The Impact of Flow Experience on Chinese Primary School Students' Mandarin Language Creative Performance in Mandarin Classrooms

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ABSTRACT:
This study examined the relationship between flow experience and the Mandarin language creative performance of Chinese primary school students. Although schools increasingly expect students to be creative, classroom instruction in Mandarin remains heavily oriented towards examinations. Flow, a state in which learners become fully absorbed in a task, was proposed as a condition that could support creative writing and storytelling. Five flow antecedents were examined: perceived challenge–skill balance, concentration on tasks, intrinsic enjoyment of learning, loss of self-consciousness, and immediate feedback availability, with flow state tested as a mediator. A cross-sectional questionnaire was administered to 400 students in Year 4 to Year 6 of selected schools in China, and the data were analysed in SPSS using descriptive statistics, Cronbach's alpha, Pearson correlation, multiple regression, and the Baron and Kenny mediation procedure supported by the Sobel test. All five antecedents were significant positive predictors of creative performance, jointly explaining 64.0% of its variance, and were also significant predictors of flow state, explaining 54.8% of its variance. Flow state showed the strongest association with creative performance (r = .73) and partially mediated the relationship between each antecedent and creative performance. The findings indicate that classroom conditions which foster flow are associated with stronger creative expression and offer practical guidance for designing Mandarin lessons that enhance engagement and creativity.

Keywords: Flow experience, creative performance, Mandarin language, primary education, mediation.

1. Introduction

Education systems increasingly treat creativity and student engagement as core competencies rather than optional extras, since engaged and creative learners tend to show stronger problem-solving, critical thinking, and adaptability (Lin et

al., 2024; Kaufman et al., 2022). In language education, creative expression through storytelling, composition, and improvisation is central to communicating meaning. One construct that has become prominent in this discussion is flow. Introduced by Csikszentmihalyi (1990), flow describes a psychological state in which a person becomes fully absorbed in an activity, enjoys the process, and loses awareness of time and surroundings. Flow has been linked to deeper engagement and, in several settings, to stronger creative performance (Peifer et al., 2022; Zhang & Wang, 2024).

In China, creativity has become a national priority in educational reform. The 2022 Compulsory Education Curriculum Program and Standards, situated within the China Education Modernization 2035 blueprint, reposition learning from an examination orientation towards competence-based education and foreground innovation and creative expression (Yu, 2022; Luo, 2023). In Mandarin, students are expected to show originality in composing texts, telling stories, and interpreting literature. In practice, however, primary classrooms often remain oriented towards examinations, correctness, and memorisation (Pan et al., 2023), producing a persistent gap between curriculum goals and classroom reality.

Despite a large body of flow research in sport, gaming, and STEM subjects (Peifer et al., 2022; Wojtasiński et al., 2025), evidence in Mandarin primary classrooms remains scarce. Chinese flow studies have concentrated on English as a foreign language and on digital game-based learning (Liu & Song, 2021; Li et al., 2021; Zhou, 2024) rather than on creative use of the native language. As a result, two questions remain open. Empirically, it is unclear whether flow antecedents predict creative performance in Mandarin learning; theoretically, it is unclear whether flow state operates as a psychological mechanism linking classroom conditions to creative outcomes, a mediating role that has been proposed but not tested in this context (Mao et al., 2024).

This study therefore examines how five flow antecedents — perceived challenge–skill balance, concentration on tasks, intrinsic enjoyment of learning, loss of self-consciousness, and immediate feedback availability — relate to the creative performance of Chinese upper-primary students in Mandarin classrooms, and whether flow state mediates these relationships. Two objectives guide the study. The first (RQ1) is to examine the direct effects of the five antecedents on creative performance in Mandarin language. The second (RQ2) is to determine whether flow state mediates the relationship between each antecedent and creative performance.

2. Literature Review

2.1. Flow antecedents, engagement, and creativity

International research consistently identifies challenge–skill balance and concentration as key conditions for flow in learning. When students perceive tasks as appropriately challenging and relevant to their skills, they report greater engagement and concentration (Shernoff & Twersky, 2022), and reduced distraction strengthens the link between engagement and performance (Cho et al., 2022). Intrinsic enjoyment and timely feedback also sustain flow: enjoyment energises participation (Bossmann et al., 2023), while prompt, clear feedback allows learners to adjust their work while still engaged (Maier & Klotz, 2022). A growing literature connects flow to creativity specifically, showing that flow supports the cognitive flexibility and originality central to creative work (Ji et al., 2025; Peifer et al., 2022; Kang, 2023), and that lowered self-consciousness encourages creative risk-taking by reducing fear of evaluation (Rebecchi & Hagège, 2022).

2.2. Flow in language learning and the Chinese context

In language learning, challenge–skill balance and intrinsic enjoyment have been found crucial for maintaining flow during communicative tasks, with students in flow more willing to engage in creative storytelling and improvisation (Almukhaild, 2023). Yet this evidence is concentrated on English as a foreign language, on

university learners, and on Western settings. Within China, studies of EFL and game-based learning indicate that immediate feedback and concentration raise engagement (Liu & Song, 2021; Bian et al., 2022; Li et al., 2021), but creativity in the native Mandarin language has received little empirical attention. Cultural expectations that emphasise correctness and respect for established knowledge can heighten self-consciousness and inhibit the creative risk-taking that flow is thought to enable (Wang & Chen, 2021), making the Chinese primary Mandarin classroom a distinctive and under-examined context.

2.3. Theoretical framework

The study draws on two complementary theories. Flow theory (Csikszentmihalyi, 1990) explains the mechanism of optimal experience: when task demands and personal skills are balanced and clear goals and immediate feedback are present, learners become absorbed, enjoy the process, and lose self-consciousness. Creativity theory, developing from Guilford's account of divergent thinking and Amabile's componential model, explains the outcome: creative performance depends on domain knowledge, creativity-relevant processes, intrinsic motivation, and a psychologically safe environment (Oh, 2022; Amabile, 2011). Flow theory thus describes how learners engage deeply, while creativity theory describes what creative performance requires. Integrating the two, flow state is positioned as the psychological process that links flow-supportive classroom conditions to creative language outcomes.

2.4. Research gap and hypotheses

Three interrelated gaps motivate the study. Empirically, few quantitative studies examine flow and creativity in primary Mandarin learning. Contextually, the realities of Chinese primary classrooms — where policy demands creativity but practice remains exam-centred — are under-explored. Theoretically, the mediating role of flow between classroom conditions and creative performance has not been tested in this setting. Accordingly, the conceptual model specifies five antecedents predicting creative performance both directly and indirectly through flow state, giving eleven hypotheses: H1–H5, that each antecedent (challenge–skill balance, concentration, enjoyment, loss of self-consciousness, and immediate feedback) positively predicts creative performance; H6, that flow state positively predicts creative performance; and H7–H11, that flow state mediates the relationship between each antecedent and creative performance.

3. Methodology

3.1. Design and participants

A quantitative, cross-sectional correlational survey design was adopted, which is appropriate for statistically testing hypothesised relationships and mediation effects (Baron & Kenny, 1986). The unit of analysis was the individual student. Stratified random sampling was used so that the sample reflected variation in school type and grade level: schools were classified as public or private, students were grouped by grade, and respondents were then selected within each stratum. Applying Krejcie and Morgan's (1970) guidance with a 95% confidence level, a minimum of about 384 respondents was required, and the study targeted 400. The final sample of 400 upper-primary students was almost evenly distributed across Year 4 (33.8%), Year 5 (33.3%), and Year 6 (33.0%); 55.0% were female and 45.0% male; and respondents came from public urban, suburban, and rural schools as well as private schools, with diverse home-language backgrounds.

3.2. Instrument

Data were collected through a structured questionnaire with a demographic section followed by scales for the five antecedents (five items each), flow state (five items), and creative performance (five items), all rated on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). Items for challenge–skill balance, concentration, loss of self-consciousness, and immediate feedback were adapted from the Flow State Scale-2 and Dispositional Flow Scale-2 (Jackson & Marsh, 1996; Jackson & Eklund, 2002); intrinsic enjoyment was adapted from the

Intrinsic Motivation Inventory (McAuley et al., 1989); flow state items were adapted from EduFlow-2 (Heutte et al., 2021); and creative performance was adapted from Zhou and George (2001) and contextualised to Mandarin storytelling, writing, and classroom expression. Content validity was established through an expert panel, and a pilot study (n = 30) supported the instrument: the Kaiser–Meyer–Olkin measure was .95, all corrected item-total correlations ranged from .39 to .57, and composite reliability ranged from .82 to .84.

3.3. Procedure and ethics

Approval was obtained from participating schools, and informed parental consent was secured because the participants were minors. Students completed the questionnaire individually and anonymously during a regular Mandarin lesson in about twenty minutes; teachers assisted with organisation only and did not influence responses. Students were assured that participation was voluntary and that their answers would not affect their grades. Questionnaires were coded with identification numbers to protect anonymity, and incomplete responses were excluded before analysis.

3.4. Data analysis

Data were analysed in SPSS using descriptive statistics, Cronbach's alpha for internal consistency, Pearson correlation, multiple regression, and the Baron and Kenny (1986) mediation procedure, with the significance of each indirect effect tested using the Sobel (1982) test. Regression assumptions were examined and satisfied: residuals approximated normality, scatterplots indicated linearity and homoscedasticity, the Durbin–Watson statistic was about 2.05–2.06, and variance inflation factors ranged from 1.21 to 1.68, indicating no multicollinearity concern.

4. Results

4.1. Reliability and descriptive statistics

In the main study, Cronbach's alpha for the seven constructs ranged from .81 to .84, all comfortably above the .70 threshold, indicating good internal consistency (Table 1). The construct means ranged from 3.23 to 3.28 on the five-point scale, all within the moderate band, with standard deviations of about 0.90 to 0.94. The dataset was complete (N = 400 with no missing values), and skewness and kurtosis values fell within the commonly accepted limits of ±2 and ±7 (Hair et al., 2019), supporting the use of parametric analyses.

4.2. Correlations

All variables were positively and significantly correlated ($p < .01$; Table 2). The strongest relationship was between flow state and creative performance ($r = .73$), a large association indicating that students who experienced stronger flow tended to perform more creatively. Among the antecedents, perceived challenge–skill balance ($r = .64$), intrinsic enjoyment of learning ($r = .62$), and concentration on tasks ($r = .62$) showed large correlations with creative performance, while loss of self-consciousness ($r = .50$) and immediate feedback availability ($r = .49$) showed moderate-to-large correlations. The antecedents were also positively related to flow state, most strongly for concentration ($r = .58$) and intrinsic enjoyment ($r = .58$).

4.3. Direct effects

Two multiple regression models were estimated (Table 3). In the first, with creative performance as the dependent variable, the five antecedents jointly explained 64.0% of the variance, $R^2 = .64$, $F(5, 394) = 140.15$, $p < .001$, and all five were significant positive predictors ($\beta = .19$ to $.24$), with perceived challenge–skill balance showing the strongest standardised effect. In the second, with flow state as the dependent variable, the five antecedents explained 54.8% of the variance, $R^2 = .55$, $F(5, 394) = 95.70$, $p < .001$, and again all were significant ($\beta = .17$ to $.24$), with concentration on tasks showing the strongest effect. The antecedents therefore predicted both creative performance and flow state.

4.4. Mediation

Mediation was tested using the Baron and Kenny procedure with the Sobel test (Table 4). For every antecedent, the indirect effect through flow state was positive and statistically significant (Sobel z

= 8.38 to 10.14, all $p < .001$). Because the direct effect of each antecedent on creative performance remained significant after flow state was entered, the mediation was partial in every case: the standardised direct effect fell, for example, from .64 to .32 for challenge–skill balance, from .62 to .29 for concentration, from .62 to .29 for intrinsic enjoyment, from .50 to .18 for loss of self-consciousness, and from .49 to .22 for immediate feedback, while remaining significant. All eleven hypotheses were supported, with the five mediation hypotheses supported as partial mediation (Table 5).

Table 1 Reliability and Descriptive Statistics of the Study Variables (N = 400)

Construct	Items	α (pilot)	α (main)	M	SD
Perceived challenge–skill balance (CSB)	5	.82	.83	3.28	0.91
Concentration on tasks (CON)	5	.82	.83	3.27	0.92
Intrinsic enjoyment of learning (IE)	5	.78	.83	3.23	0.92
Loss of self-consciousness (LSC)	5	.83	.82	3.26	0.92
Immediate feedback availability (IFA)	5	.80	.81	3.26	0.90
Flow state (FLOW)	5	.79	.84	3.26	0.94
Creative performance (CP)	5	.81	.84	3.27	0.93

Note. α = Cronbach's alpha; M = mean; SD = standard deviation. Means are based on a five-point scale (1–5).

Table 2 Pearson Correlations Among the Study Variables (N = 400)

Variable	1	2	3	4	5	6	7
1. CSB	1						
2. CON	.55	1					
3. IE	.49	.52	1				
4. LSC	.39	.34	.41	1			
5. IFA	.37	.32	.32	.20	1		
6. FLOW	.57	.58	.58	.49	.43	1	
7. CP	.64	.62	.62	.50	.49	.73	1

Note. CSB = challenge–skill balance; CON = concentration; IE = intrinsic enjoyment; LSC = loss of self-consciousness; IFA = immediate feedback availability; FLOW = flow state; CP = creative performance. All correlations are significant at $p < .01$ (two-tailed).

Table 3 Summary of Multiple Regression Analyses for the Five Antecedents

Predictor	Creative performance (DV)			Flow state (DV)		
	B	β	t	B	β	t
CSB	.248	.244	6.23	.186	.179	4.10

Predictor	Creative performance (DV)			Flow state (DV)		
	B	β	t	B	β	t
CON	.232	.230	5.92	.249	.243	5.58
IE	.239	.237	6.20	.230	.223	5.22
LSC	.186	.185	5.42	.214	.210	5.48
IFA	.220	.214	6.45	.181	.173	4.65

Note. DV = dependent variable; B = unstandardised coefficient; β = standardised coefficient. Model 1 (DV = creative performance): $R^2 = .64$, $F(5, 394) = 140.15$, $p < .001$. Model 2 (DV = flow state): $R^2 = .55$, $F(5, 394) = 95.70$, $p < .001$. All coefficients are significant at $p < .001$.

Table 4 Sobel Tests of the Indirect Effect of Each Antecedent Through Flow State

Path	a (SE)	b (SE)	Indirect (a×b)	Sobel z	p	Mediation
CSB → FLOW → CP	.586 (.043)	.540 (.037)	.316	9.95	< .001	Partial
CON → FLOW → CP	.599 (.042)	.556 (.039)	.333	10.14	< .001	Partial
IE → FLOW → CP	.595 (.042)	.554 (.038)	.330	10.10	< .001	Partial
LSC → FLOW → CP	.497 (.045)	.633 (.037)	.315	9.30	< .001	Partial
IFA → FLOW → CP	.450 (.047)	.629 (.036)	.283	8.38	< .001	Partial

Note. a = predictor → flow path; b = flow → creative performance path in the combined model. All indirect effects are statistically significant.

Table 5 Summary of Hypothesis Testing

Hyp.	Statement	Result
H1	Perceived challenge–skill balance positively predicts creative performance.	Supported
H2	Concentration on tasks positively predicts creative performance.	Supported
H3	Intrinsic enjoyment of learning positively predicts creative performance.	Supported
H4	Loss of self-consciousness positively predicts creative performance.	Supported
H5	Immediate feedback availability positively predicts creative performance.	Supported
H6	Flow state positively predicts creative performance.	Supported
H7	Flow state mediates the challenge–skill balance – creative performance link.	Supported (partial)
H8	Flow state mediates the concentration – creative performance link.	Supported (partial)
H9	Flow state mediates the intrinsic enjoyment – creative performance link.	Supported (partial)

Hyp.	Statement	Result
H10	Flow state mediates the loss of self-consciousness – creative performance link.	Supported (partial)
H11	Flow state mediates the immediate feedback – creative performance link.	Supported (partial)

Note. All eleven hypotheses were supported; the five mediation hypotheses were supported as partial mediation, with indirect effects confirmed by significant Sobel tests (Table 4).

5. Discussion

The findings show that the five flow antecedents were each significantly and positively associated with creative performance in Mandarin language, and that flow state held the strongest association of all (r = .73). Perceived challenge–skill balance emerged as the strongest antecedent predictor, suggesting that creativity in Mandarin depends not only on language knowledge but also on how well a task is calibrated to the learner — neither so easy that students disengage nor so difficult that they become anxious. This is consistent with evidence from Chinese primary classrooms that flow experience predicts creativity (Zhang, 2025) and with findings that task features sustaining an appropriate level of challenge support flow in the language classroom (Zuniga, 2023). The contributions of concentration and intrinsic enjoyment underline that creative expression requires both sustained attention and a positive affective relationship with the subject, while the role of reduced self-consciousness and immediate feedback points to the importance of a psychologically safe, responsive classroom climate (Almukhaild, 2023; Bian et al., 2022).

The mediation results are central to the study. Flow state partially mediated all five antecedent–creativity relationships, indicating that one reason these classroom conditions are associated with stronger creative performance is that they help students enter a state of flow. Because the mediation was partial rather than full, each antecedent also contributed to creative performance through pathways beyond flow, such as freer expression or more accurate language production. Flow therefore appears to function as an important, but not exclusive, psychological mechanism linking classroom experience to creative outcomes.

5.1. Practical implications

Several practical implications follow for Mandarin teaching. Because challenge–skill balance mattered, teachers can design tiered versions of writing and storytelling tasks — a guided version with sentence starters and prompts for less confident students and an open version for more advanced students — so that every learner is stretched without being overwhelmed. Because concentration predicted both flow and creativity, lessons should protect attention through one clear creative goal, short instructions, timed stages, and few interruptions. Because enjoyment mattered, activities such as collaborative story building, role-play, theme-based writing linked to students' interests, and word games can make lessons more engaging. Because reduced self-consciousness was linked to flow, teachers can build psychological safety by treating early drafts as work in progress, encouraging before correcting, allowing sharing first in pairs, and praising originality publicly while giving corrective feedback privately. Finally, because immediate feedback was significant, teachers should give prompt, specific feedback during creative tasks through brief checkpoints and short peer-feedback rounds. At the school level, these practices can be supported by teacher workshops on flow-based lesson design and by scheduling longer, uninterrupted blocks for creative Mandarin work.

5.2. Theoretical implications

Theoretically, the study extends flow theory to a primary-school, native-language context that differs markedly from the Western, individualistic settings in which the theory originated. It supports the logic of flow theory by

showing that the five antecedents predicted flow state, and it extends that logic by demonstrating that flow state is meaningfully associated with creative performance in Mandarin. The partial mediation across all five antecedents enriches the educational application of flow theory by showing that flow operates as a psychological process through which classroom experience relates to creative learning, while leaving room for direct effects. The study also contributes to creativity research by positioning a momentary psychological state, rather than only stable cognitive traits, as a contributor to creative performance.

5.3. Limitations and future research

Several limitations should be noted. The cross-sectional design measures associations and cannot establish that flow antecedents cause creative performance; longitudinal or quasi-experimental designs could test the direction of effects. All variables were measured by student self-report, which is open to social-desirability and common-method bias; future studies could add teacher ratings, classroom observation, and performance-based creative tasks scored with an established rubric. The sample was restricted to upper-primary students in selected schools in China, so the findings may not generalise to other grades, regions, or languages, and creative performance was assessed through perceptions rather than authentic student work. Finally, the mediation analysis used the Baron and Kenny procedure with the Sobel test; future work could adopt bootstrapping through the PROCESS macro or structural equation modelling, which estimate indirect effects and their confidence intervals without assuming normality and can test all five paths within a single model (Hayes, 2022). Additional variables such as teacher support, classroom climate, learning anxiety, and self-efficacy could build a fuller model of how flow and creativity develop.

6. Conclusion

This study demonstrated that perceived challenge–skill balance, concentration on tasks, intrinsic enjoyment of learning, loss of self-consciousness, and immediate feedback availability were each significantly and positively associated with the creative performance of Chinese primary school students in Mandarin language. The five antecedents jointly explained 64.0% of the variance in creative performance and 54.8% of the variance in flow state, and flow state showed the strongest single association with creative performance. Importantly, flow state partially mediated all five relationships, with the indirect effects confirmed by significant Sobel tests, indicating that flow plays a central role in how classroom learning experiences relate to creative language outcomes. When Mandarin tasks are suitably challenging, engaging, attention-focusing, encouraging, and rich in feedback, students tend to show meaningfully higher creative performance. The study thus advances both the theoretical understanding and the practical design of Mandarin classrooms that nurture creativity.

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