The teaching method of "siplaecec" in language learning: The conditional role subject to need climate within a self-determination theory framework

American Journal of Social Sciences and Humanities
Vol. 10, No. 2, 16-33, 2025
e-ISSN: 2226-4809/p-ISSN: 2304-6945

Qi Zhang

School of English and International Studies, Beijing Foreign Studies University, Beijing, China.
Email: waiked@126.com

ABSTRACT

This study investigates, framed within Self-Determination Theory (SDT), how need climate (Need-supportive versus need-thwarting) and teaching method ("Siplaecec" featuring scaffolded interactive play, ludic autonomous engagement, and competence-embedded context versus "traditional method" through didactic instruction) interact to influence language learning outcomes. A two-way ANCOVA measures the interaction effect, controlling for pre-intervention performance, to examine the potential synergistic relationship between the need climate and teaching method. The results demonstrate that the need climate alone has a significant main effect on learning outcomes, with need-supportive environments outperforming need-thwarting conditions. In contrast, the teaching method alone reveals a non-significant main effect, indicating that innovative pedagogy does not necessarily facilitate learning in isolation. Notably, the results highlight a disordinal interaction effect. Explicitly speaking, learners in the group of "siplaecec" employed in need-supportive climates have achieved the highest outcomes, while those in the group of "siplaecec" employed in need-thwarting climates have achieved the lowest outcomes. Traditional methods have yielded relatively stable effects regardless of need climates. These findings suggest the conditional efficiency of pedagogical innovation, the potential persistence-stimulating role of need frustration, and the resilience of traditional methods in buffering against the debilitating influences of unsupportive environments. This study extends the principles of SDT and presents the climate-sensitive implementation of play-related pedagogies.

Keywords: *Language learning, Need climate, Need-supportive climate, Need-thwarting climate, Self-Determination Theory, "Siplaecec", Teaching method.*

DOI: 10.55284/ajssh.v10i2.1573
Citation | Zhang, Q. (2025). The teaching method of "siplaecec" in language learning: The conditional role subject to need climate within a self-determination theory framework. *American Journal of Social Sciences and Humanities*, *10*(2), 16–33.

Funding: This research is supported by the Fundamental Research Funds for the Central Universities (Grant number: 2025JX099) and the Research Funds of Beijing Foreign Studies University (Grant number. 2025JX099).
Institutional Review Board Statement: The Ethical Committee of the Beijing Foreign Studies University, China has granted approval for this study on 29 May 2025 (Ref. No. 2025JX099).
Transparency: The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.
Competing Interests: The author declares that there are no conflicts of interests regarding the publication of this paper.
History: Received: 16 June 2025/ Revised: 4 August 2025/ Accepted: 25 August 2025/ Published: 15 September 2025
Publisher: Online Science Publishing

Highlights of this paper

- Grounded in Self-Determination Theory, "Siplaecec" is a novel pedagogy for language learning that emphasizes interactive and playable experiences.
- Grounded in Self-Determination Theory, "Siplaecec" is a novel pedagogy for language learning that emphasizes interactive and playable experiences.
- A disordinal interaction between need climate and teaching method indicates that the need climate fundamentally shapes how pedagogical innovations influence language learning outcomes.

1. INTRODUCTION

The advancement in educational research technologies has contributed to an increasing emphasis on learner-centered and motivation-cultivating instructions, which reflects that students' learning outcomes are interwoven with their psychological experiences (Finch, 2023). Such an association between affective states and learning outcomes is interpretable through Self-Determination Theory (SDT) (Ryan & Deci, 2000), which elucidates how fulfilling the psychological needs of autonomy, competence, and relatedness influences learners' engagement, well-being, and performance. While the satisfaction of psychological needs contributes to facilitating effects on learning experiences (Shelton-Strong, 2025), the frustration of these needs, i.e., the absence and active undermining of psychological satisfaction, can still exist in pedagogical practices, potentially leading to detrimental effects on learning experiences (Burgueño, García-González, Abós, & Sevil-Serrano, 2024).

Interpersonal climate established by teachers is a central determinant of need satisfaction and frustration (Burgueño et al., 2024). Within the SDT framework, interpersonal-climate-emphasizing instructions involve educators' encouragement of learners' spontaneous autonomy, presentation of structured knowledge, and cultivation of warm, reciprocal relationships (Hoang Le, Nguyen, & Pham, 2025). In contrast to the psychologically facilitating instruction, need-thwarting reveals the maladaptive situations where learners experience excessive control, criticism, or isolation (Ahmadi et al., 2023). Despite the assumed avoidance of psychological debilitation for sustainable learning enhancement, the seemingly thwarting environments do not necessarily always lead to adverse effects on learning experiences (Titova & Sheldon, 2022). These statements address the first research gap: the specific affective and cognitive consequences of need-thwarting climates, particularly regarding autonomy, competence, and relatedness frustration. Exploration of the consequences can provide instructional references to supplement the effects of need-supportive environments on learning.

Besides, pedagogical innovations based on technological advancements have introduced alternatives to traditional didactic instruction (Bayaga, 2025). As one such method, ludicization, i.e., the transformation of target environments into playable experiences involving metaphorical analogies between virtual-setting features and real-life attitudes/states/behaviors, allows for decompositions of learning into manageable, game-like segments that enhance learners' motivation, self-regulation, and sustained engagement (Namaziandost, Çakmak, & Ashkani, 2025). Corresponding with learner-centeredness and an emphasis on volitional affective growth accompanied by game-like experiences (Takshara, Bhuvaneswari, & Kumar, 2025), this study proposes a specified method of implementing ludicization: "siplaecec" aiming to transform passive reception into active exploration by stimulating scaffolding, fostering autonomous engagement, and embedding progression in learning steps. These statements address the second research gap: the empirical evidence on "siplaecec", particularly compared with traditional instructional methods. Explicitly speaking, this study aims to investigate how the relative effectiveness of "siplaecec" versus traditional methods enhances learning outcomes and mitigates psychological need frustration.

Additionally, the need climate and teaching methods may exert potentially interactive effects on learning (Hickey, Curthoys, Wright, & Riddle, 2025). Despite the general assumption that pedagogical innovations foster an autonomy-supportive environment (Bayaga, 2025), it is still worth exploring whether methods like "siplaecec" can

alleviate the adverse psychological effects of need-thwarting climates. That point provides references for whether an interactive, engaging method partially counteracts a demotivating environment and whether the effectiveness of "siplaecec" is contingent on supportive climates. These statements address the third research gap: the factorial design that examines how need climates and teaching methods interact to influence psychological states and learning outcomes. This study has practical implications for learning environments that cannot always guarantee ideal interpersonal conditions.

Furthermore, prior studies have mainly concentrated on either learning outcomes, e.g., test scores, under separate learning conditions, rather than exploring the potential interactive effect of need climates and teaching methods on learning outcomes, while controlling for pre-intervention proficiency. An analysis of the two-way interaction effect can reveal how instructional settings and social-relational differences interactively influence language learning (Escriva-Boulley, Haerens, Tessier, & Sarrazin, 2021). This modeling presents deeper theoretical and practical insights into how class-related factors co-act to influence learners.

Aligning with these research gaps, the current study reflects the following contributions. Firstly, this study explores the differential effects of need-supportive versus need-thwarting climates on learners' psychological states and learning outcomes. Secondly, it empirically evaluates the "siplaecec" method versus the traditional didactic method within university-level language education. Thirdly, it applies a two-way interaction analysis to illuminate the influencing mechanisms of learning outcomes. Fourthly, it centers on need-frustration as a distinct and powerful predictor for the broader SDT literature.

Overall, this research integrates a novel instructional approach ("siplaecec"), a distinctive relational variable (need-thwarting climate), and a psychological-need-related framework (SDT) to gain a deeper understanding of what makes learning effective, engaging, and psychologically facilitating. Since in real-world scenarios, pedagogical climates are not necessarily uniformly facilitating, e.g., to be inadvertently controlling or distant due to teaching constraints or stress (Ahmadi et al., 2023) psychologically nourishing and engaging instructions, e.g., "siplaecec", may function as protective pedagogical tools to guarantee learners' motivation, resilience, and persistence. Empirical evidence of instructional effectiveness and influencing mechanisms can test the efficiency of such an instruction.

2. LITERATURE REVIEW

This section presents academic support for the key concepts and assumed relationships underlying the research hypotheses.

2.1. Self-Determination Theory and Language Learning: From Need Satisfaction to Need Frustration

Self-Determination Theory (SDT) posits that human well-being and optimal operations depend on the satisfaction of three innate psychological needs: autonomy, competence, and relatedness (Ryan & Deci, 2000). Autonomy refers to self-initiated volition to persist in learning experiences; competence refers to the perception of knowledge effectiveness and mastery; relatedness refers to the sense of belonging and connection with others (Ryan & Deci, 2000). The principle of satisfying these psychological needs is transferable to educational settings, enabling an understanding of how pedagogical practices influence learners' motivation, engagement, and learning outcomes (Finch, 2023).

Regarding language learning, SDT reflects that motivational processes pave the path for successful language acquisition (Noori, Samadi, Orfan, & Li, 2025). Satisfying autonomy, competence, and relatedness contributes to learners' higher levels of intrinsic motivation, persistence, and language performance (Shelton-Strong, 2025). When

a learning environment supports these psychological needs, e.g., offering meaningful choices, providing constructive feedback, and fostering a reciprocal classroom climate, this environment can enhance learners' engagement in communication-oriented activities to promote vocabulary retention, semantic mastery, and verbal retrieval (Printer, 2024).

In contrast to need satisfaction corresponding with a need-supportive climate, SDT elicits need frustration, i.e., the active thwarting or suppression of autonomy, competence, or relatedness, corresponding with a need-thwarting climate (Ahmadi et al., 2023). Unlike low need satisfaction that reflects a neutral or passive state, need frustration denotes a debilitating psychological experience associated with perceptions of control, pressure, humiliation, or exclusion (Ghasemzadegan, Roshanak, Xodabande, Koleini, & Lotfi Gaskaree, 2025). In language learning, need-thwarting behaviors, such as providing rigid instructions, ignoring learners' input, or publicly shaming errors, lead to affective disengagement, performance anxiety, and dropout intentions (Printer, 2023).

Need satisfaction and frustration elicit the discussion about need climates that shape learners' need experiences. While need-supportive climates enable learners to take initiative, collaborate, and conduct meaningful conversation-oriented explorations (Shelton-Strong, 2025), need thwarting climates reveal authoritarian control, evaluative pressure, and social neglect (Burgueño et al., 2024). These climates influence how learners internalize language goals and strategies based on their motivational states (Vansteenkiste, Ryan, & Soenens, 2020). Understanding the duality between supportive and thwarting environments is crucial for effective language-learning pedagogies, particularly in terms of content conveyance and learner well-being.

Overall, SDT theoretically interprets the dynamics between instructional practices and performative outcomes. The shift from need satisfaction to need frustration emphasizes the prevention of debilitating classroom climates that would undermine learners' motivational resources. This theoretical stance elicits an evaluation of how different need climates affect psychological states and language learning outcomes.

2.2. "Siplaecec" As a Learner-Centered Pedagogy Supported by Self-Determination Theory

The advance in learner-centered and game-informed pedagogies contributes to various teaching models, including the "siplaecec" model that combines scaffolding, interactivity, autonomy, and competence in meaningful language use. "Siplaecec" stands for three interlinked instructional principles: 1) SIP for scaffolded interactive play, 2) LAE for ludic autonomous engagement, and 3) CEC for competence-embedded context. This model reinterprets language classrooms not as situations of knowledge transmission but as dynamic ecosystems of playable, self-regulated explorations.

SIP (scaffolded interactive play) refers to interactive language tasks supported by temporary scaffolds such as guiding questions, models, or peer collaboration. SIP tasks, featuring social negotiation, peer collaboration, and guided exploration, position learners within meaningful communication contexts where they operate just beyond their independent capacity, along with gradual internalization of new language forms (Zhang & Crawford, 2024). Corresponding with SDT, SIP meets the relatedness need by situating learners in socially meaningful interactions (Lu & Moller, 2024) while addressing competence needs by adapting task difficulty to learners' reachable domain for optimized learning success and avoidance of failure-induced frustration (Alfares, 2025). Thus, SIP fosters a sense of relatedness through interpersonal connection and strengthens competence through meaningful, internalized operations.

LAE (ludic autonomous engagement) refers to the mechanics for cultivating learner agency within play-oriented, yet self-directed experiences. LAE-centered environments, e.g., open-ended language quests, adaptive adventure dialogues, and sandbox-style storytelling, enable learners to actively make decisions, construct meaning,

and regulate their own learning (Takshara et al., 2025). Corresponding with SDT, LAE aims to amplify learner agency, allowing learners to pursue linguistic challenges in personally meaningful and volitional ways, thereby meeting the autonomy need (Namaziandost et al., 2025). In contrast to traditional didactic instruction, where learners are passive recipients of learning challenges (Chen, 2024), LAE reframes learners as proactive co-constructors of the learning process involving structured goal settings (Hsia, Lin, Lin, & Hwang, 2025). Thus, LAE minimizes autonomy frustration from overly controlled or rigid tasks and fosters self-initiated enjoyment for deep language learning.

CEC (Competence-embedded context) refers to authentic, level-appropriate, and cognitively simulating language learning contexts that visibly demonstrate language competence. CEC tasks, e.g., debate simulations, content-integrated presentations, interactive media creations, and real-world problem-solving, encourage learners to apply their language skills and demonstrate their proficiency (Alharbi, 2025). Corresponding with SDT, CEC is inherently competence-oriented, as it fosters learners' progress and efficacy through embedded task accomplishments and constructive feedback, thereby satisfying the competence need (Derakhshan, 2025). Meanwhile, CEC supports autonomy needs by adapting language tasks to learners' interests, learning targets, or expressions of identity (Namaziandost et al., 2025). Thus, CEC promotes deep, progressive learning and alleviates the frustration from feeling reduced to test performers in instructional settings.

The assumed effectiveness of "siplaecec" is analyzable through its holistic approach to motivated learner engagement. Unlike traditional didactic instruction that often prioritizes grammatical correctness and rote memorization, "siplaecec" emphasizes learner agency, experiential learning, and psychological facilitation to promote sustainable learner motivation and language proficiency.

2.3. Interaction Effect of Need Climate and Teaching Method on Language Learning

Sections 2.1 and 2.2 establish the potential determinants of "need climate" (Need-supportive versus need-thwarting) and "teaching method" ("Siplaecec" versus traditional didactic teaching) in influencing language learning effectiveness, particularly through the impacts on learners' psychological needs. The established contents elicit a model that assesses the interactive impact of need climate and teaching method on learning outcomes.

The analysis of the interaction effect requires investigating the separate effects of interpersonal climates and pedagogical approaches on learning achievements (Hickey et al., 2025). While need-supportive climates foster empathy, encouragement, and self-initiated choices that promote intrinsic motivation and volitional engagement (Bayaga, 2025), need-thwarting climates are assumed to contribute to restricted affective persistence and hinder performative progress (Ahmadi et al., 2023). Besides, while traditional didactic language learning often features control, evaluation, and fixed information transmission (Chen, 2024), approaches like "siplaecec" emphasize meaningful, interactive, and self-regulated progression for performative growth (Jeon, 2022). Thus, an interaction effect of these two pedagogical dimensions on language learning elicits the following hypotheses (Hs).

H_1: Need-supportive climate per se can enhance language learning outcomes.

H_2: "Siplaecec" per se can enhance language learning outcomes.

The separated effects elicit how the interactive effects of teaching practices on learning achievement occur (Escriva-Boulley et al., 2021). Interpersonal warmth and choice from need-supportive environments may buffer the traditional didactic method, thereby decreasing frustration (Hoang Le et al., 2025). By contrast, learner-centered designs like "siplaecec" may not entirely prevent frustration due to excessive control or neglect from need-thwarting climates (Burgueño et al., 2024). Since the need climate would intensify or dilute the psychological

impacts of the instructional methods, it is assumed that need climate moderates the influence of learning method on need frustrations.

"Siplaecec" is assumed to be associated with need satisfaction/Frustration by promoting volitional self-direction (Dealing with autonomy need), scaffolded mastery (Dealing with competence need), and meaningful interactions (dealing with relatedness need) (Shelton-Strong, 2025). In contrast, the traditional didactic method is also associated with need satisfaction/Frustrations based on pedagogical structure, interactive designs, and personalized delivery (Dipendra, Kc, Rado, & Vichit-Vadakan, 2025). Since the teaching method influences learners' psychological and performative states associated with the need climate, it is assumed that the teaching method affects the need climate in relation to learning outcomes. Thus far, this study has hypothesized a two-way interaction between the need climate and teaching method regarding language learning outcomes, eliciting the following hypothesis.

H_3: Need climate and teaching method exert significant interactive effects on language learning outcomes.

Overall, these hypotheses reflect the potential interactive effectiveness of play-based, need-supportive conditions in facilitating language learning.

3. METHODOLOGY

This section describes the methodological designs for the two-way interaction analysis.

3.1. Participants and Instruments

Corresponding to the university-level setting, this study recruited 200 participants (108 females and 92 males) who were aware of the research aim and procedure in advance and voluntarily consented to participate in the study to address the ethical concerns. The mean (M) age of the participants is 19.97 with a standard deviation (SD) of 1.106. To exclude potential confounding factors of language learning during the empirical procedure, all participants do not major in foreign-language-related subjects or foreign studies.

The instruments of this study include the criteria to define the need climate (supportive versus thwarting), the pedagogical technology to differentiate teaching methods ("siplaecec" versus traditional teaching), and the test to assess language proficiency as the learning outcome. To define the being-supportive/thwarting state of the learning circumstances, corresponding with the psychological needs of SDT, need climate depends on autonomy frustration, competence frustration, and relatedness frustration (Ahmadi et al., 2023). Since frustration of autonomy, competence, and relatedness reflects pressure, failure, and exclusion, need frustration reflects a thwarting atmosphere, e.g., controlled motivation, disengagement, and pressure (Ghasemzadegan et al., 2025). In contrast, controlled frustration stands for psychologically supportive circumstances where learners are volitionally motivated to engage in persistent knowledge development (Shelton-Strong, 2025). Thus, the curricular design is based on the extent of frustration potentially associated with mixed effects on learning (Titova & Sheldon, 2022).

Regarding the pedagogical technology to differentiate the teaching method, digital technology for interactive, immersive, and individualized learning experiences is the instrument to incorporate ludic elements in pedagogical practices (Bayaga, 2025). Traditional teaching often involves pedagogical practices that lack engaging or entertaining designs. By contrast, "siplaecec" proceeds based on the application "Habitica" that embeds virtual-setting game elements into learning experiences, i.e., transforming goal-attainment processes during learning into monster-beating achievements during virtual adventures. "Habitica", featuring playable interactions, offers structured guides for learners to achieve long-term progress, meeting the demand for scaffolded interactive play. "Habitica" aims to immerse learners in virtualized adventures, extending rule-regulated achievement to self-

regulated persistence in real-life learning, while promoting ludic autonomous engagement. "Habitica" enables learners to transfer virtual-setting attainments to real-life habitual development, satisfying the need for competence-embedded context.

To measure learners' language proficiency, this study employs the College English Test Band 6 (CET-6) as the authoritative assessment of university students' English proficiency. With a score ranging [0, 100], the adapted version of CET-6 includes 25 listening comprehension multiple-choice questions (eight questions for conversations, seven questions for passages, and ten questions for news reports), 30 reading comprehension multiple-choice questions (ten questions for cloze, ten questions for paragraph-matching, and ten questions for in-depth reading), and one writing task (no less than 150 words). To exclude the confounding influence of prior language proficiency on the study, two adapted versions of the CET-6 are implemented, along with parallel questions designed to assess pre- and post-intervention language proficiency.

3.2. Empirical Procedure

The research instruments are employed in the empirical procedure as the information source of this study. The empirical procedure involves three stages: pre-, while-, and post-intervention. In the pre-intervention stage, all participants are randomly divided into four groups with the same sample size (N = 50 for each group) by two factors. The two grouping factors are the two independent variables "Need_Climate" ("Supportive" and "Thwarting") and "Teaching_Method" ("Siplaecec" and "Tradition"). After grouping, the participants also took the pre-intervention CET-6 to assess their prior English proficiency, which elicited the covariate "Pretest" ([0, 100]).

During the while-intervention stage, participants in four groups attended the "College English" courses, which were conducted in parallel and based on the same syllabus, and taught by four college English teachers for each group. Need climates and teaching methods are distinct in the groups. Group 1 employs "Habitica" to implement "siplaecec" while meeting participants' demands for autonomy, competence, and relatedness during supportive experiences. Group 2 employs a traditional slide-based lecturing approach while ensuring supportive conditions. In contrast, group 3 employs "Habitica" but based on dissatisfaction of participants' psychological needs for thwarting experiences. Group 4 employs a traditional approach based on thwarting circumstances. The instructional intervention has lasted 6 weeks (from June 3, 2025, to July 11, 2025).

In the post-intervention stage, all participants took the post-intervention CET-6 to assess their post-course language learning outcomes, thereby eliciting the dependent variable "Posttest" ([0, 100]). The raters are the teachers of the "English course" courses. Then, all variables except information irrelevant to academic research are recorded for the subsequent statistical analyses.

3.3. Analytical Plan

This study aims to investigate the interaction effect between the two independent variables on the dependent variable, while considering the covariate. The employed analytical method is the two-way analysis of covariance (two-way ANCOVA) that explains how "Need_Climate" and "Teaching_Method" interact to affect "Posttest" after adjusting for "Pretest" (Garson, 2013).

Conducting the two-way ANCOVA still requires investigating whether the data fulfill the following assumptions. Assumption 1: "Pretest" and "Posttest" in each combined group by "Need_Climate" and "Teaching_Method" should be normally distributed, which is analyzable through the Shapiro-Wilk test. Assumption 2: "Pretest" and "Posttest" should reveal a linear relation for each combined group by "Need_Climate" and "Teaching_Method", which is analyzable through the scattered plot. Assumption 3: The relationship between

"Pretest" and "Posttest" should be homogeneous in regression slopes across all groups by the independent variables, which can be checked through the interaction items. Assumption 4: Group variances of "Posttest" adjusted by "Pretest" should be equal, which is measurable through Levene's test of variance equality. Assumption 5: The spread of residuals should be equal across predicted values (homoscedasticity) for all combined values of the independent variables and covariate, which is explorable through the scattered plots for the predicted values and standardized residuals. Assumption 6: The unusual outliers should be non-significant, which is identifiable through the absolute standardized residuals and Cook's distance values (Abu-Bader, 2021; Garson, 2013).

Satisfying these assumptions guarantees the persuasiveness of the subsequent result report. The first part of the results presents estimates of the means and adjusted means of "Posttest" by the separate independent variables, associated with H1 and H2. The second part of the results examines whether a two-way interaction effect exists regarding the statistical indices and profile plots, as predicted by H3.

4. RESULTS

This section presents the two-way ANCOVA results to test the hypotheses.

4.1. Fulfillments of Assumptions

Since all significance (sig.) values are greater than 0.050 in the Shapiro-Wilk test (see Table 1), "Pretest" and "Posttest" reveal normal distributions in all combined groups, fulfilling Assumption 1 (Abu-Bader, 2021). According to the scatter plot (see Figure 1), "Pretest" and "Posttest" show linear relations with distinctive slopes across the combined groups, fulfilling Assumption 2 (Abu-Bader, 2021). The interaction items "Need_Climate * Pretest", "Teaching_Method * Pretest", and "Need_Climate * Teaching_Method * Pretest" are non-significant (sig. > 0.050 of 0.057, 0.923, and 0.061, respectively), fulfilling Assumption 3 (Abu-Bader, 2021). The Levene's test of variance equality is non-significant (sig. = 0.243 > 0.050), fulfilling Assumption 4 (Abu-Bader, 2021). According to the homoscedasticity-checking plot (see Figure 2), the residuals are randomly scattered and evenly distributed, fulfilling Assumption 5 (Abu-Bader, 2021). All absolute standardized residuals are greater than 3.000, and all Cook's distance values are less than 1.000, fulfilling Assumption 6 (Abu-Bader, 2021).

Table 1. Normality of the grouped data of "Pretest" and "Posttest".

Independent variable		Target variable	Shapiro-Wilk test		
Need_Climate	Teaching_Method		Statistic	Degree of freedom	Significance value
Supportive	Siplaecec	Pretest	0.982	50	0.653
		Posttest	0.977	50	0.417
	Traditional	Pretest	0.982	50	0.620
		Posttest	0.966	50	0.155
Thwarting	Siplaecec	Pretest	0.961	50	0.099
		Posttest	0.973	50	0.319
	Traditional	Pretest	0.944	50	0.059
		Posttest	0.987	50	0.840

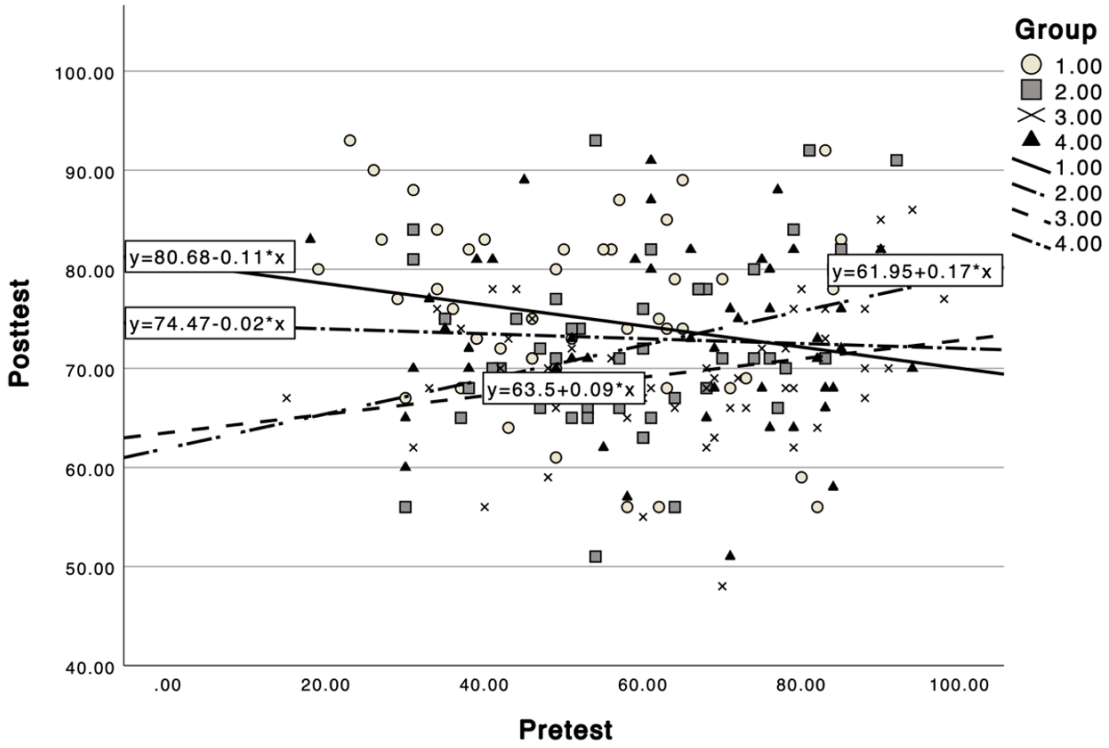

Figure 1. Scatter plot of the linear relation between "Pretest" and "Posttest" across the combined groups.

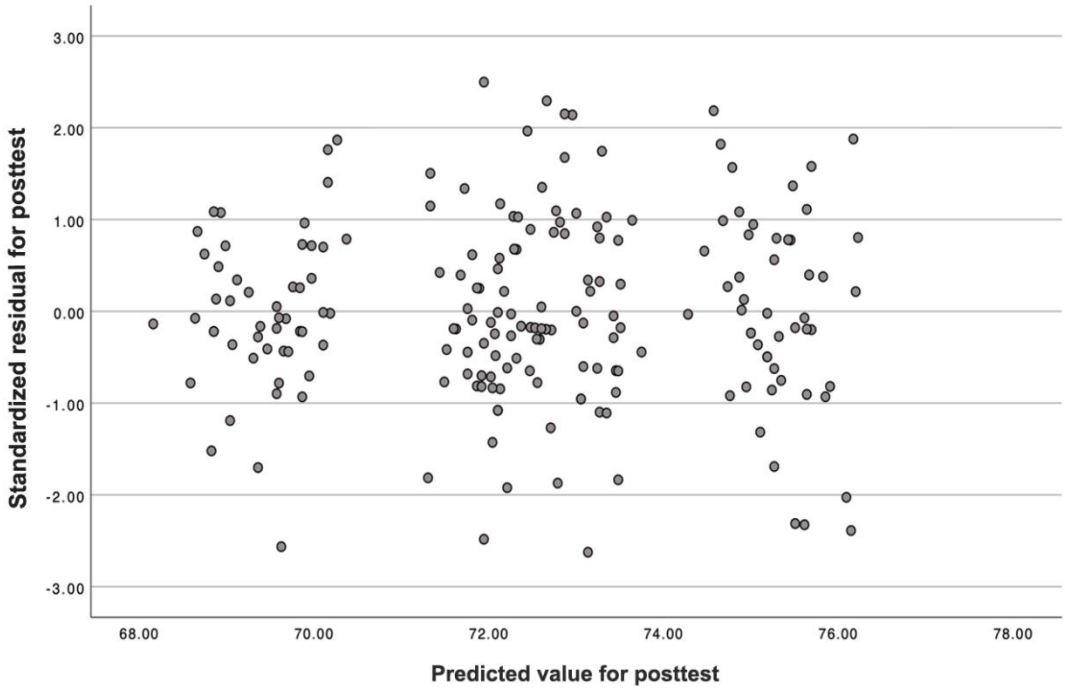

Figure 2. Scatter plot of standardized Residuals against predicted values to check homoscedasticity.

4.2. Statistical Tests to Test Hypotheses

Fulfillment of all assumptions confirms the results of two-way ANCOVA. According to the two-way ANCOVA summary (see Table 2), after controlling for "Pretest" that shows a significant influence on "Posttest" (sig. = 0.022 < 0.050), there are statistically significant differences between the groups by "Need_Climate" (sig. = 0.028 < 0.050).

However, groups by "Teaching_Method" reveal non-significant differences (sig. = 0.991 > 0.050) in "Posttest" while controlling for "Pretest".

Table 2. Two-way ANCOVA summary with "Posttest" as the dependent variable.

Source	Type III sum of squares	Degree of freedom	Mean square	F	Significance value	Partial Eta squared
Corrected Model	917.691[a]	4	229.423	3.226	0.014	0.062
Intercept	85605.919	1	85605.919	1203.764	< 0.001	0.861
Pretest (covariate)	45.956	1	45.956	4.646	0.022	0.123
Need_Climate (Independent variable)	350.741	1	350.741	4.932	0.028	0.125
Teaching_Method (Independent variable)	0.009	1	0.009	0.000	0.991	0.000
Teaching_Method * Need_Climate[b] (Interaction effect)	592.536	1	592.536	8.332	0.004	0.141
Within groups	13867.464	195	71.115			

Note: a. R Squared = 0.062 (Adjusted R Squared = 0.043)
b. "Teaching_Method * Need_Climate" indicates the combined effect of "Teaching_Method" and "Need_Climate" on the dependent variable ("Posttest"), beyond their separate main effects.

The estimates of "Posttest" by the separate independent variables (see Table 3) suggest that participants' language learning outcomes are higher for need-supportive climate (M = 73.800, standard error (SE) = 0.857) than need-thwarting climate (M = 71.070, SE = 0.857), reflecting a difference of 2.730. In contrast, the approaches of "siplaecec" (M = 72.428, SE = 0.845) and traditional learning (M = 72.442, SE = 0.845) contribute to participants' similar performance. These results suggest that the need climate per se can significantly influence language learning outcomes, despite the non-significant enhancement of "siplaecec" on language learning. These findings support the acceptance of H1 and rejection of H2, necessitating an investigation into how to enhance the efficiency of "siplaecec" in language learning, particularly in terms of the interaction effect between need climate and teaching method.

Table 3. Estimates of "Posttest" by separate independent variables.

Independent variable	Mean	Standard error	95% confidence interval	
			Lower bound	Upper bound
By "Need_Climate"				
Supportive	73.800[a]	0.857	72.111	75.490
Thwarting	71.070[a]	0.857	69.380	72.759
By "Teaching_Method"				
Siplaecec	72.428[a]	0.845	70.761	74.096
Traditional	72.442[a]	0.845	70.774	74.109

Note: a. Covariates appearing in the model are evaluated at the following values: Pretest = 58.9400.

Regarding the interaction effect, the interaction item "Need_Climate * Teaching_Method" is statistically significant (sig. = 0.004 < 0.050). The profile plots (see Figures 3 & 4) demonstrate that the lines are not parallel. Explicitly speaking, the cases of "Need_Climate" versus "Teaching_Method" and "Teaching_Method" versus "Need_Climate" show the crossed lines, which visually confirm the disordinal interaction effect, i.e., the condition that the effectiveness of factor A is positive for one level of factor B and negative for another level of factor B.

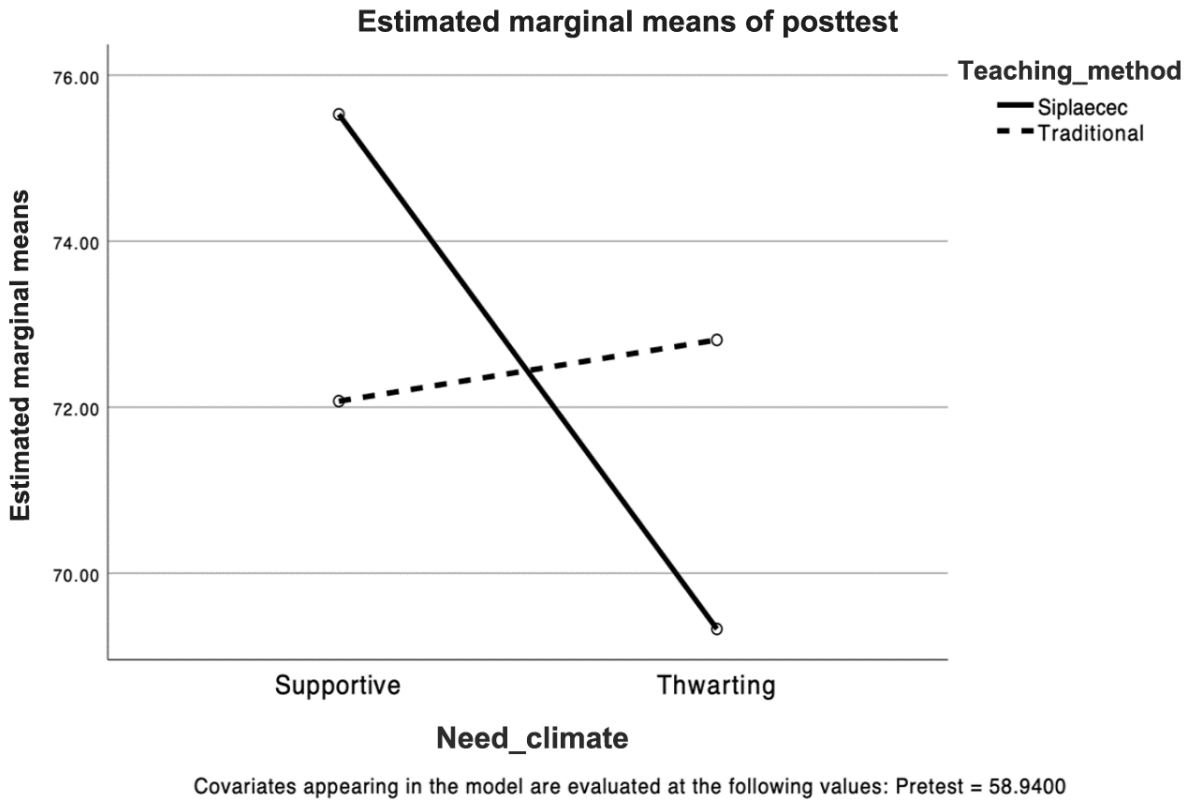

Figure 3. Profile plot representing the effect of "Need_Climate" on "Teaching_Method" in terms of "Posttest" after controlling for "Pretest".

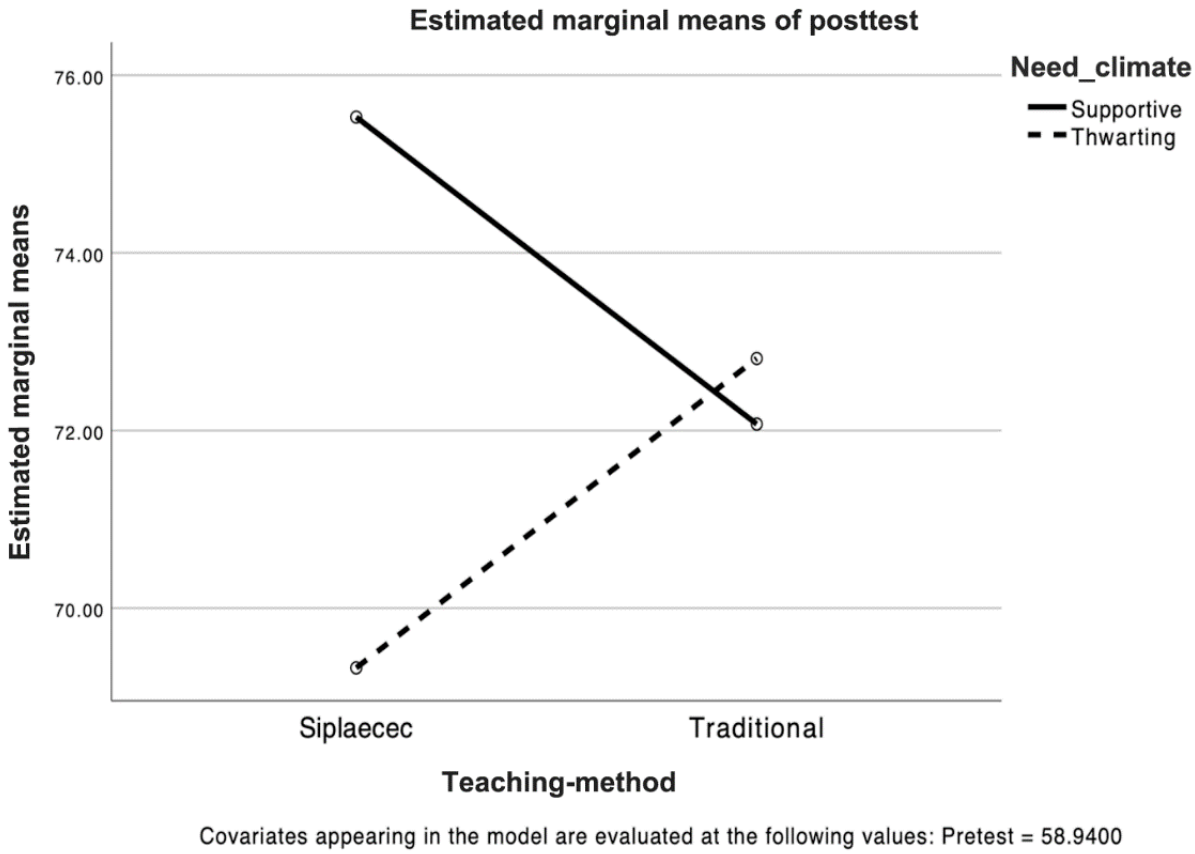

Figure 4. Profile plot representing the effect of "Teaching_Method" on "Need_Climate" in terms of "Posttest" after controlling for "Pretest".

The estimates of "Posttest" by the interacted independent variables (see Table 4) show that participants in group 1 ("Siplaecec" and "supportive") outperform other groups in language learning outcomes (M = 75.528, SE = 1.226). Participants in group 2 ("Traditional" and "supportive") (M = 72.073, SE = 1.193) and group 4 ("Traditional" and "thwarting") (M = 72.811, SE = 1.200) make similar learning achievements. Participants in group 3 ("Siplaecec" and "thwarting") reveal the lowest learning outcomes (M = 69.328, SE = 1.204). These results suggest that the need climate and teaching methods can contribute to synergistic effects on language learning. While the "siplaecec" approach in a need-supportive condition (group 1) contributes to a significant enhancement in language learning, this approach, when utilized in a need-thwarting condition (group 3), adversely affects language learning outcomes, compared with the learning outcomes in the traditional learning groups (groups 2 and 4). These findings support the acceptance of H3, necessitating the implementation of play-featuring pedagogy in need-supportive circumstances.

Table 4. Interactive effects of the independent variables on "Posttest".

Need_Climate	Teaching_Method	Unadjusted		Adjusted by "Pretest"			
		Mean	Standard deviation	Mean	Standard error	95% confidence interval	
						Lower bound	Upper bound
Supportive	Siplaecec	75.30	9.132	75.528[a]	1.226	73.110	77.946
	Traditional	72.06	8.644	72.073[a]	1.193	69.721	74.425
Thwarting	Siplaecec	69.46	7.181	69.328[a]	1.204	66.954	71.703
	Traditional	72.92	8.619	72.811[a]	1.200	70.443	75.178

Note: a. Covariates appearing in the model are evaluated at the following values: Pretest = 58.9400.

5. DISCUSSION

This section discusses the interpretations of the results.

5.1. Main Effect of Need Climate on Language Learning Outcomes

The results support H1 and confirm that the need climate significantly shapes language learning outcomes. Learners in need-supportive conditions achieve higher post-intervention scores than those in need-thwarting conditions, while controlling for pre-intervention language proficiency. This finding is consistent with SDT that emphasizes need-supportive instructions to prompt engagement, motivation, and performance (Ryan & Deci, 2000; Shelton-Strong, 2025). Language learning experiences that allow for choice and minimize controlling demands can foster deeper immersion and sustained persistence for substantial progress (Finch, 2023; Noori et al., 2025).

Theoretically speaking, the finding consolidates the SDT interpretations regarding the distinction between need satisfaction and need frustration. While research has primarily focused on the benefits of satisfying autonomy, competence, and relatedness, this study emphasizes the adverse effects of need-thwarting climates, which operate as a significant source of affective impairment (Ghasemzadegan et al., 2025). When exposed to controlling, dismissive, or pressuring climates, learners may internalize failure, disengage from learning, and reduce their willingness to communicate, which should be a critical component of language learning (Printer, 2024). Such adverse effects of need-thwarting conditions contrast with the psychologically favorable features of need-supportive conditions (Ahmadi et al., 2023).

Besides, corresponding with the observable difference in post-intervention scores between supportive and thwarting conditions, language learners may demonstrate resilience even in the need-thwarting conditions whose detrimental effects may be compensated for by personal resources, peer support, or strategic learning habits

(Burgueño et al., 2024; Vansteenkiste et al., 2020). That interpretation elicits a more nuanced view of SDT: although need-thwarting climates are debilitating (Printer, 2023), their effects may be mitigated by learner agency or prior strategic competence. Based on self-regulated, goal-oriented, and reciprocal designs in accordance with SDT psychological needs, adaptive experiences still enable learners to overcome the psychologically discouraging influences of need-frustrating contexts (Printer, 2024).

Pedagogically speaking, the finding provides empirical evidence of the institutionalization of need-supportive professional development to facilitate language learning, highlighting the synergistic relationship between psychological and performative development. As essential components of need-supportive experiences, open-ended questioning, scaffolded choice, and emotional recognition can foster learners' long-term motivation to use languages with lower anxiety (Shelton-Strong, 2025). Relaxed and explorative immersion in authentic communicative practices guarantees language proficiency development (Printer, 2024). Thus, need-supportive climates that balance affective and performative development are crucial to the effectiveness of language learning pedagogies.

5.2. Main Effect of Teaching Method on Language Learning

The results are contrary to H2 expectations, as shown by a non-significant main effect of teaching method on language learning outcomes. When considered independently of the need climate, both approaches of "siplaecec" and traditional didactic instruction have produced similar post-intervention scores. This finding appears to challenge the assumption that play-oriented pedagogies inherently outperform traditional instruction. However, the absence of a direct effect elicits deeper reflection.

From an SDT perspective, the finding highlights the principle that pedagogy cannot be independent of need climate (Escriva-Boulley et al., 2021). "Siplaece" aims to maximize need satisfaction through scaffolded interactions, cultivate self-regulated engagement, and reinforce orientation for competence development embedded in entertaining learning experiences (Alharbi, 2025; Jeon, 2022; Takshara et al., 2025; Zhang & Crawford, 2024). Notably, when implemented in a non-need-supportive climate, the pillars of scaffolded interactive play (SIP), ludic autonomous engagement (LAE), and competence-embedded context (CEC) may not manifest their potential. Learners' perception of a dismissive, excessively authoritarian, or unsupportive atmosphere leads to their contrived states in scaffolded activities (Burgueño et al., 2024). In contrast, despite showing fewer innovative features, traditional instructions may still deliver acceptable outcomes in climates where learners feel supported, respected, and competent (Hoang Le et al., 2025).

The interrelated relationship between teaching method and need climate is a challenge to method-centric approaches to language pedagogy. Research on language learning primarily focuses on whether communicative, task-based, or game-like methods are more effective than traditional instruction (Bayaga, 2025). However, the current finding suggests that the efficiency of the teaching method per se is extensible to the need climate enacted in the corresponding method. This interpretation aligns with a shift from efficient methods per se to favorable conditions to facilitate learning based on a balance between performative and affective development (Hickey et al., 2025).

Additionally, the non-significant facilitating effect of "siplaecec" per se on language learning outcomes does not signify dismissing the potential of "siplaecec". Although this method may not guarantee enhanced outcomes across all contexts, its interaction with need climate (see H3) still reveals conditions where this method can be transformative. This interpretation implies that the introduction of innovations in pedagogy should not be isolated

but embedded within psychological and cognitive dimensions aimed at cultivating supportive climates (Alfares, 2025; Hsia et al., 2025; Namaziandost et al., 2025).

5.3. Interaction Effect between Need Climate and Teaching Method

The most compelling finding is the test of H3, which reveals a significant disordinal interaction between need climate and teaching method. Learners attending need-supportive climate employing the "siplaecec" approach have achieved the highest learning outcomes, while learners in the need-thwarting condition of "siplaecec" have obtained the lowest learning outcomes. By contrast, traditional instruction has exerted stable effects on learning outcomes regardless of need climate. These findings confirm that the effectiveness of "siplaecec" is contingent on the supportiveness of the need climate.

The thriving outcomes of "siplaecec" under need-supportive conditions are significant in terms of the alignment between the three principles of "siplaecec" and the three SDT needs. SIP fosters relatedness through collaborative playable activities (Lu & Moller, 2024; Zhang & Crawford, 2024). LAE nurtures autonomy based on playful, self-regulated choices (Chen, 2024; Hsia et al., 2025). CEC guarantees competence development by embedding challenges within meaningful contexts (Derakhshan, 2025; Namaziandost et al., 2025). Supportive stances in an encouraging, validating, and respectful atmosphere contribute to the full realization of these principles, yielding synergistic effects that propel learning (Bayaga, 2025). This interpretation offers strong validation for the theoretical alignment between "siplaecec" and SDT, reflecting the consistency between play-for-competence pedagogies and affective cultivation for efficient language learning.

A more striking result is that "siplaecec" has produced worse learning outcomes than traditional instruction in need-thwarting climates. This counterproductive effect of "siplaecec" suggests that innovative pedagogy is not inherently protective but likely to exert adverse effects if learners experience it as coercive, confusing, or disconnected from their needs (Ahmadi et al., 2023; Titova & Sheldon, 2022). For instance, playable tasks that are rigidly controlled may intensify autonomy frustration (Ghasemzadegan et al., 2025; Printer, 2023) and interactive activities in unfriendly climates may amplify relatedness frustration (Ahmadi et al., 2023; Burgueño et al., 2024). In these cases, the strengths of "siplaecec" become vulnerable to need-thwarting conditions. This paradoxical finding implies that need-thwarting climates may neutralize or buffer the benefits of play-related pedagogy. Efficient pedagogical innovations require concurrent attention to need climates to avoid debilitating effects on learning (Dipendra et al., 2025; Escriva-Boulley et al., 2021; Shelton-Strong, 2025). This interpretation highlights the primacy of operating pedagogies in terms of psychological climates over pedagogical forms themselves.

Another notable finding is the stable outcomes of traditional instruction regardless of the need climate. Despite their middle-position performance, learners in groups employing the traditional didactic methods (group 2 and group 4) appear less sensitive to climate variations. This finding suggests that learners may approach such instruction with clear expectations and strategies that mitigate the potential debilitating environmental influences (Vansteenkiste et al., 2020). From an SDT perspective, traditional didactic methods evoke lower variance in need satisfaction or frustration, contributing to motivational neutrality (Dipendra et al., 2025). This resilient feature of traditional instruction in language learning can explain the persistent implementation of traditional didactic pedagogy because of its less risky features, even in unsupportive climates. Practically speaking, since pedagogical innovations without supportive climates may be counterproductive, traditional didactic methods may manifest as a stable interim approach.

Overall, this study accepts H1 and H3 while rejecting H2, eliciting expected and striking insights. The findings affirm the centrality of need-supportive climates, reveal the counterproductive influences of adopting innovative pedagogies independent of need climate, and emphasize the nuanced dynamics of need-thwarting conditions in

language learning. At the level of SDT, the findings demonstrate that pedagogical methods cannot be disentangled from need climates. At the level of pedagogical practices, the findings pave the way for context-sensitive, affectively grounded language learning, highlighting the synergistic relationship between play-related pedagogies and the satisfaction of needs.

6. CONCLUSION

This section summarizes major findings, implications, and limitations associated with insights.

6.1. Major Findings

This study examines how the need climate (need-supportive versus need-thwarting) and the teaching method ("siplaecec" versus traditional didactic instruction) interact to shape language learning outcomes. The separate effects of these factors on language learning are the premise for investigating interactive effects, which elicit H1 and H2. The assumed interactive effects aim to present a synergistic relationship between these factors that facilitates language learning, thereby supporting H3.

The results strongly support H1, suggesting that the need climate per se exerts a significant main effect on language learners' outcomes. Learners in need-supportive conditions consistently achieve higher post-intervention scores compared with those in need-thwarting conditions. This finding reinforces SDT that emphasizes the satisfaction of basic psychological needs for autonomy, competence, and relatedness to foster sustainable engagement and long-term learning progress. In contrast, the frustration of these needs weakens learning achievement, although learner resilience and adaptive strategies may buffer against that debilitating effect.

The results do not support H2, suggesting that the teaching method per se does not exert a significant main effect on language learners' outcomes. Learners experiencing "siplaecec" do not outperform those receiving the traditional didactic instruction. That finding seemingly challenges the assumption that innovative pedagogical methods inherently guarantee superior learning outcomes. Instead, this finding demonstrates that the efficiency of language learning pedagogy cannot be isolated from the climate in which teachers enact the pedagogy. Despite its aim to promote the meaningful transfer of behavioral performance between virtual settings and real-life contexts, "siplaecec" may not reach its full potential unless embedded in supportive circumstances.

The results strongly support H3, confirming a significant disordinal interaction between need climate and teaching method. Learners in the condition of "siplaecec" plus need satisfaction achieve the highest scores, while those in the condition of "siplaecec" plus need frustration achieve the lowest scores. By contrast, traditional methods yield stably moderate learning outcomes regardless of the need climate. This finding reveals that pedagogical efficiency is more sensitive to the need climate for innovative pedagogies than traditional didactic instruction. Although need-supportive conditions prompt learning far beyond traditional methods, need-thwarting conditions still risk impairing learning more severely.

Overall, these findings indicate a) the primacy of a synergistic integration of need climate and teaching method over an emphasis on method alone, b) the possibility of adverse effects of innovative language learning pedagogy in unsupportive conditions, and c) the resiliency of traditional teaching methods to need climate. These points elicit the following theoretical and practical implications.

6.2. Theoretical and Practical Implications

From the theoretical perspective, this study reflects potential contributions to SDT-related research and applied linguistics pedagogy. First, this study highlights the conditional nature of need-supportive environments.

The benefits of need-supportive climates, according to SDT, are extendable into the interaction with pedagogy. The facilitating potential of "siplaecec" is contingent upon supportive climates, as its pedagogical design resonates with the satisfaction of autonomy, competence, and relatedness. This statement provides a concrete pedagogical illustration of the SDT, emphasizing the role of psychological satisfaction in shaping the internalization of practices. Second, this study reflects the constructive and destructive roles of need frustration. Although generally debilitating, need frustration in specific contexts may prompt adaptive responses, e.g., persistence, coping, and reliance on extrinsic regulation. The seemingly paradoxical facilitating effects of need frustration can expand the SDT perspective by explaining approaches to utilizing need frustration for goal attainment. Third, this study challenges the method-centric paradigm in applied linguistics. The current findings necessitate a shift in focus from methods per se to the conditions under which the methods are implemented. This shift aligns with emerging perspectives in education-related research that emphasize contextual contingency over the isolated, universal effectiveness of pedagogies.

The practical implications involve the standpoints of educators, teachers, learners, and institutions. For educators, "siplaecec" with the satisfaction of SDT needs offers a blueprint for innovative language curricula that are both motivating and educationally effective. Notably, the evaluation of that integrated language learning pedagogy is not only dependent on outcomes but also on its consistency with motivational states. For teachers, creating climates of trust, autonomy, and self-actualization requires training and a gradual introduction to activate their pedagogical potential. Traditional didactic instructions can operate as transitional strategies when need-supportive conditions are challenging to achieve. For learners, regular self-monitoring of need satisfaction and frustration is necessary for fostering self-oriented development paths based on learning strategies and contributing to long-term learning achievements. For schools and universities, since pedagogical innovation is not risk-free, implementing pedagogical innovations regarding the integration of play-based approaches and supportive circumstances should be phased and scaffolded, along with regular motivational surveys or diagnostic tools for anticipation and modification.

6.3. Limitations and Insights for Future Research

Despite striking findings, this study still reveals several limitations that can provide references for future research. First, this study mainly relies on carefully constructed empirical contexts, suggesting that the data is extensible to capture the complexity of real classroom dynamics. Learning experiences in pedagogy and climate are multifaceted, encompassing personality, cultural norms, and in-class interactivity. Second, this study focuses on a relatively homogeneous sample, reflecting that the research sample is extensible to achieve further generalizability of the results. The climate-method interaction may vary across diverse educational systems.

Corresponding with these limitations, future research can incorporate longitudinal and mixed-method designs to combine experimental rigor and qualitative analyses of learning experiences. Besides, future research can adopt theoretical pluralism, e.g., by integrating SDT with complementary perspectives to enrich the analyses. Additionally, future research can involve cross-cultural replication to test whether and how the interaction effect between need climate and teaching method is stable across different cultural contexts of language learning. Future research can also examine the boundary conditions of need frustration, e.g., when it debilitates learning, and when it stimulates short-term or long-term persistence, to regard need-thwarting conditions as both potential barriers and motivators of learning progress.

REFERENCES

Abu-Bader, S. H. (2021). *Using statistical methods in social science research: With a complete SPSS guide* (3rd ed.). New York: Oxford University Press.

Ahmadi, A., Noetel, M., Parker, P., Ryan, R. M., Ntoumanis, N., Reeve, J., . . . Ahmadi, M. (2023). A classification system for teachers' motivational behaviors recommended in self-determination theory interventions. *Journal of Educational Psychology, 115*(8), 1158–1176. https://doi.org/10.1037/edu0000783

Alfares, N. (2025). Effectiveness of a scaffolded autonomous learning scheme in enhancing learners' motivation in EFL classes. *Learning and Motivation, 89*, 102084. https://doi.org/10.1016/j.lmot.2024.102084

Alharbi, A. S. (2025). Hidden dialogues: The power of informal peer feedback in EFL online reflective blogging. *Education and Information Technologies*. https://doi.org/10.1007/s10639-025-13593-7

Bayaga, A. (2025). Leveraging AI-enhanced and emerging technologies for pedagogical innovations in higher education. *Education and Information Technologies, 30*(1), 1045-1072. https://doi.org/10.1007/s10639-024-13122-y

Burgueño, R., García-González, L., Abós, Á., & Sevil-Serrano, J. (2024). Students' motivational experiences across profiles of perceived need-supportive and need-thwarting teaching behaviors in physical education. *Physical Education and Sport Pedagogy, 29*(1), 82-96. https://doi.org/10.1080/17408989.2022.2028757

Chen, M. R. A. (2024). The AI chatbot interaction for semantic learning: A collaborative note-taking approach with EFL students. *Language Learning & Technology, 28*(1), 1–25. https://doi.org/10.64152/10125/73586

Derakhshan, A. (2025). EFL students' perceptions about the role of generative artificial intelligence (GAI)-mediated instruction in their emotional engagement and goal orientation: A motivational climate theory (MCT) perspective in focus. *Learning and Motivation, 90*, 102114. https://doi.org/10.1016/j.lmot.2025.102114

Dipendra, K., Kc, P., Rado, I., & Vichit-Vadakan, N. (2025). Digital inequality and learning outcomes: Evidence from Thailand. *Education and Information Technologies*. https://doi.org/10.1007/s10639-025-13570-0

Escriva-Boulley, G., Haerens, L., Tessier, D., & Sarrazin, P. (2021). Antecedents of primary school teachers' need-supportive and need-thwarting styles in physical education. *European Physical Education Review, 27*(4), 961-980. https://doi.org/10.1177/1356336X211004627

Finch, H. (2023). Dialogic co-creation in English language teaching and learning: A personal experience. *Language Learning in Higher Education, 13*(1), 341-348. https://doi.org/10.1515/cercles-2023-2010

Garson, G. D. (2013). *Univariate GLM, ANOVA, and ANCOVA*. Asheboro, NC: Statistical Associates Publishers.

Ghasemzadegan, Roshanak, S., Xodabande, I., Koleini, N., & Lotfi Gaskaree, B. (2025). Exploring the role of autonomy support and thwarting in the well-being of Iranian early career language teachers. *Discover Psychology, 5*(1), 36. https://doi.org/10.1007/s44202-025-00368-x

Hickey, A., Curthoys, W., Wright, T., & Riddle, S. (2025). Whole-school relational pedagogy: Establishing the climate for effective student engagement. *Teachers and Teaching*, 1-17. https://doi.org/10.1080/13540602.2025.2500037

Hoang Le, G. N., Nguyen, T. T., & Pham, T. X. (2025). A collaborative autoethnography on Vietnamese English language educators' professional development and learning in language teacher associations. *Innovation in Language Learning and Teaching*, 1-19. https://doi.org/10.1080/17501229.2025.2508807

Hsia, L.-H., Lin, Y.-N., Lin, C.-H., & Hwang, G.-J. (2025). Effectiveness of gamified intelligent tutoring in physical education through the lens of self-determination theory. *Computers & Education, 227*, 105212. https://doi.org/10.1016/j.compedu.2024.105212

Jeon, J. (2022). Exploring a self-directed interactive app for informal EFL learning: A self-determination theory perspective. *Education and Information Technologies, 27*(4), 5767-5787. https://doi.org/10.1007/s10639-021-10839-y

Lu, A. S., & Moller, A. C. (2024). Elaborating the role of narrative and self-Determination theory in video game design research. *Interacting with Computers*, 1-15. https://doi.org/10.1093/iwc/iwae058

Namaziandost, E., Çakmak, F., & Ashkani, P. (2025). How do you feel? Unmasking ambiguity tolerance, learning adaptability, self-management, and learning outcomes in gamification vs. ludicization in foreign language learning. *Computers in Human Behavior Reports*, *18*, 100651. https://doi.org/10.1016/j.chbr.2025.100651

Noori, A. Q., Samadi, K., Orfan, S. N., & Li, M. (2025). Social and economic factors affecting students' motivation towards learning English: A case study. *Cogent Social Sciences*, *11*(1), 2491703. https://doi.org/10.1080/23311886.2025.2491703

Printer, L. (2023). Positive emotions and intrinsic motivation: A self-determination theory perspective on using co-created stories in the language acquisition classroom. *Language Teaching Research*. https://doi.org/10.1177/13621688231204443

Printer, L. (2024). Towards a motivating language acquisition curriculum. *The Curriculum Journal*, *35*(4), 727-731. https://doi.org/10.1002/curj.287

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68-78. https://doi.org/10.1037/0003-066X.55.1.68

Shelton-Strong, S. J. (2025). Promoting learner flourishing and well-being beyond the classroom: The role of advising in language learning from a self-determination theory perspective. *Learning and Motivation*, *90*, 102127. https://doi.org/10.1016/j.lmot.2025.102127

Takshara, K. S., Bhuvaneswari, G., & Kumar, T. S. P. (2025). The game of language learning and rewiring biocognitive receptors. *MethodsX*, *14*, 103143. https://doi.org/10.1016/j.mex.2024.103143

Titova, L., & Sheldon, K. M. (2022). Thwarted beneficence: Not getting to help lowers mood. *The Journal of Positive Psychology*, *17*(1), 21-33. https://doi.org/10.1080/17439760.2020.1858339

Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic psychological need theory: Advancements, critical themes, and future directions. *Motivation and Emotion*, *44*(1), 1-31. https://doi.org/10.1007/s11031-019-09818-1

Zhang, Z., & Crawford, J. (2024). EFL learners' motivation in a gamified formative assessment: The case of Quizizz. *Education and Information Technologies*, *29*(5), 6217-6239. https://doi.org/10.1007/s10639-023-12034-7