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# Classroom learning environment as a determinant of psychological well-being in adolescents

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**ABSTRACT**

Psychological well-being (PWB) is critical in adolescent development as well as academic success. In terms of self-determination theory, satisfaction of autonomy, competence, and relatedness psychological needs leads to PWB. In schooling contexts, these psychological needs can be satisfied in a supportive classroom learning environment (CLE), which in turn will promote adolescents' overall well-being. The study examines the predictive impact of CLE on Chinese adolescent PWB as well as which specific dimensions of CLE are effective predictors to PWB. A sample consisting of 918 14- to 19-year-old adolescents participated. What Is Happening In this Class (WIHIC) questionnaire and the Brief Chinese Version of the psychological well-being scale (PWBS) were applied for data collection. Pearson correlation showed a positive correlation between CLE's seven dimensions and PWB. Meanwhile, structural equation modelling (SEM) analysis identified student cohesiveness, teacher support, involvement, and task orientation, dimensions of CLE, significantly predict PWB. The result indicated CLE plays a crucial role in predicting PWB. The findings inform recommendations for improving adolescents' PWB and discusses further implications.



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## 1. INTRODUCTION

Adolescents in the initial transition to high school face complex challenges due to the increasing academic tasks, which profoundly influencing their psychological well-being (PWB) [1]. Classroom learning environment (CLE) has shown itself as a critical contributor to PWB and other adolescents' behaviors. CLE encompasses the sociopsychological, and pedagogical contexts in which learning occurs, including teacher behaviors, teacher-student interactions, and peer interactions [2], [3]. Prior studies have revealed strong correlations between CLE and academic, socio-emotional, and behavioral outcomes [4]–[6]. Specifically, the relationship between adolescents' perception of CLE and PWB has been well-researched in prior studies [7].

However, existing research mostly emphasizes the pedagogical aspects, for instance, the teaching strategies and classroom management, neglecting the attention to the psychosocial and interpersonal dimensions of the learning environment, which are essential determinant for fostering a holistic educational experience and PWB [8]. Furthermore, to the best of our knowledge, limited research has systematically investigated how all seven CLE dimensions predict adolescents' PWB in the context of Northeast China. This study extends prior work by adopting a comprehensive framework based on the What Is Happening In this Class? (WIHIC) scale and applying it to an underrepresented population. In doing so, it not only fills a geographic and methodological gap but also offers a novel insight into the complex role of teacher support,

which emerged as a negative predictor of well-being—an outcome that invites further exploration in future research.

This study endeavors to examine the role of CLE in shaping PWB and identify the significant predictors of PWB among adolescents in Northeast China. The present study seeks to answer the following research questions:

i) What is the level of CLE and PWB among the adolescents in Northeast China?
ii) Is there a significant relationship between CLE and PWB among the adolescents in Northeast China?
iii) Do the CLE dimensions (student cohesiveness, teacher support, involvement, investigation, task orientation, cooperation, and equity) predict PWB among the adolescents in Northeast China?

## 2. LITERATURE REVIEW

CLE refers to "the social, psychological, and pedagogical contexts in which learning occurs and which affect student achievement and attitudes" [2]. CLE contains student relationships, teacher-student interactions and the instructional strategies implemented in classrooms [2], [3]. It is widely accepted as an important predictor of adolescent's outcomes of both emotional and behavioral aspects. Research revealed CLE directly influences students' engagement, motivation, and PWB [4], [5], [9]. CLE dimensions work together to foster a supportive and nurturing classroom climate [10]. Empirical studies have identified these dimensions as effective predictors of students' academic success as well as socio-emotional growth [6], [10].

PWB refers to living life to its fullest potential, marked by autonomy, positive interpersonal relationships, self-acceptance, a clear sense of purpose, continual personal development, and effective management of one's environment [11], [12]. As Suldo and Shaffer [13] proposed in their dual-factor model, PWB is a fundamental component of mental health, not merely the absence of psychopathology. Researchers also believed that PWB is a dynamic construct encompassing subjective, social, and psychological domains, along with health-related behaviors [14]. According to self-determination theory, PWB is attained when individuals' fundamental needs for autonomy, competence, and relatedness are satisfied [15], [16]. In the school-related context, these needs are closely linked to the support that students receive from teachers, the encouragement of peers, and their engagement with challenging but manageable tasks [17]–[20].

A wide array of empirical work has emphasized the profound impact of CLE on students' behavior and PWB across various educational settings [21]–[23]. One finding that has emerged consistently is that a nurturing and engaging CLE is significantly related to higher PWB, which in turn is associated with better academic motivation, engagement, and overall achievement. Previous empirical studies indicates that students' perceptions of their CLE significantly influence their PWB. When students perceive their classroom environment as supportive, well-structured, and conducive to autonomy, they tend to experience positive emotions, cultivate resilience, and demonstrate greater persistence in academic endeavors [16], [24].

A positive CLE fosters a sense of belonging and competence, thereby enhancing adolescents' confidence in their academic capabilities and contributing to their long-term well-being [25], [26]. For instance, a Norwegian study found that a positive classroom climate is significantly linked to adolescents' self-efficacy and mental wellbeing [25]. A conducive classroom climate, characterized by supportive teacher-student relationships, constructive social interactions, and elevated academic and behavioral expectations, thus enhances students' PWB. Conversely, a negative classroom climate, marked by tension, conflict, and diminished academic and behavioral expectations, adversely affects students' PWB. Similarly, research by Long *et al.* [18] also found that the quality of pupil-peer relationships and pupil-teacher relationships, as dimensions of CLE, significantly influences adolescents' PWB. Additionally, Wang *et al.* [7] analyzed 61 studies —including 679 effect sizes and 73,824 participants—from 2000 to 2016, and contributed a comprehensive overview, demonstrating a positive association between a positive classroom climate and both the academic performance and students' PWB.

In the Chinese context, Cao [27] expanded the existing research by emphasizing the mediating role of teacher–student rapport in shaping a supportive classroom environment that enhances adolescents' PWB. Classrooms distinguished by constructive teacher-student relationships and the provision of autonomy support demonstrated a positive correlation with adolescents' attitudes and overall well-being. Complementing this, Wu and Dong [28] investigated 387 university students taking French courses in China and found that positive teacher-student interactions, strong peer relationships, and perceived autonomy support all jointly enhance students' PWB.

Despite these findings, gaps persist regarding knowledge about CLE in China. Much of the extant literature targets pedagogical aspects and neglects the psychosocial dimensions relating to PWB [8]. Previous studies have predominantly targeted university students or regions, such as Southwest and South-Central China, while giving less weight to high school contexts, especially in Northeast China. To bridge these

research gaps, this present study investigates the predictive effects of CLE dimensions on PWB among Chinese adolescents in high schools in Northeast China.

For this study, Deci and Ryan's self-determination theory (SDT) [15] provides a useful perspective to analyze how students' PWB is influenced by the CLE. SDT suggests that people are motivated when their core psychological needs of competence, autonomy, and relatedness are met. Within the classroom context, students who feel supported by teachers and peers in the classroom are more likely to develop stronger senses of competence, autonomy, and relatedness. This leads to higher motivation and better relationships with others, personal growth and self-acceptance, which are essential dimensions of PWB. When students feel that they are capable of succeeding in their studies and that they are supported by others, they will experience a meaningful purpose in life and stay motivated to learn [16]. Chinese adolescents are under pressures to perform academically, which makes meeting their psychological needs especially important.

Based on the reviewed literature and guided by SDT, this study proposes the following hypotheses. The first hypothesis is: a significant association exists between the CLE and students' PWB among adolescents in Northeast China (H1). The second hypothesis is: dimensions of CLE significantly predict PWB (H2). A close relationship between the CLE and adolescents' PWB is hypothesized. Specifically, the study tests whether overall CLE and its seven dimensions significantly predict students' PWB. The conceptual model illustrating these proposed relationships is presented in Figure 1.

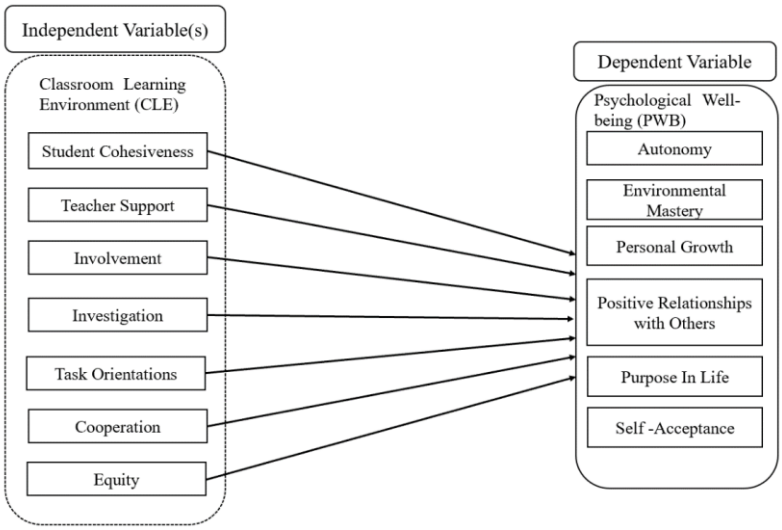


Figure 1. Conceptual framework

## 3. METHOD

### 3.1. Participants

This study recruited 918 adolescents, aged 14 to 19, from two high schools in a city in Northeast China, specifically from the 10th and 11th grades, using a stratified sampling approach. After obtaining ethical approval, 1,000 questionnaires were distributed to the selected schools. Among the eligible participants, 417 were male and 501 were female, all of whom completed the questionnaires, resulting in 918 valid responses. Given that the structural model includes multiple latent variables and a moderate number of observed indicators and estimated parameters, a sample size of 918 is well above the recommended ratio of 10–20 participants per parameter [29], and far exceeds the minimum requirement of 200 cases for structural equation modelling (SEM) [30].

### 3.2. Instruments

#### 3.2.1. WIHIC questionnaire

The WIHIC questionnaire is an extensively used instrument for evaluating the CLE. This questionnaire includes 56 items organized into seven dimensions: student cohesiveness, teacher support, involvement, investigation, task orientation, cooperation, and equity. Respondents rate each item using a five-point Likert scale, with 1 representing strong disagreement and 5 representing strong agreement. Numerous studies confirmed its reliability and validity across diverse educational settings and cultural backgrounds.

The WIHIC subscales demonstrate high reliability across items, with Cronbach's alpha values ranging from 0.70 to 0.90 [31], [32]. A recent meta-analysis confirmed high reliability of the WIHIC, with overall α=0.85 (95% CI 0.83–0.87) and subscale alphas ranging from 0.80 to 0.88 [33]. Confirmatory factor analysis (CFA) further supports the instrument's seven-factor structure with strong model fit indices (RMSEA=0.044 and CFI=0.96) [32]. In the present study, the WIHIC demonstrated excellent psychometric properties. It showed exceptional internal consistency, with a total Cronbach's alpha of 0.966 and subscale coefficients ranging from 0.877 to 0.925. CFA results further illustrate a good model fit ($\chi^2$/df=3.01, CFI=0.92, RMSEA=0.05), supporting the scale's construct validity.

#### 3.2.2. The Brief Chinese Version of the psychological well-being scale (PWBS)

The Brief Chinese Version of the psychological well-being scale (PWBS) was adapted by Chan *et al.* [34] from Ryff's original measure [11]. This 24-item instrument uses a five-point Likert response format and encompasses six facets: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. Prior studies have demonstrated the scale's reliability, with Cronbach's alpha coefficients for its subscales falling between 0.67 and 0.83 [34], which indicates acceptable to good internal consistency. Additionally, CFA has demonstrated a solid model fit ($\chi^2$/df=2.89, CFI=0.93, RMSEA=0.05). In alignment with previous research [35], in our study, the PWBS scale also demonstrated strong reliability, with an overall Cronbach's alpha of 0.937. CFA results indicated a good model fit ($\chi^2$/df=4.33, CFI=0.94, RMSEA=0.06), supporting the scale's construct validity.

### 3.3. Data collection procedures

Ethical approval was secured from the Human Research Committee of the first author's institution before data collection commenced. Participants received a full explanation of the study's objectives and their rights, including informed consent, voluntary participation, and the right to withdraw at any time without repercussion. Confidentiality of responses was guaranteed, and it was made clear that the data would be used solely for academic research. Parental written consent was obtained for all participants. Subsequently, 1,000 printed questionnaires were administered physically to the selected schools, and data were collected during a 30-minute session during regular school hours through a face-to-face approach.

### 3.4. Data analysis

SPSS version 26 and AMOS version 26 were employed to analyze the data. Of the 1,000 questionnaires distributed, 82 were excluded due to irregularities, resulting in 918 valid responses and an effective response rate of 91.8%. The internal consistency was assessed using Cronbach's alpha (α), verifying that the items accurately measured the intended constructs. CFA was executed in AMOS to evaluate the validity and reliability of the measurement model. Additionally, descriptive statistics were computed to summarize key features of the dataset, including sample characteristics and measurement variables. Pearson correlation analysis was performed to investigate the correlations among variables, and SEM was applied to examine complex interconnections and develop a predictive model. Potential confounding variables such as gender were considered during preliminary analysis. However, regression results indicated that gender had no statistically significant effect on PWB (p>.05). Therefore, it was not included as a control variable in the final SEM.

Table 1 illustrates the indices of the CFA, which are the Chi-square minimum divided by degrees of freedom (CMIN/DF), comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR). The model fit indices are all within satisfactory thresholds. These values indicate that the measurement model fits the data well and supports the construct validity of the instruments used in this study.

Table 1. Assessment of the CFA model's goodness of fit

| Criteria | | Threshold | | | |
|---|---|---|---|---|---|
| | | Terrible | Acceptable | Excellent | Evaluation |
| CMIN | 7257.913 | | | | |
| DF | 2952 | | | | |
| CMIN/DF | 2.459 | >5 | <5 | <3 | Excellent |
| CFI | 0.911 | <0.9 | >0.9 | >0.95 | Acceptable |
| TLI | 0.907 | <0.9 | >0.9 | >0.95 | Acceptable |
| RMSEA | 0.040 | >0.08 | <0.08 | <0.06 | Excellent |
| SRMR | 0.0531 | >0.10 | <0.08 | <0.05 | Acceptable |

## 4. RESULTS

Table 2 shows the descriptive statistics of the studied variables. Results indicate the overall CLE mean score of 3.39, and the average scores across the various WIHIC dimensions ranged from 2.81 to 3.71—each falling below 4—which indicates that, on all subscales, participants felt their classroom offered the corresponding activities less than "often", which indicate a moderate level. The mean score for PWB is 3.54, suggesting an above average level.

Table 2. Descriptive statistics of the SEM variables

| Constructs (N=918) | | Statistics | | | Dispersion | | Distribution | |
|---|---|---|---|---|---|---|---|---|
| | | Min. | Max. | Mean | Std. Deviation | Variance | Skewness | Kurtosis |
| CLE (overall) | | 1.73 | 4.95 | 3.39 | 0.62 | 0.387 | -0.06 | -0.22 |
| CLE dimensions | Student cohesiveness | 1.00 | 5.00 | 3.68 | 0.71 | 0.505 | -0.36 | 0.07 |
| | Teacher support | 1.00 | 5.00 | 3.36 | 0.88 | 0.766 | -0.09 | -0.35 |
| | Involvement | 1.00 | 5.00 | 3.08 | 0.84 | 0.707 | 0.16 | -0.31 |
| | Investigation | 1.00 | 5.00 | 2.81 | 0.88 | 0.780 | 0.02 | -0.41 |
| | Task orientation | 1.00 | 5.00 | 3.69 | 0.71 | 0.505 | -0.47 | 0.11 |
| | Cooperation | 1.00 | 5.00 | 3.36 | 0.85 | 0.729 | -0.33 | -0.15 |
| | Equity | 1.00 | 5.00 | 3.71 | 0.86 | 0.737 | -0.43 | -0.17 |
| | PWB | 1.38 | 5.00 | 3.54 | 0.71 | 0.503 | -0.09 | -0.48 |

Table 3 shows the reliability and the validity of the constructs used in this study are acceptable. The results of CFA illustrated that all the constructs exceeded the threshold (CR>0.7) of composite reliability (CR) and demonstrated acceptable convergent validity with most values of the average variance extracted (AVE) above 0.5. One item in WIHIC (SC6) was removed due to the factor loading lower than 0.5. In addition, discriminant validity was established by applying the Fornell-Larcker criterion [36]. According to this standard, for each construct, the square root of its AVE must exceed its correlations with other constructs, as seen in Table 4. Empirical distinctiveness among constructs is confirmed through this criterion.

Table 3. Composite reliability and discriminant validity of the constructs

| Constructs | Indicators | Reliability | | Convergent validity | Discriminant validity |
|---|---|---|---|---|---|
| | | Cronbach's alpha (α) | CR | AVE | Square roots of AVE |
| | | >0.7 | >0.7 | >0.5 | —— |
| CLE dimensions | Student cohesiveness | 0.892 | 0.9035 | 0.5740 | 0.758 |
| | Teacher support | 0.925 | 0.9235 | 0.6025 | 0.776 |
| | Involvement | 0.900 | 0.8948 | 0.5164 | 0.719 |
| | Investigation | 0.924 | 0.9240 | 0.6043 | 0.802 |
| | Task orientation | 0.877 | 0.8756 | 0.4695[1] | 0.685 |
| | Cooperation | 0.906 | 0.9074 | 0.5525 | 0.743 |
| | Equity | 0.918 | 0.9080 | 0.5554 | 0.745 |
| PWB | Autonomy | 0.846 | | | |
| | Environmental mastery | 0.871 | | | |
| | Personal growth | 0.808 | | | |
| | Positive relations with others | 0.771 | 0.9713 | 0.5872 | 0.766 |
| | Purpose in life | 0.896 | | | |
| | Self-acceptance | 0.863 | | | |

Note: [1] Fornell and Larcker posited that when the AVE is below 0.5, yet the composite reliability (CR) exceeds 0.6, the construct's convergent validity remains satisfactory [36].

Table 4 shows the results of the Fornell-Larcker criterion [36] with the square root of the AVE for each construct on the diagonal, and the correlational analysis, which indicated significant relationships between the seven dimensions of CLE and PWB. As shown in the table, the square root of the AVE for each construct all exceeds its correlations with other constructs, suggesting the discriminant validity is within specifications. In addition, the correlational analysis indicated significant relationships between the seven dimensions of CLE and PWB. Specifically, involvement (INVO) exhibited the highest positive correlation with PWB (r=.471, p<.01), followed by task orientation (TO) (r=.449, p<.01) and cooperation (COOP) (r=.418, p<.01). Student cohesiveness (SC) also demonstrated a notable positive correlation with PWB (r=.415, p<.01). Other dimensions, such as investigation (INVE) (r=.403, p<.01), equity (EQUI) (r=.376, p<.01), and teacher support (TS) (r=.321, p<.01), were positively associated with PWB, albeit to a slightly lesser degree. Hence, H1 is supported, as the all dimensions of CLE are significantly positively correlated with PWB at the 0.01 level (p<0.01).

The associations between CLE dimensions and adolescents' PWB were analyzed using SEM. The model exhibited a satisfactory fit to the data, as reflected by the fit indices: $\chi^2$/df=2.459, CFI=0.911, TLI=0.907, RMSEA=0.040, and SRMR=0.0531, all of which fall within the acceptable range, suggesting a well-fitting model. The findings in Table 5 highlights the factors influencing the adolescents' PWB with CLE dimensions. Specifically, as shown in the standardized path diagram as in Figure 2, the model explains 37.1% of the variance in PWB, highlighting the significant role of CLE in shaping adolescents' PWB. This suggests that the adolescents who perceive a more positive CLE are likely to experience greater PWB. Furthermore, the model identified significant predictors of PWB among the seven CLE dimensions, task orientation (β=0.319, p<.001), involvement (β=0.354, p<.001), and student cohesiveness (β=0.174, p<.001) emerged as a significant positive predictor of PWB, suggesting that adolescents who are highly involved in learning tasks, take an active role in classroom activities, and feel a strong sense of belonging generally exhibit higher levels of PWB.

Table 4. Results of the correlation analysis and Fornell-Larcker criteria

| Variables | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| CLE dimensions | 1. SC | .758* | | | | | | | |
| | 2. TS | .461** | .776* | | | | | | |
| | 3. INVO | .548** | .623** | .719* | | | | | |
| | 4. INVE | .397** | .470** | .705** | .802* | | | | |
| | 5. TO | .392** | .378** | .437** | .467** | .685* | | | |
| | 6. COOP | .561** | .414** | .603** | .566** | .551** | .743* | | |
| | 7. EQUI | .432** | .580** | .521** | .414** | .483** | .543** | .745* | |
| | 8. PWB | .415** | .321** | .471** | .403** | .449** | .418** | .376** | .766* |

** Correlation is significant at the 0.01 level (2-tailed).
* The square root of AVE is bolded and on the diagonal.

Table 5. Linear regression results via SEM

| | | | Estimate | S.E. | C.R. | P | Std. estimate | $R^2$ |
|---|---|---|---|---|---|---|---|---|
| PWB | <--- | Task orientation | 0.281 | 0.045 | 6.224 | *** | 0.319 | |
| PWB | <--- | Student cohesiveness | 0.161 | 0.042 | 3.839 | *** | 0.174 | |
| PWB | <--- | Teacher support | -0.086 | 0.039 | -2.2 | 0.028 | -0.125 | |
| PWB | <--- | Involvement | 0.255 | 0.063 | 4.026 | *** | 0.354 | 0.371 |
| PWB | <--- | Investigation | -0.008 | 0.049 | -0.165 | 0.869 | -0.010 | |
| PWB | <--- | Equity | 0.038 | 0.034 | 1.106 | 0.269 | 0.056 | |
| PWB | <--- | Cooperation | -0.039 | 0.045 | -0.863 | 0.388 | -0.051 | |

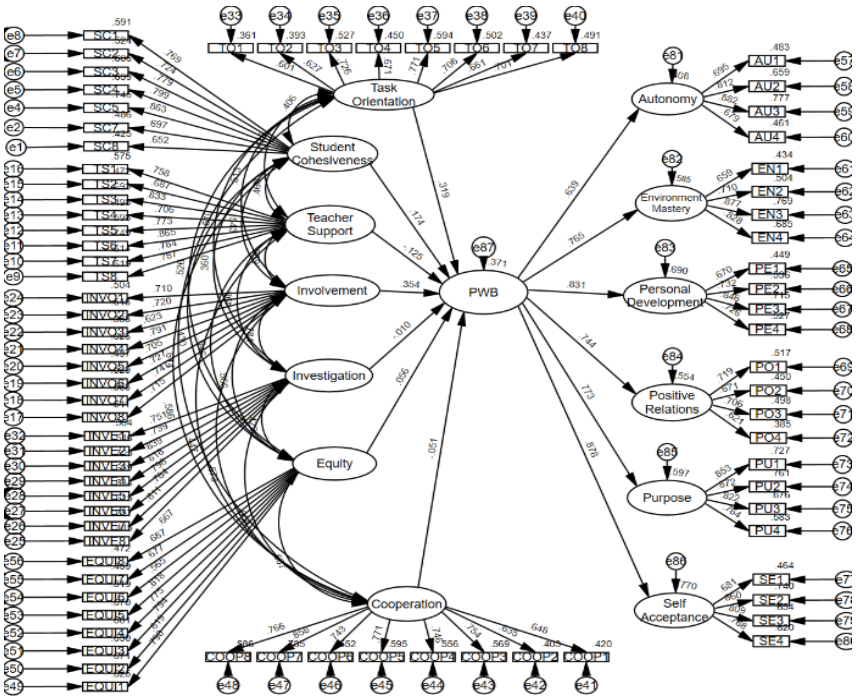


Figure 2. The final model with standardized estimates

Unexpectedly, teacher support (β=-0.125, p=.028) negatively predicted PWB, suggesting that increased perceived teacher support may not always lead to enhanced well-being, potentially reflecting a more complex or bidirectional relationship that warrants further investigation. Meanwhile, investigation (β=-0.010, p=.869), equity (β=0.056, p=.269), and cooperation (β=-0.051, p=.388) were not significant predictors of PWB, implying that these aspects of CLE might not have a direct impact on adolescents' PWB. Furthermore, the measurement model confirmed the multidimensional nature of PWB, with strong standardized factor loadings across its six dimensions: autonomy, environmental mastery, personal development, positive relations, purpose, and self-acceptance. These dimensions were well-represented by their respective observed indicators, supporting the construct validity of the PWB measurement.

Overall, these findings emphasize the importance of task engagement, student cohesiveness, and active involvement in fostering adolescents' PWB. These three factors were identified as significant predictors in the structural model, explaining a considerable portion of the variance in well-being. Meanwhile, the unexpected negative effect of teacher support highlights a complex and possibly context-specific relationship that warrants further investigation.

## 5. DISCUSSION

### 5.1. The levels of CLE and PWB among adolescents

The results of this study reveal a moderate overall level of CLE and an above average level of PWB of adolescents in Northeast China. The results are inconsistent with those of some previous studies. For CLE, several studies have indicated that Chinese students generally perceive their CLE less positively [37]–[39]. On the other side, Fan and Karnjanapun [40] reported that Grade 9 students in Kunming, a city in southwestern China, had an overall positive perception of their classroom environment. One possible explanation for these inconsistent results is the geographical location of the studies. Many of the previous studies were conducted in less developed regions of China, such as West and South China, where educational resources are often scarce, and students may face greater academic pressures due to limited educational facilities. For this current study, which was conducted in a city in the developed province in Northeast China, where students may benefit from higher educational standards and better learning facilities.

For the level of PWB, the findings of Chan *et al.* [41] align with the results of the current study, revealing a moderate to high level of well-being among 856 adolescents in Hong Kong. Besides, study by Luo and Mu [42] also reported moderate PWB among 610 high school students from southern region of China. These consistent findings across different regions highlight a common trend of moderate well-being among Chinese students, suggesting that while students are generally not at risk, their PWB is still far from optimal. In this study, students' CLE and PWB are not particularly low, but their moderate or moderate to high levels suggest that they still have room for improvement and should not be overlooked and certain factors may be impacting their outcomes.

### 5.2. The predictive role of CLE in PWB

The results reveal that among the dimensions of the CLE, involvement (β=0.354, p<.001), task orientation (β=0.319, p<.001), and student cohesiveness (β=0.174, p<.001) are significant positive predictors of PWB, whereas teacher support (β=-0.125, p=.028) is a significant negative predictor. SEM analysis indicates that while these four dimensions significantly contribute to the variance in PWB. In contrast, other dimensions, such as investigation, cooperation, and equity, are not statistically significant (p>.05).

#### 5.2.1. Positive predictors of PWB: task orientation, involvement and student cohesiveness

The results of SEM analysis identified three significant positive predictors of PWB among the adolescents in Northeast China, namely, involvement, task orientation and student cohesiveness. Our results align with SDT [16], [43], a strong task orientation appears to enhance students' sense of competence and achievement, which in turn positively influences their overall well-being. Active participation not only enhances involvement but also cultivates a deeper connection with the learning process, thereby contributing to improved emotional well-being. Furthermore, strong student cohesiveness fosters a supportive peer network that alleviates stress and bolsters resilience. These findings are consistent with prior studies emphasizing the pivotal role of a structured and interactive classroom environment in promoting PWB [7].

Past research efforts have consistently demonstrated a positive correlation between student engagement and greater satisfaction with the educational environment, as well as enhanced emotional health [44]. Our findings are also consistent with those of Zhang [45], who demonstrated that student engagement plays a key mediating role in the relationship between teacher support and PWB, highlighting how active academic involvement contributes positively to students' overall mental health. Additionally, task-oriented students are more inclined to systematically manage their academic responsibilities, cultivating personal fulfillment and stronger self-belief. Ramzan *et al.* [46] similarly identified a significant positive association

between task orientation and PWB among Pakistani adolescents, particularly in areas related to self-development and purpose. Moreover, student cohesiveness acts as a buffer against adverse experiences, such as academic stress and peer conflict. Yang *et al.* [47] reported that higher classroom cohesiveness was significantly associated with improved well-being among Chinese adolescents. When students feel they are part of a cohesive group, they are more likely to experience acceptance and emotional security, both of which contribute to their overall PWB [48].

The findings of this study highlight these connections, and Involvement became the most potent predictor of PWB when it yielded the highest beta coefficient (β=0.354). In other words, adolescents who actively engage in task-oriented and cohesive environments that emphasize mastery, personal growth, and skill acquisition are more inclined to cultivate a sense of confidence in relation to their well-being. This result supports SDT [15]. Fundamentally, PWB is predominantly influenced by the satisfaction of three core needs: autonomy, competence, and relatedness [43].

#### 5.2.2. Negative predictor of PWB: teacher support

This study found that teacher support had a significant negative effect on PWB (β=-0.125), which was both surprising and theoretically important. This unexpected finding underscores the complexity of teacher-student interactions and suggests that support from teachers may not always be perceived positively by students. While traditional research has generally linked teacher support to improved student outcomes, recent studies indicate that its effects may vary depending on specific contexts and individual differences.

A potential reason for this inconsistency could be the presence of other factors that might affect the relationship between teacher support and PWB. Brandseth *et al.* [49] have reported that although teacher support was positively correlated with students' sense of belonging, its impact on mental well-being varied. Their study suggested that teacher support might exert its effects through mediators such as autonomy support and perceptions of the classroom climate. When teacher support is perceived as overly directive or controlling, it can undermine students' sense of autonomy, ultimately diminishing their PWB [16]. According to self-determination theory, individuals achieve optimal PWB when autonomy, competence, and relatedness are in equilibrium [50]. If teacher support becomes excessively prescriptive, it may clash with students' intrinsic need for autonomy, leading to unintended negative consequences for their well-being. Moreover, the emotional authenticity of teacher support plays a key role in shaping its impact. This perspective is reinforced by Lavy and Naama-Ghanayim's study [51], which found that when teachers express genuine care, it enhances students' self-esteem and engagement. Conversely, if students perceive such support as merely obligatory or lacking genuine emotional investment, it can have the opposite effect, potentially contributing to psychological distress. Additionally, instructional styles, particularly the nature of teacher-student interactions, may further influence these outcomes. Zheng [52] underscored the importance of balancing supportive teacher engagement with respect for student independence. This finding suggests that when teacher support lacks emotional responsiveness or fails to foster student autonomy, it can generate unintended pressures, ultimately harming PWB.

In conclusion, our findings highlight a complicated interplay between teacher support and other teacher-related aspects in CLE. When support is experienced as overly controlling, it may conflict with students' intrinsic needs, thereby reducing PWB. Future investigations should further explore these dynamics—examining factors such as cultural context, instructional styles, and individual student motivation—to clarify under what conditions teacher support fosters versus hinders PWB.

#### 5.2.3. Roles of other dimensions: investigation, cooperation and equity

While involvement, task orientation and student cohesiveness emerged as the significant positive predictors and teacher support as the negative predictor of PWB in this study, other dimensions of CLE—investigation, cooperation and equity—collectively contribute to fostering PWB. These dimensions, although less statistically impactful individually, create a supportive and interactive environment that indirectly nurtures adolescents overall well-being. Such an environment may indirectly enhance students' overall well-being by fostering curiosity, collaboration, and a sense of fairness.

Investigation refers to the focus on inquiry skills and processes, and their application in problem solving and exploration [31], [32], [53]. While investigation supports the development of autonomy and competence by fostering curiosity and independent thinking [54], [55], its focus on cognitive engagement may not directly translate into emotional benefits for students [56]. Investigation is often more strongly associated with academic outcomes, for example, critical thinking skills and academic performance [55], than to PWB. This may account for its non-significant contribution to PWB in this study. While cooperation may not show statistical significance, it remains crucial in fostering student engagement and is consistent with social interdependence theory [57]. Collaborative learning fosters social interaction and teamwork, yet its limited impact on PWB may be due to the complexities of peer relationships. While cooperation can

strengthen social connections, it does not always lead to a positive emotional experience—especially when students feel pressured to conform or experience interpersonal conflict in a group setting [57]. The emotional benefits of cooperation may be more pronounced in individualistic societies, where students are encouraged to make personal connections for group work while maintaining their individuality [57]. In contrast, in collectivist cultures, where group harmony has long been deep-rooted in everyday life, cooperation may not provide additional emotional benefits as it is an expected part of the educational process [58]. Additionally, cooperative learning tends to have stronger effects on cognitive and social development than on emotional well-being [59].

Similarly, equity referring to how teachers treat students equally by fairly distributing praise, questions, and opportunities for inclusion in discussions [31], [32], [53], plays an indirect role in supporting PWB by promoting a sense of belonging and competence through perceived fairness and engagement [60]. However, its impact is not uniform across all cultural contexts. In societies that prioritize individualism, fairness in resource distribution is deeply tied to the principle of equity, highlighting personal autonomy and individual rights. When people in these cultures perceive unfair treatment, it can lead to emotional distress, diminished self-esteem, and even disengagement from academic settings [61], as fairness is closely connected to adolescents' sense of self-worth and overall well-being [16]. On the other hand, in cultures with higher collectivism, such as those found in East Asia, preserving social harmony often takes precedence over strictly enforcing equal distribution. Rather than viewing fairness through an individualistic lens, people in these societies see equity as something shaped by relationships, ensuring that social balance is upheld. For example, Chinese students may be more inclined to accept perceived inequalities if doing so contributes to maintaining group stability [62]. As a result, in collectivist cultures, the emphasis on preserving harmonious relationships may buffer students against the negative effects of perceived inequities, making equity a less central factor in shaping their well-being [63].

While investigation, cooperation and equity may not have a strong direct impact on PWB, they contribute to a learning environment that supports student well-being in other ways. Theoretical perspectives such as self-determination theory and social interdependence theory emphasize how these elements work together to shape students' experiences. To maximize well-being, educators should prioritize task-oriented learning, student involvement, and classroom cohesion while also simultaneously fostering autonomy-supportive teaching practices. When combined, these strategies create a positive educational atmosphere that nurtures students' confidence, motivation, and academic success.

### 5.3. Limitations and recommendations for future studies

Data for this study were derived solely from self-administered questionnaires, which may have led to biases, including social desirability effects and recall errors. In future studies, employing a mixed-method approach—incorporating classroom observations, teacher evaluations, and participant interviews—could yield more nuanced and comprehensive insights. Additionally, the use of a cross-sectional design limits the study's ability to determine causal relationships between the variables investigated. Future studies could benefit from implementing longitudinal or quasi-experimental designs to delineate causal pathways and track developmental changes over time. Given the study's cross-sectional nature and focus on a single latent construct CLE, no control variables were included in the final structural model. Although gender was initially considered as a potential confounding variable, preliminary regression analysis found no significant association with PWB, and thus it was excluded. This limitation may affect the generalizability of the findings across demographic subgroups, and future studies are encouraged to incorporate additional covariates such as socio-economic status, academic performance, and teacher characteristics. Furthermore, selecting participants from two high schools in a single city in Northeast China presents limitations in terms of generalizability. Given the disparities in educational resources across regions, one should be cautious when generalizing these findings to other contexts. To better evaluate the broader relevance of these results, future research should include more diverse and culturally heterogeneous populations across various educational and sociocultural settings.

### 5.4. Contributions and implications

This research contributes to the existing literature in several meaningful ways. First, it provides empirical evidence from high school students in Northeast China—a context that has received little attention in studies on CLE and PWB. This regional focus enriches the geographic and developmental scope of current understanding. Second, by employing the full seven-dimension WIHIC framework, the study offers a nuanced examination of the classroom environment's multifaceted influence on well-being, beyond the commonly studied dimensions such as peer relationships or engagement. Third, the discovery of a significant negative association between perceived teacher support and PWB introduces a novel and culturally sensitive insight, suggesting that support, if perceived as controlling or inauthentic, may hinder rather than help

adolescent well-being. These findings not only challenge prevailing assumptions but also underscore the importance of contextualized, student-centered pedagogical practices.

## 6. CONCLUSION

This study reveals the substantial predictive role of the CLE on the PWB of adolescents in Northeast China. While participants rated moderate overall levels of CLE and moderate-to-high levels of PWB, our research identified a clear trend: the more positive the learning environment, the higher students' well-being. In particular, three key factors stood out—task orientation, involvement, and student cohesiveness. When classrooms are well-structured, engaging, and foster a sense of belonging, students tend to thrive emotionally and psychologically. Conversely, the unexpected negative impact of teacher support on PWB emphasizes the complexity of teacher-student interactions and indicates that this aspect of the learning environment may require further investigation to fully understand its implications. Overall, this research emphasizes the critical role of optimizing classroom environments to support student development and well-being, thereby providing critical implications for educators and policymakers seeking to improve educational outcomes.

Although this study has highlighted the predictive role of CLE on adolescent PWB, future investigations are encouraged to adopt longitudinal designs to explore causality over time. Moreover, qualitative approaches (e.g., interviews or classroom observations) could uncover the nuanced mechanisms underlying teacher support and peer interactions. Inclusion of additional variables such as socio-economic status, academic achievement, or teacher characteristics would further enhance the model's robustness and generalizability.

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## AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
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## CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

## INFORMED CONSENT

Informed consent was secured from the parents of all participants, and consent for publication of anonymized data was granted by the participants.

## ETHICAL APPROVAL

The study adhered to all applicable national regulations and institutional guidelines, in line with the Declaration of Helsinki. Approval from the ethics committee of the first author's institution was secured prior to data collection.

## DATA AVAILABILITY

Data are available from the first author, [YM], on reasonable request.

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