Development and Evaluation of a Cooperative Learning Model for Enhancing Emotional Intelligence in First-year Chinese College English Learners

[1]Zhou Siyan, [2]Pasana Chularu, and [3]Thammachot Aeamtussana

Faculty of Education, Srinakharinwirot University, Thailand

E-mail: [1]524020260@qq.com, [2]pasana@g.swu.ac.th, [3]thammachota@g.swu.ac.th

Abstract

This article aimed to study (1) the definition, characteristics, and current levels of Emotional Intelligence (EI) among Chinese undergraduate students, including demographic differences; (2) the development of a Cooperative Learning (CL) model specifically designed to enhance college students' emotional intelligence within English language learning contexts; and (3) the evaluation of the effectiveness of this developed CL model in improving undergraduate students' emotional intelligence. The research was conducted in three phases. In the first phase, a stratified random sample of 578 first-year university students from a total population of 5,110 in Chengdu was surveyed to assess their EI. In the second phase, 50 students with low-to-moderate EI scores were randomly assigned to either an experimental group (n=25) or a control group (n=25) for the intervention. In the third phase, data were collected using a validated self-report Emotional Intelligence Scale for English Learning (Chinese Version), along with semi-structured interviews and classroom observations. Data were analyzed using descriptive statistics, inferential statistics (independent samples t-tests, one-way ANOVA), and repeated measures ANOVA. The key findings were as follows:

1. Current college students' EI showed significant room for improvement and notable differences across genders and academic majors. Females scored higher than males, and management majors outperformed optoelectronic engineering majors across most EI dimensions.

2. A comprehensive CL intervention model was successfully developed. It integrated core CL principles—such as positive interdependence, face-to-face interaction, and individual accountability—with specific EI cultivation objectives within English language tasks.

3. The implemented CL model demonstrated significant effectiveness in enhancing college students' EI. The experimental group showed statistically significant improvements (p<.05) in intrapersonal skills, interpersonal skills, stress management, and adaptability from pre-test to post-test, and these gains were sustained during follow-up.

In contrast, the control group's EI levels remained stable. Qualitative feedback from interviews and observations corroborated these findings, highlighting enhanced learning engagement, communication, and emotional management.

Keywords: Emotional intelligence; Cooperative learning; English language teaching; Higher education; Quasi-experimental study

Introduction

In the contemporary educational landscape, Emotional Intelligence (EI) has garnered increasing recognition as a crucial determinant of success, extending beyond traditional academic achievement to encompass personal well-being and professional competence (Goleman, 1995; Mayer & Salovey, 1997). High EI correlates with improved communication, effective stress management, adept problem-solving, and robust interpersonal relationships. This is particularly relevant in China, where recent studies continue to emphasize the vital role of EI in higher education. For example, research by Ning et al. (2024) highlights the positive impact of EI on college students' academic performance and mental health in the Chinese context. Similarly, a study by Wang and Chen (2023) found a strong link between EI and reduced academic anxiety among Chinese undergraduates.

For first-year college students, particularly those engaging with English as a second language, nascent EI levels can manifest as heightened anxiety during language tasks, frustration with challenging assignments, and diminished motivation, thereby impeding academic performance and social integration (Petrides & Furnham, 2001). This challenge is particularly pronounced for students in their transitional year, where the combined pressure of a new academic environment and a demanding subject like English can exacerbate emotional difficulties. Studies such as that by Jin et al. (2024) specifically examine how low EI can negatively impact foreign language

acquisition among Chinese university students, underscoring the urgent need for targeted interventions.

Despite the well-documented importance of EI in education, a significant gap persists in understanding how specific pedagogical strategies, such as cooperative learning (CL), can systematically enhance emotional intelligence within a curricular framework. Existing research has primarily focused on direct EI interventions (e.g., Nelis et al., 2009; Schutte et al., 1998) rather than integrated pedagogical approaches that naturally embed EI development. This is a critical oversight, as CL's foundational principles—including positive interdependence, face-to-face interaction, and the development of social skills—create an ideal and authentic environment for practicing and developing EI. These core components of CL directly align with the key domains of emotional intelligence, such as empathy, communication, and emotional regulation, by requiring students to navigate group dynamics, resolve conflicts, and offer mutual support. Thus, CL is not merely a teaching method but a powerful social-emotional learning framework that can naturally and organically foster both cognitive and affective growth. This study addresses the aforementioned void by exploring the development and effectiveness of a cooperative learning model tailored for English language education, aiming to foster both cognitive and affective growth.

The context of Chinese college English learning presents a unique set of challenges and opportunities for EI development. As students transition into tertiary education, they face new academic pressures, social adjustments, and the demanding task of mastering a foreign language. Research indicates that higher EI equips students better to navigate these transitions, fostering effective communication, collaboration, and resilience—skills paramount in interactive language learning environments (Brackett & Mayer, 2003). This is particularly relevant for first-year students at institutions like the Chengdu University of Information Technology, who are in a critical developmental phase. A recent study by Liu and Wang (2023) highlights that first-year Chinese university students often struggle with heightened levels of foreign language anxiety and academic burnout, which are closely linked to their emotional management skills. Therefore, targeting this specific cohort is crucial for establishing foundational EI skills that will support them throughout their academic careers. Cooperative Learning, characterized by structured group activities, shared goals, and individual accountability (Johnson & Johnson, 1999), inherently aligns with the cultivation of these emotional and social competencies.

The researchers' extensive experience in higher education and pedagogical innovation informed the design of an intervention that targets the specific emotional needs of this student demographic, recognizing the potential for CL to serve as a powerful vehicle for holistic development. The target audience for this research is educators, curriculum developers, and policymakers in higher education, particularly those involved in foreign language instruction.

This research paper presents the development and evaluation of a Cooperative Learning Model designed to promote emotional intelligence in the context of college English learning. It systematically details the theoretical underpinnings, methodological approach, and empirical findings related to the model's impact.

The ultimate benefit of this work is to provide empirically validated, practical insights for fostering emotionally intelligent learners who can thrive academically and interpersonally, thereby contributing to the improvement of higher education quality.

Research Objectives

1. To study the characteristics of emotional intelligence of undergraduate students.

2. To develop the Cooperative Learning model for enhancing emotional intelligence of undergraduate students.

3. To evaluate the effectiveness of the Cooperative Learning model for enhancing emotional intelligence of undergraduate students.

Literature Review

The intersection of Emotional Intelligence (EI) and Cooperative Learning (CL) forms the theoretical bedrock of this study, aiming to bridge existing knowledge gaps in integrated pedagogical approaches. This review synthesizes extant literature on EI definitions, theories, components, characteristics, measurement, and promotion strategies, alongside the definitions, elements, characteristics, methods, advantages, limitations, and related research concerning CL.

Emotional intelligence, initially conceptualized by Salovey and Mayer (1990) as the ability to perceive, understand, manage, and use emotions, was later expanded by Goleman (1995, 2001) and Bar-On (1997, 2006) to include broad competencies like self-awareness, self-regulation, motivation, empathy, social skills, stress management, adaptability, and general mood. Bar-On's five-dimensional model (intrapersonal skills, interpersonal skills, stress management, adaptability, and general mood) provides the foundational framework for this study's definition and

measurement of EI. Theoretical underpinnings for EI development are found in Fredrickson's (2004) Broaden-and-Build Theory, which posits that positive emotions expand cognitive and behavioral repertoires, fostering resilience and long-term adaptive advantages. This theory suggests that creating positive emotional states in learning environments can promote EI. Additionally, Pekrun's (2000) Control-Value Theory highlights the influence of subjective control and value evaluation on academic emotions, suggesting that perceptions of control and value in learning tasks impact emotional responses, making it relevant for understanding how CL might influence student emotions. While studies consistently link higher EI to improved academic performance (e.g., Schutte et al., 1998; Pishghadam, 2009; Ebrahimi et al., 2018), some research shows minimal or inverse associations (Brackett & Mayer, 2003), indicating the complexity of this relationship. Strategies to promote EI, such as reflective journaling, mindfulness, and role-playing, are often integrated into educational settings, yet direct integration within comprehensive pedagogical models like CL remains underexplored. Measurement of EI typically involves performance-based (e.g., MSCEIT) and self-report measures (e.g., EQ-i, TEIQue), each with distinct advantages and limitations regarding objectivity and ease of administration. This study utilizes a validated self-report scale adapted from Bar-On's framework, focusing on the subjective experience of EI. While the importance of emotional intelligence (EI) is well-established, existing literature has three main limitations.

First, research on integrating EI development within pedagogical frameworks like cooperative learning (CL) is scarce.

Second, findings on the link between EI and academic performance are inconsistent, requiring more nuanced investigation.

Finally, studies often overlook how students subjectively experience their own emotional growth in response to interventions. This study addresses these gaps by developing and evaluating a tailored CL model to systematically foster EI.

Cooperative Learning, defined by Johnson and Johnson (1999) as "the instructional use of small groups so that students work together to maximize their own and each other's learning," stands in contrast to traditional, individualistic, or competitive learning paradigms. Key elements distinguishing CL include positive interdependence, face-to-face promotive interaction, individual accountability, social skills, and group processing (Johnson & Johnson, 1999; Kagan, 1994). These elements are crucial for successful CL implementation, fostering mutual support, effective communication, and shared responsibility. Various CL methods like Jigsaw (Aronson et al., 1978),

STAD, TGT, Group Investigation (Sharan & Sharan, 1992), and Learning Together (Johnson & Johnson) provide structured frameworks for collaborative tasks. The advantages of CL are manifold, encompassing improved academic performance, enhanced social and emotional skills (e.g., communication, empathy, conflict resolution), increased student motivation, and fostering inclusivity (Johnson & Johnson, 2019; Gillies, 2016). However, challenges such as unequal participation ("social loafing"), group conflicts, high teacher preparation demands, and difficulties in individual assessment persist (Slavin, 2014). Research on CL in English language teaching (ELT) has shown mixed results, with some studies demonstrating positive effects on academic English acquisition (Jacob et al., 1996) and learner perceptions (Ghaith, 2001), while others found no significant advantages over individualistic instruction. In China, CL research has evolved from theoretical introductions to empirical studies integrating CL into college English reading, speaking, and writing. Despite this substantial body of empirical evidence supporting Cooperative Learning's benefits across various educational domains, its potential as a structured pedagogical framework for systematically developing Emotional Intelligence (EI) has not yet been comprehensively investigated.

Despite extensive research in both EI and CL, a knowledge gap exists in the systematic development and empirical evaluation of a CL model specifically designed to foster EI in college English learning contexts. Most studies either address EI or CL in isolation, or focus on direct EI training without integrating it into a comprehensive pedagogical framework. This research aims to fill this gap by proposing and validating a novel CL model that organically embeds EI development within the English curriculum, ensuring a naturalistic and sustained enhancement of students' emotional competencies. The synthesis of Broaden-and-Build Theory and Control-Value Theory, along with Bar-On's EI model and Johnson and Johnson's CL elements, informs the conceptual framework, guiding the design of activities that promote positive emotions, enhance perceived control, and facilitate the development of key EI skills through collaborative English learning tasks.

While previous research has primarily addressed EI and CL in isolation, this study reframes the problem by using CL as an integrated and sustainable solution for fostering emotional intelligence. Our research moves beyond direct EI training by leveraging CL's social dynamics—such as positive interdependence and face-to-face interaction—as a natural environment for emotional development. By synthesizing key theories, this study provides a comprehensive conceptual framework that was previously absent. It serves as a novel investigation into how

collaborative learning can become a potent vehicle for fostering EI, directly addressing the limitations of existing isolated approaches.

Conceptual Framework

This research is a quasi-experimental study designed to investigate the effectiveness of a Cooperative Learning (CL) model in promoting emotional intelligence (EI) among undergraduate students. The researcher defines the research conceptual framework based on a synthesis of Bar-On's (1997) five-dimensional model of emotional intelligence, Johnson and Johnson's (1999) five basic elements of cooperative learning, Fredrickson's (2004) Broaden-and-Build Theory, and Pekrun's (2000) Control-Value Theory.

The conceptual framework posits that the Independent Variable (IV) is the Cooperative Learning model. This model is operationalized through a structured sequence of instructional processes, drawing on established CL techniques.

IV		DV
Constructivism Theory	**+**	**Cooperative Learning Model** 1. Lead-in 2. Guided Exploration and Explanation. 3. Activity Applying 4. Comprehensive Evaluation and Evaluation and Conclusion	→	**Emotional Intelligence:** Intrapersonal Skills Interpersonal Skills Stress Management Adaptability General Mood

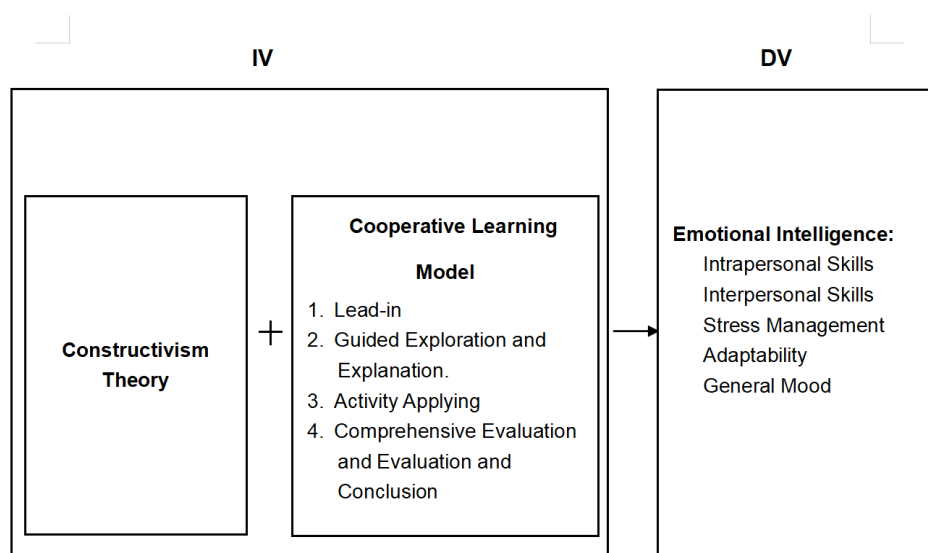**Figure 1** Conceptual framework

Research Methodology

The present study primarily adopts a quantitative research method, supplemented by certain qualitative research tools, to comprehensively investigate and evaluate the Cooperative Learning (CL) model's impact on undergraduate students' emotional intelligence (EI). The research was structured into three distinct phases to address the stated objectives.

Phase 1: Studying the characteristics of emotional intelligence of undergraduate students. This phase utilized both qualitative and quantitative research.

Qualitative Research: In-depth semi-structured interviews were conducted with five experienced professionals (doctoral and master's degree teachers with 10+ years of experience, and municipal excellent design teachers/teaching experts) in higher education from Sichuan Province, China. The interview questions focused on teachers' perceptions of college students' EI, the effectiveness of traditional teaching in promoting EI, and the potential of CL. The interview protocol was developed based on an extensive literature review and was then reviewed and validated by a panel of subject-matter experts to ensure its reliability and validity before being submitted to the dissertation advisory committee for final approval.

Quantitative Research: A large-scale survey was conducted using an Emotional Intelligence Scale for English Learning—Chinese Version, adapted from Schutte et al. (1998). This 33-item (later specified as 40 items in results) self-report Likert-scale (1–5) questionnaire measured trait EI across Bar-On's five dimensions. Population: 5110 the first-year students in Chengdu University of Information Technology. Sample (for Phase 1 survey): 621 first-year university students from Chengdu University of Information Technology (later 578 valid questionnaires were obtained for analysis). This method involves dividing the population (first-year students) into smaller subgroups, or strata, based on shared characteristics (such as academic major or gender), and then randomly selecting a proportionate number of students from each stratum. This ensures the sample of 578 students accurately reflects the diversity of the larger student population.

Data Collection: Questionnaires were administered online, with participants recruited via university channels. Semi-structured interviews were conducted in-person or via video conferencing with informed consent.

Data Analysis: Quantitative data were analyzed using descriptive statistics (means, standard deviations) and inferential statistics. Reliability analysis (EFA and Cronbach's Alpha) and Exploratory Factor Analysis (KMO and Bartlett's sphericity tests, Principal Component Analysis with Varimax rotation) were performed to validate the questionnaire. Independent sample t-tests were used to examine gender differences, and one-way ANOVA with post-hoc tests to explore differences across majors. Qualitative interview data were transcribed and analyzed using thematic analysis.

Phase 2: Developing a Cooperative Learning model for promoting undergraduate students' emotional intelligence. This phase focused on the systematic design of the intervention model.

Process of Development: 1. Literature Review and Conceptual Framework Development: Extensive review of CL strategies and their adaptation for EI, leading to a conceptual framework (as described above). 2. Design of Cooperative Learning Activities: Creation of specific CL activities targeting EI components, including situational dialogues, role-playing, group discussions, problem-solving, case analysis, collaborative writing, and presentations, all within English learning contexts. 3. Pilot Testing and Refinement: Pilot testing with a small student group, gathering feedback from students and instructors to refine activities for effectiveness and feasibility. 4. Development of Instructional Materials and Training: Creation of guidelines, handouts, rubrics, and training sessions for instructors. 5. Finalization and Preparation for Implementation: Comprehensive review and finalization of the model, with a detailed implementation plan. 6. Data Analysis: The content reasonableness of the developed model was assessed by experts using the Index of Item Objective Congruence (IOC), calculating Content Validity to ensure the model aligned with objectives.

Phase 3: Evaluating the effectiveness of the Cooperative Learning model for promoting emotional intelligence of undergraduate students. This phase employed a quasi-experimental design to assess the model's impact.

Research Design: A Control Group Pre-test, Post-test Design was utilized. Group: E (Experiment Group) and C (Control Group). Assignment: R (Random Assignment). Tests: T1 (Pre-test), T2 (Post-test), T3 (Follow-up). Treatment: X (Strategically designed using a Cooperative Learning model designed to enhance emotional intelligence).

Table 1 Randomized Control-Group Pre-test--post-test Design

Group	Pre-test	Treatment	Post-test	Follow up
E R	T1	X	T2	T3
C R	T1	T1	T2	T3

Population and Sample: From an initial population of 5110 first-year undergraduate students at Chengdu University of Information Technology, 50 students with the *lowest* pre-test EI scores (from the Phase 1 survey) were selected. These 50 students were then randomly divided into an experimental group (n=25) and a control group (n=25) to ensure comparability at baseline. The intervention lasted 6 weeks (2 or 3 times a week).

Experiment Implementation: 1. Pre-test: Standardized EI questionnaire administered to both groups to establish baseline EI levels. 2.Treatment: Experimental group engaged in CL activities for 6 weeks. Control group received traditional instruction. 3. Post-test: Same EI questionnaire administered to both groups after treatment. 4. Follow-up: EI assessment conducted several weeks after post-test to evaluate long-term effects. 5. Data Analysis: Repeated Measures ANOVA was the primary statistical method, analyzing Time main effects, Group main effects, and Time × Group interactions. Pairwise comparisons (LSD post hoc tests) were used for detailed trend analysis. Qualitative feedback from experimental group students (interviews, open-ended questions, classroom observations) was collected and analyzed thematically to triangulate quantitative findings.

Research Results

Objective 1. Analysis and Research on the emotional intelligence of college students. This phase revealed the definition, constituent elements, general characteristics of the sample, and the current level of emotional intelligence among college students.

Definition and Constituent Elements: Drawing on Bar-On's theory, EI was defined as a set of emotional and social competencies encompassing five main components: Intrapersonal Skills (self-awareness, self-confidence, independence, self-actualization, optimism); Interpersonal Skills (compassion, social responsibility, interpersonal relationships); Stress Management (stress tolerance, impulse control); Adaptability (reality testing, flexibility, problem-solving); and General Mood (optimism, well-being).

General Information of the Sample: Out of 578 initially surveyed students, 50 with the lowest EI scores were selected and randomly assigned (25 experimental, 25 control) for the intervention, ensuring baseline comparability.

Current Level of Emotional Intelligence: Reliability and Validity (Table 2-5): The Emotional Intelligence Scale demonstrated high reliability and validity. Cronbach's Alpha coefficients for all dimensions were above 0.880 (e.g., Intrapersonal Skills: 0.942; Interpersonal Skills: 0.948; Stress Management: 0.880; Adaptability: 0.915; General Mood: 0.909), and the overall questionnaire yielded 0.952, indicating excellent internal consistency. CITC values (0.6–0.9) further confirmed strong item-to-latent-variable correlation. KMO test (0.895) and Bartlett's sphericity test (p<0.001) supported suitability for factor analysis. Exploratory factor analysis yielded five factors with eigenvalues >1, accounting for 67.167% of total variance, confirming the scale's structural

validity. Gender Differences (Table 6): Independent sample t–tests revealed significant differences (P<0.05) in Intrapersonal Skills (P=0.003), Interpersonal Skills (P=0.023), Stress Management (P=0.008), Adaptability (P=0.024), and overall Emotional Intelligence (P=0.001), with female students consistently scoring significantly higher than male students in these dimensions. No significant difference was found for General Mood (P=0.055). Major Differences (Table 7): One–way ANOVA demonstrated significant differences (P<0.001) across all five EI dimensions and overall emotional intelligence among students from different majors. Students from the School of Management showed the highest average EI across all dimensions (e.g., Intrapersonal Skills: 4.253, Overall EI: 4.011), while those from the School of Optoelectronic Engineering exhibited significantly lower levels (e.g., Intrapersonal Skills: 3.689, Overall EI: 3.503). This suggests disciplinary background influences EI development, with management–related fields fostering higher EI.

Table 2 The test of differences among different majors in Scale CITC and reliability analysis

Variables	Measurement items	Revised item with total correlation (CITC)	Cronbach Alpha after removing the item	Cronbach Alpha
Intrapersonal Skills	Q6	0.789	0.935	0.942
	Q9	0.682	0.939	
	Q12	0.719	0.938	
	Q13	0.698	0.938	
	Q16	0.743	0.937	
	Q18	0.761	0.936	
	Q19	0.729	0.937	
	Q22	0.723	0.937	
	Q26	0.691	0.938	
	Q34	0.756	0.936	
	Q37	0.730	0.937	
	Q41	0.787	0.935	
Interpersonal Skills	Q4	0.725	0.945	0.948
	Q7	0.766	0.944	
	Q14	0.704	0.945	
	Q21	0.771	0.943	
	Q27	0.832	0.942	
	Q28	0.714	0.945	
	Q29	0.755	0.944	
	Q32	0.690	0.946	
	Q33	0.768	0.943	
	Q35	0.755	0.944	

Variables	Measurement items	Revised item with total correlation (CITC)	Cronbach Alpha after removing the item	Cronbach Alpha
	Q40	0.709	0.945	
	Q42	0.720	0.945	
	Q43	0.770	0.943	
Stress Management	Q24	0.778	0.838	
	Q31	0.685	0.860	
	Q36	0.676	0.863	0.880
	Q38	0.688	0.860	
	Q39	0.744	0.846	
Adaptability	Q5	0.837	0.885	
	Q8	0.740	0.905	
	Q23	0.751	0.903	0.915
	Q25	0.798	0.893	
	Q30	0.792	0.895	
General Mood	Q10	0.769	0.889	
	Q11	0.712	0.900	
	Q15	0.777	0.887	0.909
	Q17	0.780	0.887	
	Q20	0.818	0.880	
Overall Questionnaire				0.952

Table 3 KMO and Bartlett tests

		Value
KMO		0.895
Bartlett sphericity test	Approximate Chi–square	3230.786
	Degrees of freedom	780
	Salience	<0.001

Table 4 Explanation of total variance

Components	Initial Eigenvalues	Extraction Sums of Squared Loadings	Rotation Sums of Squared Loadings
	Total	Variance percentage	Cumulative %
1	14.437	36.093	36.093
2	5.147	12.868	48.96
3	2.923	7.306	56.267
4	2.427	6.067	62.333
5	1.933	4.833	67.167
6	0.909	2.273	69.44

Components	Initial Eigenvalues	Extraction Sums of Squared Loadings	Rotation Sums of Squared Loadings
	Total	Variance percentage	Cumulative %
7	0.867	2.167	71.608
8	0.822	2.056	73.663
9	0.781	1.952	75.615
10	0.710	1.775	77.39
11	0.667	1.668	79.058
12	0.619	1.547	80.605
13	0.546	1.364	81.97
14	0.523	1.306	83.276
15	0.494	1.235	84.511
16	0.460	1.150	85.662
17	0.453	1.133	86.794
18	0.424	1.060	87.854
19	0.423	1.058	88.912
20	0.392	0.981	89.894
21	0.372	0.931	90.825
22	0.365	0.913	91.738
23	0.316	0.790	92.527
24	0.306	0.765	93.293
25	0.277	0.692	93.984
26	0.259	0.648	94.632
27	0.252	0.630	95.262
28	0.241	0.604	95.866
29	0.192	0.481	96.347
30	0.190	0.476	96.823
31	0.170	0.425	97.248
32	0.168	0.419	97.668
33	0.152	0.380	98.047
34	0.146	0.365	98.412
35	0.129	0.322	98.734
36	0.122	0.305	99.04
37	0.116	0.290	99.329
38	0.103	0.257	99.586
39	0.093	0.231	99.818
40	0.073	0.182	100

Table 5 Rotation component matrix

Variables	Measurement items	Ingredients
Intrapersonal Skills	Q6	0.125
	Q9	0.182
	Q12	0.164
	Q13	0.031
	Q16	0.272
	Q18	0.087
	Q19	0.124
	Q22	0.192
	Q26	0.112
	Q34	0.293
	Q37	0.070
	Q41	0.173
Interpersonal Skills	Q4	0.748
	Q7	0.812
	Q14	0.743
	Q21	0.792
	Q27	0.817
	Q28	0.731
	Q29	0.758
	Q32	0.723
	Q33	0.781
	Q35	0.761
	Q40	0.728
	Q42	0.714
	Q43	0.790
Stress Management	Q24	0.186
	Q31	0.064
	Q36	0.139
	Q38	0.263
	Q39	0.086
Adaptability	Q5	0.135
	Q8	0.151
	Q23	0.064
	Q25	0.074
	Q30	0.094
General Mood	Q10	0.203
	Q11	0.199
	Q15	0.160
	Q17	0.193
	Q20	0.181

Table 6 Tests for differences between genders in each variable

Variables	Gender	Cases	Average value	Standard deviation	Mean standard error	t	P
Intrapersonal Skills	Male	287	3.970	0.695	0.041	−2.981	0.003
	Female	291	4.130	0.584	0.034		
Interpersonal Skills	Male	287	3.656	0.619	0.037	−2.274	0.023
	Female	291	3.776	0.648	0.038		
Stress Management	Male	287	3.798	0.682	0.040	−2.661	0.008
	Female	291	3.951	0.696	0.041		
Adaptability	Male	287	3.708	0.841	0.050	−2.257	0.024
	Female	291	3.854	0.711	0.042		
General Mood	Male	287	3.576	0.940	0.055	−1.920	0.055
	Female	291	3.718	0.833	0.049		
Emotional intelligence	Male	287	3.765	0.533	0.031	−3.462	0.001
	Female	291	3.907	0.449	0.026		

Table 7 The test of differences among different majors in each dimension

Variables	N	Average	Standard deviation	Standard error	F	P
Intrapersonal Skills	200	4.253	0.476	0.034	19.886	<0.001
	102	3.689	0.743	0.074		
	71	3.759	0.666	0.079		
	105	4.175	0.579	0.057		
	100	4.091	0.673	0.067		
	578	4.051	0.646	0.027		
Interpersonal Skills	200	3.852	0.611	0.043	10.350	<0.001
	102	3.401	0.552	0.055		
	71	3.632	0.636	0.075		
	105	3.830	0.649	0.063		
	100	3.710	0.642	0.064		
	578	3.717	0.636	0.026		
Stress Management	200	4.050	0.627	0.044	15.372	<0.001
	102	3.494	0.635	0.063		
	71	3.789	0.712	0.085		
	105	4.074	0.654	0.064		
	100	3.764	0.720	0.072		
	578	3.875	0.693	0.029		
Adaptability	200	3.943	0.665	0.047	6.565	<0.001
	102	3.486	0.942	0.093		
	71	3.690	0.821	0.097		
	105	3.857	0.686	0.067		

Variables	N	Average	Standard deviation	Standard error	F	P
	100	3.746	0.798	0.080		
	578	3.782	0.781	0.032		
General Mood	200	3.871	0.775	0.055		
	102	3.345	0.970	0.096		
	71	3.468	0.889	0.105	7.295	<0.001
	105	3.690	0.888	0.087		
	100	3.590	0.914	0.091		
	578	3.647	0.890	0.037		
Emotional Intelligence	200	4.011	0.371	0.026		
	102	3.503	0.534	0.053		
	71	3.676	0.492	0.058	24.254	<0.001
	105	3.950	0.454	0.044		
	100	3.821	0.526	0.053		
	578	3.836	0.497	0.021		

Objective 2 . Cooperative learning models facilitate the development of emotional intelligence among college students This phase focused on the development of the CL intervention model, integrating EI cultivation into college English learning.

Concepts and Principles: The model is built upon six core principles: Positive Interdependence, Face-to-Face Promotive Interaction, Individual Accountability, Social Skills, Group Processing, and Emotional Integration.

Specific Contents of the Model: The model comprises three stages: Preparation Stage: Heterogeneous group formation (5-6 students, fixed groups), rotational role assignment (leader, recorder, encourager, etc.), and co-developed group rules emphasizing respect and participation. Implementation Phase: Designed English learning tasks are challenging and collaborative: Situational dialogue/role-playing (e.g., cross-cultural communication, stress coping) to develop emotional perception, expression, and regulation. Group discussion/debate (e.g., technology impact, university value) to enhance critical thinking, emotional regulation, and interpersonal skills. Problem-solving/case analysis (e.g., workplace bullying) to improve emotional understanding and facilitation of thinking. Collaborative writing/presentation to foster positive interdependence, responsibility, and emotional regulation. Teacher role as guide/facilitator, offering emotional guidance and structured reflection. Multi-dimensional feedback (peer, teacher, self-assessment) for continuous improvement. Evaluation Stage: Process evaluation (classroom observation, logs)

and results-based assessment (pre/post/follow-up EQ questionnaires, interviews) to systematically measure impact.

Objective 3. Implementation and experimental evaluation of the cooperative learning intervention model This phase rigorously evaluated the model's effectiveness using a quasi-experimental design.

Grouping Information (Table 7-8): Based on the overall emotional intelligence (M = 3.836, SD = 0.497) of 578 subjects, it was confirmed by one-way ANOVA that the experimental intervention was in intrinsic skills (f = 19.886, p < 0.001) and overall emotional intelligence dimension (F = 24.254, p < 0.001).The pre-test comparison between the control and experimental groups (n=25 each) showed no statistically significant differences (P>0.05) across any EI dimension or overall EI. This confirmed the comparability of the groups at baseline, ensuring internal validity.

Mean and Variance Analysis (Table 9-12): Repeated Measures ANOVA confirmed the effectiveness. Time Effect: Significant time effect for all EI dimensions (P<0.001), indicating changes over time. Post-hoc tests showed significant increases from pre-test to post-test, and from pre-test to follow-up for all dimensions. Grouping Effect: Significant grouping effect (P=0.005) indicating overall differences between the experimental and control groups. Time X Grouping Interaction: Significant interaction effect (P<0.001), confirming that the change in EI over time differed significantly between the experimental and control groups. The experimental group showed substantial and sustained improvements in intrapersonal skills, interpersonal skills, stress management, and adaptability from pre-test to post-test and follow-up, while the control group showed no significant changes and remained at low levels. While General Mood showed less statistical significance in improvement, its positive trend in the experimental group was noted.

Table 8 Pre-test comparison of differences between the control and experimental groups

Variables	Grouping	Number of cases	Average	Standard deviation	t	P	Cohend
Intrapersonal Skills Q	Control group	25	2.783	0.502	0.593	0.556	0.457
	Experimental group	25	2.707	0.408			
Interpersonal Skills Q	Control group	25	2.825	0.661	-0.214	0.831	0.559
	Experimental group	25	2.859	0.434			
Stress Management Q	Control group	25	2.712	0.480	-0.279	0.782	0.507
	Experimental group	25	2.752	0.533			
Adaptability Q	Control group	25	2.656	0.873	0.815	0.419	0.763
	Experimental group	25	2.480	0.635			
General Mood Q	Control group	25	2.352	0.701	0.531	0.598	0.692
	Experimental group	25	2.248	0.684			
Emotional intelligence Q	Control group	25	2.718	0.239	0.557	0.580	0.267
	Experimental group	25	2.676	0.291			

Table 9 The mean and standard deviation of emotional intelligence before the experiment (pre-test), after the experiment (post-test), and during follow-up

Measurements	Grouping	Time	Average	Standard error	Results
Intrapersonal Skills	Control group	Pre-test	2.783	0.091	low
		Post-test	2.640	0.255	low
		Follow-up	2.817	0.196	low
	Experimental group	Pre-test	2.707	0.091	low
		Post-test	3.447	0.255	Medium
		Follow-up	3.533	0.196	Moderate
Interpersonal Skills	Control group	Pre-test	2.825	0.112	low
		Post-test	2.803	0.261	low
		Follow-up	2.886	0.227	low
	Experimental group	Pre-test	2.858	0.112	low
		Post-test	3.828	0.261	Medium
		Follow-up	3.898	0.227	Moderate
Stress Management	Control group	Pre-test	2.712	0.101	low
		Post-test	2.640	0.240	low
		Follow-up	2.768	0.221	low
	Experimental group	Pre-test	2.752	0.101	low
		Post-test	3.344	0.240	Medium
		Follow-up	3.440	0.221	Moderate

Measurements	Grouping	Time	Average	Standard error	Results
Adaptability	Control group	Pre–test	2.656	0.153	low
		Post–test	2.480	0.304	low
		Follow–up	2.648	0.239	low
	Experimental group	Pre–test	2.480	0.153	low
		Post–test	3.400	0.304	Medium
		Follow–up	3.616	0.239	Moderate
General Mood	Control group	Pre–test	2.352	0.138	low
		Post–test	2.384	0.218	low
		Follow–up	2.424	0.225	low
	Experimental group	Pre–test	2.248	0.138	low
		Post–test	2.544	0.218	low
		Follow–up	2.656	0.225	low
Emotional intelligence	Control group	Pre–test	2.718	0.053	low
		Post–test	2.641	0.155	low
		Follow–up	2.763	0.129	low
	Experimental group	Pre–test	2.676	0.053	low
		Post–test	3.439	0.155	Medium
		Follow–up	3.541	0.129	Medium

Table 10 The pre–test compares the differences between the control and experimental groups

Variables	Grouping	Number of cases	Average	Standard deviation	t	P	Cohend
Intrapersona lSkills Q	Control group	25	2.783	0.502	0.593	0.556	0.457
	Experimental group	25	2.707	0.408			
Interpersonal Skills Q	Control group	25	2.825	0.661	–0.214	0.831	0.559
	Experimental group	25	2.859	0.434			
Stress Management Q	Control group	25	2.712	0.480	–0.279	0.782	0.507
	Experimental group	25	2.752	0.533			
Adaptability Q	Control group	25	2.656	0.873	0.815	0.419	0.763
	Experimental group	25	2.480	0.635			
General Mood Q	Control group	25	2.352	0.701	0.531	0.598	0.692
	Experimental group	25	2.248	0.684			
Emotional intelligence Q	Control group	25	2.718	0.239	0.557	0.580	0.267
	Experimental group	25	2.676	0.291			

Table 11 Group one-way repeated measures analysis of variance

Variable	Time	Average	Standard error	F	P	LSD
Intrapersonal Skills	Pretest	2.745	0.065	5.634	<0.001	2 > 1, 3 > 1
	Backtest	3.043	0.180			
	Follow-up	3.175	0.139			
Interpersonal Skills	Pretest	2.842	0.079			2 > 1, 3 > 1
	Backtest	3.315	0.185			
	Follow-up	3.392	0.161			
Stress Management Adaptability	Pretest	2.732	0.072			2 > 1, 3 > 1
	Backtest	2.992	0.170			
	Follow-up	3.104	0.156			
Adaptability General Mood	Pretest	2.568	0.108			2 > 1, 3 > 1
	Backtest	2.940	0.215			
	Follow-up	3.132	0.169			
General Mood Emotional intelligence	Pretest	2.300	0.098			2 > 1, 3 > 1
	Backtest	2.464	0.154			
	Follow-up	2.540	0.159			
Emotional intelligence	Pretest	2.697	0.038			2 > 1, 3 > 1
	Backtest	3.040	0.109			
	Follow-up	3.152	0.091			

Table 12 Time/multivariate test

Effect		Value	F	Assume degrees of freedom	Error degrees of freedom	Significance
Intersubjective	Intercept	0.971	299.316	5	44	<0.001
	Grouping	0.309	3.929	5	44	0.005
Within the subject	Time	0.591	5.634	10	39	<0.001
	Time* Grouping	0.544	4.653	10	39	<0.001

Feedback from Students in the Experimental Group: Qualitative data from interviews and open-ended questionnaires corroborated quantitative findings. Students reported a positive shift in classroom atmosphere (less anxiety, more engagement), significant improvement in communication and collaboration skills ("not afraid to communicate in English"), and enhanced emotional perception and management ("learned to be less easily defeated by negative emotions," "understand how others feel").
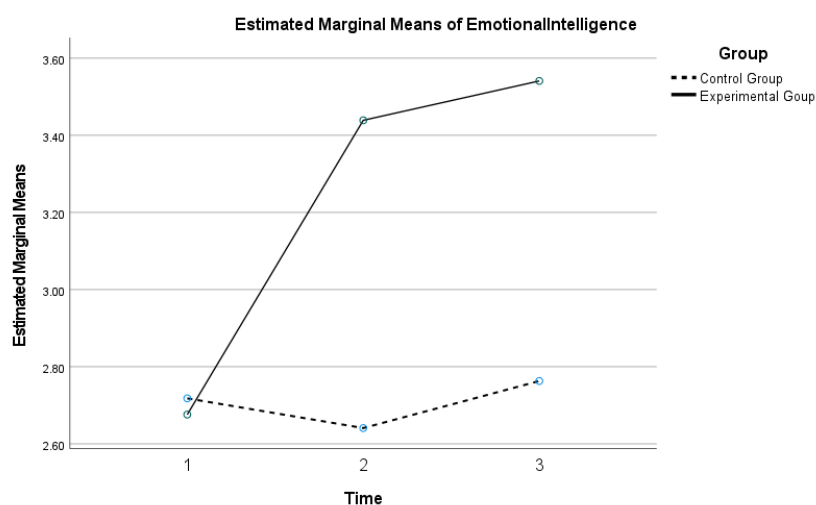
Discussions

Figure 2 mean of university students' General Mood (Experimental group+control group)

1. Key Findings

In sum, the cooperative-learning model produced robust, stable gains in college students' emotional intelligence, confirming both its short- and long-term efficacy (Fig.2,3,4,5,6,7). The findings of this study offer compelling evidence for the efficacy of a cooperative learning (CL) model in promoting emotional intelligence (EI) among Chinese college students within an English language learning context. These results align with and extend existing literature on both emotional intelligence development and cooperative learning methodologies, while directly addressing previously identified research gaps. Intrapersonal, interpersonal, stress-management and adaptability scores in the experimental group rose steeply from T1 (pre) to T2 (post) and continued upward to T3 (follow-up); the control group showed only minor, unstable fluctuations. The interaction effect was significant for all four dimensions ($p < .05$), indicating that the cooperative-learning intervention, not maturation, drove the gains. General mood also increased in the experimental group, but the change did not reach statistical significance ($p > .05$); the control group exhibited a slight, steady rise. Overall emotional intelligence mirrored the pattern of the four significant dimensions: marked improvement in the experimental group versus negligible change in controls.

Our first objective was to characterize the current state of EI among Chinese college students. The study's initial phase successfully did this, revealing significant room for improvement and notable demographic differences. The consistently low baseline EI levels in both the experimental and control groups before intervention underscore the critical need for targeted EI

cultivation in higher education, a finding that resonates with calls for more emotionally responsive pedagogical strategies (Petrides & Furnham, 2001; Zheng et al., 2024). Furthermore, the identified gender differences, with females demonstrating higher EI across most dimensions, align with a body of research suggesting women often exhibit greater emotional perception and interpersonal management abilities (Bar-On, 2006). A novel and important finding was the significant EI differences across academic majors. The higher EI among management students compared to optoelectronic engineering students suggests that disciplinary training and exposure to specific social demands may inherently foster certain EI competencies. This highlights the importance of tailored EI interventions that consider the unique needs and developmental trajectories associated with various academic fields.

Our second objective was to develop a CL intervention model, which we did successfully. This represents a significant contribution, moving beyond generic EI training to a deeply integrated pedagogical approach. By systematically embedding the core elements of CL (positive interdependence, face-to-face interaction, individual accountability, social skills, group processing) within English language learning tasks, the model facilitates EI development as an organic, rather than an additive, outcome. This approach, informed by Broaden-and-Build Theory (Fredrickson, 2004) and Control-Value Theory (Pekrun, 2000), creates a psychologically safe and motivating environment. The varied activities, such as situational dialogues, role-playing, and collaborative writing, directly targeted specific EI dimensions, enabling students to practice emotional perception, expression, understanding, and regulation in authentic communicative contexts. For instance, role-playing scenarios inherently demand empathy and emotional regulation, while collaborative writing necessitates conflict resolution and mutual support, all critical EI skills. This contrasts with traditional approaches that often treat EI as a separate subject, confirming the potential for integrated models to create more engaging and effective learning experiences (Goleman, 2001).

Our third objective was to evaluate the model's effectiveness, and the rigorous quasi-experimental evaluation unequivocally demonstrated its significant impact. The robust statistical analyses, particularly the significant time × group interaction effect in the Repeated Measures ANOVA, provide strong empirical support for the intervention. The experimental group's substantial and sustained improvements in intrapersonal skills, interpersonal skills, stress management, and adaptability from pre-test through follow-up, coupled with the control group's consistent low EI levels, directly validate the study's core hypothesis. This indicates that the observed gains are directly attributable to the CL intervention, rather than natural maturation or external factors. The

shift from "low" to "medium" EI levels in the experimental group signifies a practically meaningful enhancement in their emotional competencies. While the "general mood" dimension showed less statistically significant improvement, its positive trend in the experimental group, reinforced by qualitative feedback on increased confidence and motivation, suggests that emotional well-being is also positively influenced, albeit perhaps requiring longer or more targeted interventions.

The qualitative feedback from students in the experimental group further enriched and triangulated these quantitative findings. Students' reports of enhanced learning atmosphere, reduced anxiety, improved communication, and better emotional management offer a vivid, lived experience of the intervention's impact. Testimonials like "I used to be afraid to communicate... now I have to speak in groups, and gradually I'm not afraid anymore" or "seeing my teammates persevere and encourage each other, I get motivated" vividly illustrate the practical manifestation of improved self-regulation, social skills, and positive interdependence. This complementary evidence strengthens the overall credibility and persuasiveness of the research conclusions, demonstrating that the CL model not only yields measurable statistical gains but also profoundly impacts students' subjective learning experiences and emotional well-being.

2. The Importance of CL and EI for Chinese EFL Students

The integration of Cooperative Learning (CL) and Emotional Intelligence (EI) is particularly important for Chinese students learning English as a Foreign Language (EFL) due to specific cultural and educational contexts. Traditional Chinese education often emphasizes individual competition, rote memorization, and teacher-centered instruction, which can be at odds with the communicative and collaborative nature of modern language acquisition (Ghaith, 2001; Ebrahimi et al., 2018). As a result, many Chinese students may possess strong grammatical knowledge but lack the necessary social and emotional skills—such as assertive communication, empathy, and comfort with risk-taking—to engage in authentic English communication. CL provides a structured and safe environment to actively practice these skills, moving students from a passive to an active learning role. Furthermore, high EI is crucial for mitigating common challenges in EFL learning, such as foreign language anxiety, frustration with mistakes, and low motivation. By fostering EI through CL, students are better equipped to manage their emotional responses to these challenges, enhancing their resilience and long-term language proficiency (Jin et al., 2024).

3. Additional References and Enhanced Discussion

The findings of our study, demonstrating a significant improvement in EI through a CL model, are consistent with and build upon a growing body of research. The positive effect of CL on

social skills and academic outcomes has been widely documented (Johnson & Johnson, 2019; Gillies, 2016). For example, Slavin (2014) highlights how the structured interdependence in CL promotes not only academic achievement but also social cohesion. Our study extends this by showing that this process directly fosters key components of emotional intelligence, such as intrapersonal skills and interpersonal skills, which are essential for effective collaboration.

Specifically, the observed gains in intrapersonal skills (self-awareness, self-regulation) and stress management (stress tolerance, impulse control) align with theoretical perspectives that link positive group interactions to emotional well-being (Fredrickson, 2004). The collaborative nature of our CL model reduced individual anxiety, a well-documented barrier in EFL learning (Zheng et al., 2024), by distributing the cognitive load and providing a supportive peer network. The gains in interpersonal skills (empathy, social responsibility) and adaptability directly reflect the daily demands of group work, where students must listen to different perspectives, negotiate solutions, and flexibly adjust their strategies. This contrasts with studies on individual learning where these skills are not actively practiced.

The sustained improvements observed in our follow-up assessment are particularly noteworthy. This suggests that the skills developed within the CL framework were not merely temporary but were internalized and became part of students' lasting behavioral repertoire. This finding is critical as it addresses a common limitation of many short-term interventions and underscores the long-term, transformative potential of a well-designed pedagogical approach (Ying Jieqiong, 2017). Overall, our findings are robustly supported by both established CL theory and recent research, and they provide a new perspective on how to integrate and sustainably develop emotional intelligence within a core academic curriculum.

New Knowledge from Research

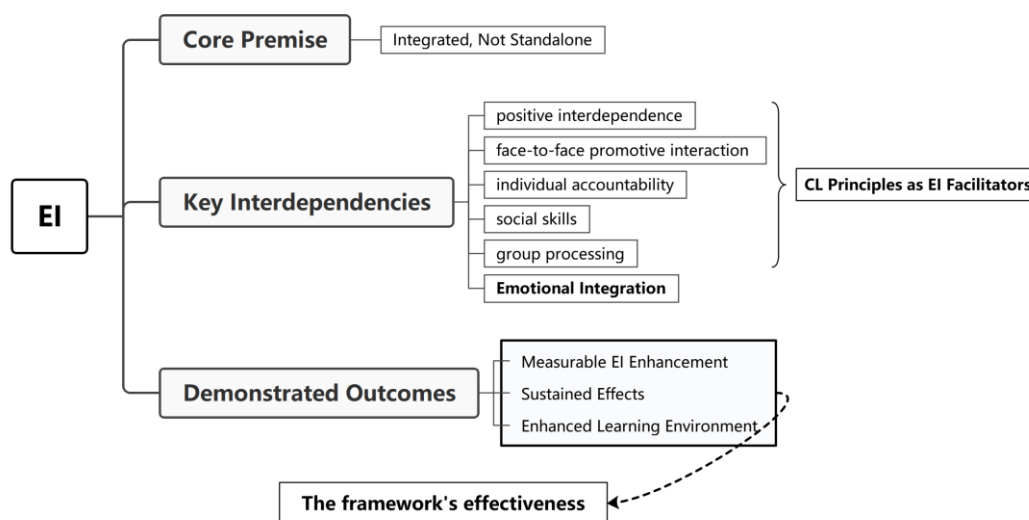In addition, the following factors are found to be very important in EI.

Figure 3 The framework of EI

The framework in Figure 3 embeds EI training within English CL, using its five principles to drive intrapersonal, interpersonal, stress-management and adaptability gains; statistically and practically significant, durable, and yielding a more positive, collaborative, low-anxiety classroom.

Conclusion

This study successfully developed and empirically validated a Cooperative Learning (CL) model designed to enhance emotional intelligence (EI) among Chinese undergraduate students within the context of English language learning. Addressing significant gaps in existing literature, the research confirmed the necessity of targeted EI interventions in higher education, particularly given the generally low baseline EI levels and notable demographic differences observed across genders and academic majors.

The developed CL model, deeply rooted in established cooperative learning principles (positive interdependence, face-to-face interaction, individual accountability, social skills, group processing) and psychological theories (Broaden-and-Build, Control-Value), effectively integrated emotional development goals into practical English language tasks. This innovative integration fostered a learning environment where EI cultivation was a natural and engaging outcome, rather than a separate curriculum component.

The rigorous quasi-experimental design, supported by robust quantitative analysis (Repeated Measures ANOVA) and complementary qualitative data (student feedback), provided

compelling evidence of the model's efficacy. The experimental group demonstrated statistically significant and sustained improvements across key EI dimensions—intrapersonal skills, interpersonal skills, stress management, and adaptability—in stark contrast to the control group, whose EI levels remained largely unchanged. This strong time × group interaction effect unequivocally attributes the observed EI gains to the CL intervention. Furthermore, qualitative feedback from students corroborated these quantitative findings, highlighting enhanced communication, collaboration, emotional management, and increased learning confidence and engagement within the cooperative classroom setting.

In conclusion, this research not only enriches the theoretical understanding of the synergy between cooperative learning and emotional intelligence but also offers a practical, empirically-supported pedagogical model for cultivating emotionally intelligent individuals. By nurturing students' emotional competencies alongside their linguistic skills, this model contributes significantly to their holistic development, preparing them for academic success, personal well-being, and future professional challenges. The findings underscore the profound importance of integrating affective and cognitive learning, advocating for a more comprehensive approach to education in the 21st century.

Suggestions

Based on the findings and identified limitations of this study, the following suggestions are proposed for future research and educational practice:

For future research, it is recommended to expand the study's scope and sample diversity, conduct long-term longitudinal studies to assess sustained effects, and integrate diversified assessment methods beyond self-report questionnaires, including in-depth qualitative methods, behavioral observation, objective tools like SJTs, and multi-source feedback. Additionally, future research should meticulously investigate the role of teacher factors, refine interventions for specific EI dimensions (especially "General Mood"), and explore the CL model's application in other subject areas to examine its universality in promoting EI and non-cognitive skills. For educational practice, institutions should integrate EI development into curriculum design, provide comprehensive teacher training on CL principles and EI theories, implement structured cooperative learning, promote reflective practices, and develop context-specific EI interventions that cater to diverse student populations, acknowledging gender and major differences. By pursuing these avenues, the

educational community can collectively enhance higher education quality, fostering academically capable and emotionally intelligent individuals.

References

Aronson, E., Blaney, N., Stephan, C., Sikes, J., & Snapp, M. (1978). *The jigsaw classroom.* California: Sage Publications.

Bar-On, R. (1997). *The Emotional Quotient Inventory (EQ-i): A test of emotional intelligence.* Toronto: Multi-Health Systems.

Bar-On, R. (2006). The bar-On model of emotional-social intelligence (ESI). *Psicothema, 18*, 13–25.

Brackett, M. A., & Mayer, J. D. (2003). Convergent, discriminant, and incremental validity of competing measures of emotional intelligence. *Personality and Social Psychology Bulletin, 29*(9), 1147–1158. https://doi.org/10.1177/0146167203254596

Ebrahimi, M. R., Khoshsima, H., Zare-Behtash, E., & Heydarnejad, T. (2018). Emotional intelligence enhancement impacts on developing speaking skill among EFL learners: An empirical study. *International Journal of Instruction, 11*(4), 625–640. https://doi.org/10.12973/iji.2018.11439a

Fredrickson, B. L. (2004). The broaden-and-build theory of positive emotions. *Philosophical Transactions: Biological Sciences, 359*(1449), 1367–1377. http://www.jstor.org/stable/4142140

Ghaith, M. (2001). Learner's perceptions of their STAD cooperative experience. *System, 29*(2), 289–301. https://doi.org/10.1016/S0346-251X(01)00016-1

Gillies, R. M. (2016). Cooperative learning: Review of research and practice. *Australian Journal of Teacher Education, 41*(3), 39–54. https://doi.org/10.14221/ajte.2016v41n3.3

Goleman, D. (1995). *Emotional intelligence: Why it can matter more than IQ.* New York: Bantam Books.

Goleman, D. (2001). Emotional intelligence: Issues in paradigm building. In C. Cherniss & D. Goleman (Eds.), *The emotionally intelligent workplace: How to select for, measure, and improve emotional intelligence in individuals, groups, and organizations* (pp. 13–26). San Francisco: Barrett-Koehler Publishers.

Jacob, E., Rottenberg, L., Patrick, S., & Wheeler, E. (1996). *Cooperative Learning: Context and opportunities for acquiring academic English. TESOL Quarterly, 30*(2), 253–280. https://doi.org/10.2307/ 3588143

Jin, F., Gu, C., & Li, Y. (2024). Trait emotional intelligence and foreign language performance: associations with academic self-efficacy and foreign language anxiety. *Frontiers in Education, 9.* https://doi.org/10.3389/feduc.2024.1419328

Johnson, D. W., & Johnson, R. T. (1999). *Learning together and alone: Cooperative, competitive, and individualistic learning.* (5th ed.). Boston: Allyn & Bacon.

Johnson, D. W., & Johnson, R. T. (2019). *Cooperation and competition: Theory and research.* Edina: Interaction Book Company.

Kagan, S. (1994). *Cooperative learning.* California: Kagan Publishing.

Mayer, J. D., & Salovey, P. (1997). *What is emotional intelligence? In P. Salovey* & D. Sluyter (Eds.), *Emotional development and emotional intelligence: Implications for educators* (pp. 3–34). New York: Basic Books.

Nelis, D., Quoidbach, J., Mikolajczak, M., & Hansenne, M. (2009). Increasing emotional intelligence: (How) is it possible?. *Personality and Individual Differences, 47*(1), 36–41. https://doi.org/10.1016/j.paid.2009.01.046

Ning, X., Luo, X., & Guo, S. (2024). Researching into Chinese university students' mental health in the post–pandemic era – problems and causes. *Frontiers in Psychology, 15.* https://doi.org/10.3389/fpsyg.2024.1393603

Pekrun, R. (2000). 7– A social cognitive, control–value theory of achievement emotions. *Advances in Psychology, 131,* 143–163. https://doi.org/10.1016/S0166–4115(00)80010–2

Petrides, K. V., & Furnham, A. (2001). Trait emotional intelligence: Psychometric investigation with reference to established trait taxonomies. *European Journal of Personality, 15*(6), 425–448. https://doi.org/ 10.1002/per.416

Pishghadam, R. (2009). A quantitative analysis of the relationship between emotional intelligence and foreign language learning. *Electronic Journal of Foreign Language Teaching, 6*(1), 31–41. Retrieved from https://e–flt.nus.edu.sg/wp–content/uploads/docroot/v6n12009/pishghadam.pdf

Salovey, P., & Mayer, J. D. (1990). Emotional intelligence. *Imagination, Cognition and Personality, 9*(3), 185–211. https://doi.org/10.2190/DUGG–P24E–52WK–6CDG

Schutte, N. S., Malouff, J. M., Hall, L. E., Haggerty, D. J., Cooper, J. T., Golden, C. J., & Dornheim, L. (1998). Development and validation of a measure of emotional intelligence. *Personality and Individual Differences, 25*(2), 167–177. https://doi.org/10.1016/S0191–8869(98)00001–4

Sharan, Y., & Sharan, S. (1992). *Expanding cooperative learning through group investigation.* New York: Teachers College Press.

Slavin, R. E. (2014). Cooperative Learning and Academic Achievement: Why Does Groupwork Work?. *Annals of Psychology, 30*(3), 785–791. https://doi.org/10.6018/analesps.30. 3.201201

Wang, Y., & Chen, J. (2023). Differences in central symptoms of anxiety and depression between college students with different academic performance: A network analysis. *Frontiers in Psychology, 14.* https://doi.org/10.3389/fpsyg.2023.1071936

Zheng, S., Zhang, J., Wang, J., & Shen, R. (2024). English language learning anxiety and academic burnout in Chinese freshmen: A chain mediating approach. *Frontiers in Psychology, 15.* https://doi.org/10.3389/fpsyg.2024.1340142