC ($\beta = .151$ and $.252$, respectively). PTS was also positively associated with CSEC ($\beta = .280$). The PIT-CSEC direct association was positive and received statistical support, although its percentile interval only narrowly excluded zero; the remaining direct intervals were more clearly separated from zero. The model accounted for 41.1% of the variance in PTS and 32.8% in CSEC. The two indirect-association intervals excluded zero: PIT through PTS, $\beta = .120$, 95% CI [.050, .207], and PROT through PTS, $\beta = .086$, 95% CI [.032, .152]. Because the variables were measured concurrently, these estimates indicate non-zero coefficient products within the specified model; they do not establish temporal ordering, causal mediation, or a uniquely identified intervening role for PTS.

As Figure 2 shows, both perceived teaching practices had direct associations with creative self-efficacy and model-specific indirect associations involving PTS, although the PIT-CSEC estimate was the smallest focal direct association.

Table 6

Hypothesis Tests from the Primary CB-SEM Model

H	Association	β	Bootstrap 95% CI	p	Decision
H1a	PIT $\rightarrow$ CSEC	.151	[.006, .283]	.044	Supported
H1b	PROT $\rightarrow$ CSEC	.252	[.114, .375]	< .001	Supported
H2a	PIT $\rightarrow$ PTS	.428	[.296, .551]	< .001	Supported
H2b	PROT $\rightarrow$ PTS	.306	[.178, .424]	< .001	Supported
H3	PTS $\rightarrow$ CSEC	.280	[.126, .435]	< .001	Supported
H4a	PIT $\rightarrow$ PTS $\rightarrow$ CSEC	.120	[.050, .207]	< .001	Supported
H4b	PROT $\rightarrow$ PTS $\rightarrow$ CSEC	.086	[.032, .152]	< .001	Supported

Note. PIT = perceived improvisational teaching; PROT = perceived reflection-oriented teaching; PTS = perceived teacher support; CSEC = creative self-efficacy in choreography. Confidence intervals are percentile intervals from 5,000 converged bootstrap resamples. Supported indicates that the bootstrap 95% confidence interval for the prespecified association did not include zero. The H1a interval only narrowly excluded zero and should therefore be interpreted cautiously. Support for H4a and H4b refers to model-specific indirect associations and does not establish temporal ordering, causal mediation, or a uniquely identified intervening role for PTS.

Total associations were positive for PIT ($\beta = .270$, 95% CI [.138, .390]) and PROT ($\beta = .338$, 95% CI [.210, .453]). Table 7 presents the direct, indirect, and total estimates for the two perceived teaching practices.

Table 7

Direct, Indirect, and Total Associations with CSEC

Practice	Direct β [95% CI]	Indirect β [95% CI]	Total β	Total 95% CI
PIT	.151 [.006, .283]	.120 [.050, .207]	.270	[.138, .390]
PROT	.252 [.114, .375]	.086 [.032, .152]	.338	[.210, .453]

Note. Indirect estimates are products of the relevant constituent paths. Percentile 95% confidence intervals were obtained from 5,000 bootstrap resamples.

Table 7 decomposes each positive total association into a direct component and a model-specific indirect component involving perceived teacher support.

The behaviour-only latent model also fitted well, $\chi^2(655) = 947.963$, CFI = .962, TLI = .959, RMSEA = .035, and produced estimates close to those of the primary model (Supplementary Table S10). Adding gender, region, year level, and prior choreography experience did not materially alter the focal associations. Alternative structural models fitted similarly, so the observed covariance structure did not empirically privilege the proposed placement of PTS (Supplementary Table S11). The primary model was retained because it was theoretically specified in advance, not because model fit uniquely identified its directional ordering. Because cluster identifiers were unavailable, cluster-robust standard errors and multilevel models could not be estimated; this constraint is considered in the limitations.

5. Discussion

This study addressed three related gaps in choreography education: the tendency to group different creativity-oriented practices together, the limited quantitative examination of theoretically specified association structures, and the treatment of teacher support as an assumed background condition rather than a measured student perception. PIT and PROT were each positively associated with CSEC and PTS, and PTS was positively associated with CSEC. Both specified indirect associations involving PTS were also positive. Taken together, the findings distinguish a generation-oriented practice from a regulation-oriented practice while showing that students' perceptions of these activities covary with their perceptions of relational support. The concurrent design does not establish the temporal order of these relationships.

The first substantive result concerns improvisational teaching. PIT retained a positive direct association with CSEC after PTS and PROT were included and received statistical support, although the lower confidence bound only narrowly exceeded zero. The pattern is consistent with choreography scholarship that treats improvisation as structured exploration rather than unrestricted spontaneity. Lavender and Predock-Linnell (2001) argued that improvisation becomes educationally productive when students can analyse and develop the material it generates, while Lavender (2009) emphasised dialogical structures that make creative choices discussable. One theoretical interpretation is that repeated prompts, variation, and try-adjust-retry activity can provide bounded mastery experiences relevant to creative self-efficacy (Bandura, 1997); this interpretation was not tested as a temporal mechanism. The result also accords with evidence that structured creative-dance and imagery work can contribute to ideational behaviour and creative potential (May et al., 2020; Richard et al., 2024). Ravn's (2020) account of improvisational agency and Larsson et al.'s (2025) analysis of creative movement likewise suggest that openness becomes learnable when pedagogical framing directs attention to what students can explore and practise. The association observed here is therefore theoretically plausible, but its magnitude and interval warrant cautious interpretation.

PIT was more strongly associated with PTS, and the specified PIT-PTS-CSEC coefficient product was positive. Real-time movement generation exposes unfinished decisions before students can protect them through rehearsal, making teacher cues, usable constraints, respectful observation, and non-humiliating feedback especially salient. This interpretation follows self-efficacy theory, which identifies social persuasion and affective interpretation as sources of efficacy information (Bandura, 1997), and MacGlone's (2023) observation that students can tolerate the discomfort of improvisation when the learning environment feels safe enough for experimentation. The result adds a relational dimension to accounts of improvisation: students may experience the generative task and the conditions under which it is introduced, witnessed, and evaluated as connected aspects of the same learning episode. At the same time, the breadth of PTS permits an alternative interpretation in which an established teacher-student climate contributes to both perceptions.

The second substantive result concerns reflection-oriented teaching. PROT was positively associated with CSEC and PTS and also showed a positive indirect association through PTS. This pattern is consistent with reflective-practice and experiential-learning accounts in which experience becomes educationally useful when it is described, interpreted, conceptualised, and returned to action (Kolb, 1984; Schön, 1983). In choreography, video review, process documentation, explanation of choices, and iterative revision can turn a diffuse judgement such as "the section does not work" into a bounded compositional problem. Dance and arts-education studies show how dialogic and collaborative reflection can make fleeting artistic decisions available for analysis (Leijen et al., 2009; Treacy & Gaunt, 2021). The present findings extend that literature by linking students' reports of reflection-oriented activity with their confidence in solving choreographic problems. They also accord with feedback research showing that information becomes educationally consequential when learners can interpret it and convert it into subsequent action (Kerman et al., 2024). Schwender et al. (2025) similarly locate embodied

reflection in the organisation of experience and its return to practice, supporting the present emphasis on reflection as structured activity rather than private introspection.

The one- and two-factor comparison supports separating generation-oriented and regulation-oriented practices at the measurement level. This distinction is conceptual as well as statistical: improvisation foregrounds the generation and variation of movement material, whereas reflection-oriented activity foregrounds interpretation, revision, and strategic control. The structural coefficients should not be used to rank the practices, because their confidence intervals overlap and the study did not test an experimental contrast between them.

The positive association between PTS and CSEC is consistent with research connecting perceived teacher support with creative self-efficacy, engagement, and achievement (Liu et al., 2021; Tao et al., 2022; Vargas-Madriz et al., 2024). Evidence from Chinese students also links teacher support with creative thinking (Shi et al., 2025), while research with art-major undergraduates reports positive associations among teacher support, art self-efficacy, and art creativity (Cui & Fan, 2026). The measurement results indicated that students' judgements of practical help, emotional respect, information, and appraisal formed a coherent higher-order perception. One theoretical interpretation is that these forms of support affect whether creative difficulty is experienced as manageable, especially because the teacher may be an expert, evaluator, and witness to unfinished work at the same time; the present design did not test this process. The items were contextually anchored to choreography learning, but their interpersonal referent was not restricted to one identified teacher or course; PTS is therefore interpreted as a broader perceived support context rather than a course-level characteristic.

At the model level, the specified model accounted for 41.1% of the variance in PTS and 32.8% in CSEC. These values indicate moderate but incomplete explained variance within the specified model. Much of the variation in creative self-efficacy remains associated with factors outside the model, including prior choreographic achievement, creative identity, peer climate, assessment design, course satisfaction, tolerance of ambiguity, and institutional culture. The study therefore narrows rather than closes the research gap. Its contribution is a differentiated account of two perceived pedagogical practices and a relational correlate, not a comprehensive explanation of creative self-efficacy.

6. Implications

Theoretically, the study separates generation from regulation within perceived choreography pedagogy. Improvisation offers exploratory mastery and multiple possible solutions; reflection-oriented activity supports attribution, self-regulation, and strategic control over revision. Self-efficacy theory provides a rationale for why both can be associated with confidence without equating confidence with artistic quality. The model also positions perceived teacher support alongside instructional practice while maintaining a conceptual distinction between what students do and how they experience the surrounding relationship. Future theory can examine whether support operates differently as a course-specific process, a broader relational context, or a condition that changes the strength of practice-efficacy associations.

For practice, improvisation can be designed as supported uncertainty. A generation sequence might begin with an imagery prompt such as "move as if the floor were gradually tilting", add one spatial or rhythmic constraint, allow several low-stakes trials, and ask students to retain one movement fragment for development. Reflection can then be organised as an action cycle: review a recording, describe what occurred, identify a discrepancy between intention and visible effect, explain the current compositional choice, select one revision, and test the revised passage. This sequence connects prompt, exploration, selection, documentation, analysis, revision, and representation without prescribing a single correct choreographic solution.

Departments can reinforce these practices through shared critique protocols, assessment criteria that recognise experimentation and revision, and faculty development on feedback language. Support should not be reduced to praise or lower standards; it involves making challenge

understandable, fair, and usable. Process-sensitive assessment is especially important because students may avoid creative risk when only the polished final product is rewarded. These applications follow the theoretical interpretation of the findings and require direct evaluation in future classroom studies.

7. Limitations and Future Research

First, the cross-sectional, same-source design cannot establish temporal ordering among teaching practices, support, and CSEC. The constructs were reported by the same students at one time point, so reverse, reciprocal, omitted-variable, and common-method explanations remain plausible (Maxwell & Cole, 2007; Maxwell et al., 2011; Podsakoff et al., 2003). The indirect associations should therefore be interpreted as theory-consistent patterns rather than evidence that teaching practices first changed support and support subsequently changed efficacy.

Second, the PTS items were contextually anchored to choreography learning, but respondents were not linked to one identified teacher or course. The higher-order score may therefore capture an established relational context extending across choreography learning. PTS could accompany students' evaluations of the reported teaching practices rather than operate as an intervening course-level variable; accordingly, the data do not identify PTS as the unique structural link between the teaching-practice perceptions and CSEC. This referent breadth limits process interpretation even though the measurement model supported the coherence of the four support dimensions.

Third, PIT and PROT were researcher-developed measures. Domain specification, expert review, an independent pilot, the one-versus-two-factor comparison, and the behaviour-only latent analysis provide several forms of initial evidence, but the $N = 368$ sample was used for both confirmatory measurement and structural testing. Same-sample fit and reliability cannot establish that the item structure will generalise to other choreography programmes or instructional contexts. Independent replication and cross-validation remain necessary, especially for indicators that combine observable activity with students' interpretation of a complete learning process.

Fourth, purposive recruitment across 12 universities limits generalisation. Institution, course, class, and instructor identifiers were not retained in the analytic dataset; consequently, shared institutional, class, or teacher influences could not be estimated directly. Only aggregate online and paper administration counts were available, so survey-mode differences could not be evaluated at respondent level. In the paper administration, instructors were present but did not guide or inspect responses; their presence may nevertheless have influenced some students' responses.

Future studies should retain clustering and administration-mode information, report cluster sizes and ICCs, and use multilevel or cluster-robust analysis where warranted. Independent validation should separate exploratory and confirmatory measurement work, retain behaviour-focused items, and use an explicitly identified referent when course-specific teacher support is intended. Combining student reports with classroom observation, teacher reports, instructional artefacts, and blind ratings of choreography would also connect perceived capability with demonstrable creative development.

Longitudinal or intervention designs could measure baseline CSEC, teaching practices during implementation, subsequent support perceptions, and later CSEC or choreographic performance. Repeated measurement would help distinguish stable response tendencies from change associated with instructional experience. Classroom observation and blind assessment of choreographic work would further clarify whether changes in creative confidence correspond to changes in performance. Such designs would provide a stronger basis for evaluating sequence and change.

8. Conclusion

This study distinguished perceived improvisational teaching from perceived reflection-oriented teaching among choreography undergraduates in Chinese comprehensive universities. The

findings support a conceptual distinction between generation-oriented and regulation-oriented practices and show positive direct and model-specific indirect associations with creative self-efficacy. The comparatively small PIT-CSEC direct estimate, whose interval only narrowly excluded zero, and the model's moderate explanatory capacity call for measured interpretation, but they do not diminish the value of examining these practices separately. By connecting creative activity, reflective regulation, relational support, and task-specific confidence within one model, the study provides a basis for longitudinal, observational, and course-level research in choreography education.

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Data availability: De-identified data, analysis code, and study materials are available from the corresponding author upon reasonable request, subject to ethical and institutional requirements.

Declaration of interest: The authors declare no conflict of interest.

Ethics declaration: Ethical approval for this study was obtained from the Institutional Review Board of the Dance College, Shandong Youth University of Political Science (Ethics Review No. 202507540421). The study involved adult undergraduate students aged 18 years or older and was conducted using an anonymous, paper-based questionnaire. Participation was voluntary, and participants were informed about the purpose of the study, confidentiality, anonymity, and their right to withdraw without penalty. Completion and return of the questionnaire constituted informed consent. No personally identifiable information was collected, and the study involved no experimental intervention and was assessed as posing minimal risk to participants. The research was conducted in accordance with applicable ethical guidelines for research involving human participants.

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